*Cl* **FM** *SC* **FM** *P* **1** *L* **33** # 332

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

Likely that this draft will need to consider amendments 802.3da and 802.3dk, both of which are ahead of it in the process. Commenter's review of 802.3dk in working group ballot has noted some overlaps with this amendment.

*SuggestedRemedy*

Add 802.3da and 802.3dk to the list of amendments considered. Editors are encouraged to review the draft for consistency with 802.3dk especially.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Based on input from the 802.3 working group chair, the order of amendments will be as follows:
Amendment #10: IEEE P802.3da
Amendment #11: IEEE P802.3dk
Amendment #12: IEEE P802.3dj
Amendment #13: IEEE P802.3dg
Using the amendment numbers and order above...
Add 802.3da and 802.3dk to the amendment list on page 1 line 33.
Add 802.3da and 802.3dk to the amendment abstract list on page 13
Add 802.3da and 802.3dk to the amendment list on the cover page (page 1) and the amendment abstract list on page 13.
Add the amendment number (12) to the title on page 1 and page 51 and to the 802.3dj entry on page 13.
Implement with editorial license.

*Cl* **FM** *SC* **FM** *P* **12** *L* **54** # 284

Maguire, Valerie Copperopolis; aff'l w/ CME Consulting and Cisco

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

Missing information on the P802.3da amendment

*SuggestedRemedy*

Insert,
"IEEE Std 802.3daT-20xx
Amendment 1X-This amendment to IEEE Std 802.3-2022 specifies additions and appropriate modifications to enhance the 10 Mb/s shared-medium (multidrop) mode of the 10BASE-T1S Physical Layer in a new, multidrop-only physical layer specification (including reconciliation sublayers, management parameters, Ethernet support for time synchronization protocols, and optional power delivery to support multiple Powered Devices on the 10 Mb/s mixing segment)."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the resonse to comment #332.

*Cl* **FM** *SC* **FM** *P* **13** *L* **0** # 468

Slavick, Jeff Broadcom

*Comment Type* **ER** *Comment Status* **A** *(Common) (bucket)*

In the Introduction, the describtion of 802.3dj does not list out the annexes.

*SuggestedRemedy*

Change <annexes> to be Annex 174A through 186A

*Response* *Response Status* **C**

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

*Cl* **FM** *SC* **FM** *P* **13** *L* **1** # 722

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket)*

802.3dk is ahead of this project

*SuggestedRemedy*

Insert: IEEE Std 802.3dk-202x
This amendment includes changes to IEEE Std 802.3-2022 and adds Clause . This amendment adds Physical Layer specifications and management parameters for 100 Gb/s Ethernet optical interfaces for bidirectional operation over a single strand of single-mode fiber.
Make other changes as appropriate

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the resonse to comment #332.

*Cl* **FM** *SC* **FM** *P* **13** *L* **1** # 333

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

Likely that 802.3da and 802.3dk will publish before this amendment their abstracts should be included.

*SuggestedRemedy*

Consult with 802.3 leadership on likely amendment order, insert abstracts for 802.3da and 802.3dk from the latest drafts of those.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the resonse to comment #332.

*Cl* **00** *SC* **0** *P* **0** *L* **0** # 293

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

The PICS subclause in many clauses and annexes is incomplete.

*SuggestedRemedy*

Update PICS subclause in all clauses and annexes as necessary.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **00** *SC* **0** *P* **373** *L* **43** # 615

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The KR specification should use 92.5 ohm impedance for all ERL measurements

*SuggestedRemedy*

add line in Table 178-14 to specify 92.5 ohm impedance

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

---

*Cl* **1** *SC* **1.1.3.2** *P* **52** *L* **21** # 469

Slavick, Jeff — Broadcom

*Comment Type* **E** *Comment Status* **R** *(Common) (bucket)*

Do we need to actually list the number of widths? It's a laundry list just introduce it as a list.

*SuggestedRemedy*

Change "Four widths" to "The following widths" on pg52 line 21 and line 40
Change "Two widths" to "The following widths" on pg53 line 6
Change "four widths" to "the following widths" on pg55 line 31
Change "four widths" to "the following widths" on pg56 line 19
Change "two widths" to "the following widths" on pg57 line 43

*Response* *Response Status* **C**

REJECT.
In principle, stating the number of widths is not necessary. However, it is not incorrect and it does clarify how many width variants to expect. The proposed change does not improve the clarity or accuracy of the draft.

---

*Cl* **1** *SC* **1.3** *P* **53** *L* **49** # 434

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **A** *non) (bucket) MDI references*

Several items in the normative references list include a specific Draft number. Some of these drafts are no longer available, and in some cases the version number does not match the date indicated (which suggests that a newer draft was intended).

For SFF documents, only the most recent draft (typically with version number x.y.z) is available; older drafts are removed.

Per the IEEE SA style manual (12.3.1 item c): "Draft standards: Unpublished drafts may be used as normative references as long as they are: (-) Dated (-) Readily available (-) Retrievable; A copy of ALL drafts shall be submitted to IEEE SA to be placed on file as an archive."

Thus, if we keep a dated draft, it should be archived in IEEE SA.

This comment pertains to the following references:

"SFF-8665, Rev 1.9.4, April 1, 2022" (QSFP+) - 1.9.4 is a draft that is no longer available. The current draft is 1.9.8. The published version, 1.9, is from 2015, apparently too old.

"SFF-TA-1011 Rev 1.1, April 19, 2024" (SFF cross reference) - revision number does not match the date; Rev 1.1 is from 2019-10-01 and is apparently too old to be referenced by this project. The current draft is 1.1.6.

"SFF-TA-1027, Rev 1.0, April 16, 2024" - (QSFP2 connector, cage, & module) - revision number does not match the date; Rev 1.0 is from 2023-05-30 and does not include QSFP224 as required for this project. The current draft is 1.0.6.

"QSFP-DD/QSFP-DD800/QSFP-DD1600 Hardware Specification for QSFP Double Density 8x Pluggable Transceivers, Rev 7.1, June 25, 2024.7" - this is indeed the current version, but it is a not a draft; there is no reason to refer to a specific version rather than the latest one.

"SFF-TA-1031, Rev 1.0, June 11, 2023, SFP2 Cage, Connector, & Module Specification" - this is indeed the current version (which does not include SFF224, subject of another comment) but it is not a draft; there is no reason to refer to a specific version rather than the latest one.

Since these are normative references that apply to multiple projects, including future ones, they should refer to documents that are available to readers in the future. Thus, we should use undated references where possible. Per the style manual (12.3.2), standards may be deted or undated; but drafts "shall be numbered and dated".

An editor's note may be used to indicate the current draft and as a reminder that "drafts shall be submitted to IEEE SA".

*SuggestedRemedy*

For each of the indicated references that is a draft, add an editor's note (to be removed before publication) indicating the revision number and date as of D2.1, and a reminder to update to the latest draft revision and date and provide a copy for the archive prior to publication.

Make similar changes as appropriate in the text that refers to these form factors in Annex 179C.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license using the versions provided in the comment.

---

*Cl* **1** *SC* **1.3** *P* **53** *L* **53** # 435

Ran, Adee Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *(withdrawn)*

Footnote 6 refers to OSFP1600, but OSFP is a normative reference not just for OSFP1600 but also for the original OSFP, which is used in the base standard (e.g. clause 136).

Similarly, Footnote 7 refers to QSFP-DD1600, but QSFP-DD is a normative reference for the base standard.

*SuggestedRemedy*

Delete "1600" in both footnotes.

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

REJECT.

This comment was WITHDRAWN by the commenter.

---

*Cl* **1** *SC* **1.3** *P* **53** *L* **54** # 145

Huber, Thomas Nokia

*Comment Type* **E** *Comment Status* **A** *non) (bucket) MDI references*

This footnote indicates where to find SFP-DD224, QSFP224, and QSFP-DD1600 specifications, but the normative reference associated with this footnote is "QSFP-DD/QSFPDD-800/QSFP-DD1600 Hardware Specification for QSFP Double Density 8x Pluggable Transceivers", which makes no mention of SFP224 or QSFP224, and following the URL in the footnote does not take the reader to a site with documents that have information about SFP-DD224 or QSFP224 formats (nor does the normatively referenced document have that information).

*SuggestedRemedy*

Align the footnote with the referenced document by replacing "SFP-DD224, QSP224" with "QSFP-DD, QSFP-DD800"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The comment identifies incorrect references to the MDI connector types defined in Annex 179C. The suggested remedy introduces new MDI connector types (QSFP-DD and QSFP-DD800) that are not explicitly reqiured for this document. The footnote should be updated to capture the MDI connector types necessary for this document and that are included in the appropriate reference material.
Resolve using response for Comment #436.

---

*Cl* **1** *SC* **1.3** *P* **53** *L* **54** # 436

Ran, Adee Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *ion) (bucket) MDI References*

QSFP-DD MSA specification is not the reference for SFP-DD224 (which does not exist yet) and QSFP224 (which is an SFF specification).

*SuggestedRemedy*

Delete "SFP-DD224, QSFP224, and"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **1** *SC* **1.4.92g** *P* **54** *L* **40** # 581

Nicholl, Shawn AMD

*Comment Type* **ER** *Comment Status* **A** *(Common) (bucket)*

Currently, the definitions of 1.6TBASE-DR8-2, 200GBASE-DR1-2, 400GBASE-DR2-2, 800GBASE-DR4-2 incorrectly point to Clause 181. They should point to Clause 182.

*SuggestedRemedy*

1.4.92g 1.6TBASE-DR8-2: IEEE 802.3 Physical Layer ... least 2 km. (See IEEE Std 802.3, Clause 182.)
1.4.104a 200GBASE-DR1-2: IEEE 802.3 Physical Layer ... least 2 km. (See IEEE Std 802.3, Clause 182.)
1.4.134c 400GBASE-DR2-2: IEEE 802.3 Physical Layer ... least 2 km. (See IEEE Std 802.3, Clause 182.)
1.4.184ca 800GBASE-DR4-2: IEEE 802.3 Physical Layer ... least 2 km. (See IEEE Std 802.3, Clause 182.)

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **1** *SC* **1.4.92i** *P* **54** *L* **46** # 580

Nicholl, Shawn AMD

*Comment Type* **ER** *Comment Status* **A** *(Common) (bucket)*

Current text: "... using the physical coding sublayer defined in Clause 175 for 1.6 Tb/s operation. (See IEEE Std 802.3, Clause 174.)"

Propose pointing to the correct Clause number.

*SuggestedRemedy*

Proposed text: "... using the physical coding sublayer defined in Clause 175 for 1.6 Tb/s operation. (See IEEE Std 802.3, Clause 175.)"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **1** *SC* **1.5** *P* **58** *L* **28** # 545

Schreiner, Stephan Rosenberger Hochfrequenztechnik GmbH & Co. KG

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

RLdc and RLcd are mentioned in the abbreviations. Howerver ILdc and ILcd are not mentioned. TCL / LCL and TCTL / LCTL would be also a typical name for the conversion parameters

*SuggestedRemedy*

Add ILdc and ILcd into the abbreviations or change "RLdc, RLcd, ILdc, and ILcd" into "TCL, LCL, TCTL, and LCTL" within the document

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add the following abbreviations:
ILcd differential-mode to common-mode insertion loss
ILdc common-mode to differential-mode insertion loss

*Cl* **30** *SC* **30.3.2.1.2** *P* **61** *L* **11** # 146

Huber, Thomas Nokia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

There is no longer an 800GBASE-ER1 PCS; ER1 and ER1-20 PHYs use the 800GBASE-R PCS.

*SuggestedRemedy*

Delete the instruction and text to insert 800GBASE-ER1 after 400GBASE-R

*Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.3.2.1.2** *P* **61** *L* **16** # 470

Slavick, Jeff Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

Clause 186 is not a PCS anymore. So it's just a 800GBASE-R PHY now.

*SuggestedRemedy*

Remove the text associated with 800GBASE-ER1 from 30.3.2.1.2 and 30.3.2.1.3

*Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.3.2.1.3** *P* **61** *L* **31** # 147

Huber, Thomas Nokia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

There is no longer an 800GBASE-ER1 PCS; ER1 and ER1-20 PHYs use the 800GBASE-R PCS.

*SuggestedRemedy*

Delete the instruction and text to insert 800GBASE-ER1 after 400GBASE-R

*Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.5.1.1.2** *P* **62** *L* **27** # 148

Huber, Thomas Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

200GBASE-DR1-2 should be inserted before 200GBASE-DR4 and after 200GBASE-DR1 rather than after 200GBASE-ER4

*SuggestedRemedy*

Delete the editing istruction that is related to the insertion of 200GBASE-DR1-2. Modify the previous editing instruction to say "Insert the following new entries. before the esntry for 200GBASE-DR4, and remove the space so 200GBASE-DR1 and 200GBASE-DR1-2 are both inserted by the same instruction.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.5.1.1.2** *P* **62** *L* **30** # 3

Marris, Arthur Cadence Design Systems

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The desription of 200GBASE-DR1-2 should include mention of the inner FEC requirement to distinquish it from the 200GBASE-DR1 description

*SuggestedRemedy*

Change "200GBASE-R PCS/PMA over single-mode fiber PMD" to "200GBASE-R PCS/PMA with type 200GBASE-R Inner FEC"

Make similar changes to 400GBASE-DR2-2, 800GBASE-DR4-2,and 1.6TBASE-DR8-2)

Change "800GBASE-R PCS/PMA over single-mode fiber PMD" to "800GBASE-R PCS/PMA with type 800GBASE-LR1 Inner FEC over single-mode fiber PMD"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy except:

Change "200GBASE-R PCS/PMA over single-mode fiber PMD" to "200GBASE-R PCS/PMA with type 200GBASE-R Inner FEC over single-mode fiber PMD"

Implement with editorial license.

*Cl* **30** *SC* **30.5.1.1.2** *P* **63** *L* **36** # 149

Huber, Thomas Nokia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

There is no longer an 800GBASE-ER1 PCS; the ER1 and ER-20 PHYs use the 800GBASE-R PCS. However they do have a unique PMA from other 800GBASE-R PHYs.

*SuggestedRemedy*

Change the description of 800GBASE-ER1 and 800GBASE-ER1-20 so they begin with "800GBASE-R PCS and 800GBASE-ER1 PMA over single-mode fiber PMD with a reach."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.5.1.1.2** *P* **63** *L* **47** # 150

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

An instruction to insert before 800GBASE-KR8 is the same thing as an instruction to insert after 800GBASE-DR8-2, since they are currently adjacent to each other (and no other task force is adding 800G PHYs). This instruction can be combined with the previous one.

*SuggestedRemedy*

Delete the editing instruction "Insert the following new entry intro the "APPRROPRIATE SYNTAX" section of 30.5.1.1.2 before the entry for 800GBASE-KR8 (inserted by IEEE Std 802.3df-2024)", and remove the space so that the text for 800GBASE-KR4 is part of the prior instruction.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **30** *SC* **30.13.1.1** *P* **65** *L* **16** # 151

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The same mgmt registers/attributes are used for ER1 FEC as are used for Inner FEC, but the text here doesn't mention ER1 FEC.

*SuggestedRemedy*

Change "If a Clause 45 MDIO Interface to PMA/PMD, Inner Fec, WIS, ."
to
"If a Clause 45 MDIO Interface to PMA/PMD, Inner FEC or ER1 FEC, WIS, ."

Change the second bullet from "For Inner FEC:." to "For Inner FEC or ER1 FEC:."

Make the same changes to 30.13.1.2 through 30.13.1.12

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **45** *SC* **45.2.1** *P* **71** *L* **48** # 152

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The TimeSync Inner FEC transmit and receive registers are also used for ER1 FEC.

*SuggestedRemedy*

Change "Time Sync inner FEC ." to "TimeSync inner FEC or ER1 FEC.."

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **45** *SC* **45.2.1** *P* **72** *L* **27** # 153

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

Registers 1.2412 through 1.2423 are used for ER1 FEC as well as Inner FEC.

*SuggestedRemedy*

Change the "Inner FEC ." to "Inner FEC or ER1 FEC ." for each set of registers in the range.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **45** *SC* **45.2.1.6** *P* **74** *L* **20** # 725

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

as amended by IEEE Std 802.3df-2024

*SuggestedRemedy*

as amended by IEEE Std 802.3df-2024 and IEEE Std 802.3dk-202x
Show the changes to these bits made by P802.3dj
Similarly in other tables

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The response to comment #332 confirms that 802.3dk is assumed to precede 802.3dj.
Implement the suggested remedy with editorial license.

---

*Cl* **45** *SC* **45.2.1.6** *P* **74** *L* **41** # 726

Dawe, Piers — Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

So that the reviewers can confirm that the new material is inserted in the correct place, in the correct style, and without using a bit that's already taken

*SuggestedRemedy*

Please show the sub-rows below and above, each time.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add to the bottom of the description unchanged row:
1 0 0 0 0 1 0 1 = 800GBASE-DR8-2 PMA/PMD

*Cl* **45** *SC* **45.2.1.10** *P* **77** *L* **32** # 154

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The text of table 45-14 (not currently included in the document) should be updated to refer to the newly added additional extended ability registers for 200G and 400G PHYs

*SuggestedRemedy*

Bring in clause 45.2.1.10 and Table 45-14. Update description for a one value for bit 1.11.13 from:
"1 = PMA/PMD has 200G/400G extended abilities listed in register 1.23 or register 1.24"
to:
"1 = PMA/PMD has 200G/400G extended abilities listed in register 1.23 (200G) or registers 1.24 and 1.75 (400G)"

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **45** *SC* **45.2.1.23** *P* **79** *L* **24** # 155

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The description for bit 1.25.1 should also identify the abilities in register 1.74.

*SuggestedRemedy*

Change ".. and has the abilities listed in register 1.73" to ". and has the abilities listed in registers 1.73 and 1.74"

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **45** *SC* **45.2.1.23** *P* **79** *L* **35** # 156

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The editing instruction to insert 45.2.1.23.aa should note that 45.2.1.23.a was inserted by 802.3df-2024

*SuggestedRemedy*

Change to say "Insert 45.2.1.23.aa before 45.2.1.23.a (as inserted by IEEE Std 802.3df-2024) as follows:"

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **45** *SC* **45.2.1.60c** *P* **82** *L* **4** # 5

Marris, Arthur — Cadence Design Systems

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Typo, missing "2"

*SuggestedRemedy*

Change "45.2.1.60c 800G PMA/PMD extended ability register (Register 1.74)" to "45.2.1.60c 800G PMA/PMD extended ability 2 register (Register 1.74)"

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **45** *SC* **45.2.1.60c.1** *P* **82** *L* **21** # 582

Nicholl, Shawn — AMD

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

Currently, 45.2.1.60c.1 contains the information for 1.74.0 register while 45.2.1.60c.2 contains the information for 1.74.1 register.

The MDIO register definitions sections are typically ordered from bit <n> to bit 0.

*SuggestedRemedy*

Propose the following text:

45.2.1.60c.1 should contain the information for 1.74.1 register. 45.2.1.60c.2 should contain the information for 1.74.0 register.

In other words, it should read as follows:

45.2.1.60c.1 800GBASE-ER1 ability (1.74.1)

When read as a one, bit 1.74.1 indicates ... as a 800GBASE-ER1 PMA/PMD type. When read as a zero, bit 1.74.1 indicates ... as a 800GBASE-ER1 PMA/PMD type.

45.2.1.60c.2 800GBASE-ER1-20 ability (1.74.0)

When read as a one, bit 1.74.0 indicates ... as a 800GBASE-ER1-20 PMA/PMD type. When read as a zero, bit 1.74.0 ... as a 800GBASE-ER1-20 PMA/PMD type.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Reorder 45.2.1.60c.1 and 45.2.1.60c.2 so that bit 1 is the first and bit 0 the second subclause, as suggested with editorial license.

*Cl* **45** *SC* **45.2.1.60e.3** *P* **84** *L* **16** # 157

Huber, Thomas — Nokia

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

This subclauses concerns 1.6TBASE-DR8, but the text refers to 1.6TBASE-DR2.

*SuggestedRemedy*

Change both instances of "1.6TBASE-DR2" in the text to "1.6TBASE-DR8".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.168a** *P* **95** *L* **6** # 4

Marris, Arthur — Cadence Design Systems

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Typo "PRBS" should be "PRBS31"

*SuggestedRemedy*

Change "The assignment of bits in the PRBS seed value lane 0 register" to "The assignment of bits in the PMA/PMD PRBS31 seed value lane 0 register"
Also change "The assignment of bits in the PMA/PMD training pattern lanes 1 through 7 registers" to "The assignment of bits in the PMA/PMD PRBS31 seed value lanes 1 through 7 registers" on lines 6 and 7 of page 95

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.168b** *P* **96** *L* **3** # 6

Marris, Arthur — Cadence Design Systems

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Typo, missing word "interface"

*SuggestedRemedy*

Change "The assignment of bits in the PMA/PMD training status register" to "The assignment of bits in the PMA/PMD interface training status register"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.168c** *P* **96** *L* **46** # 554

Nicholl, Shawn — AMD

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

In the first row of Table 45-133c the Bit(s) column contains 1.1476.15:9 text.

*SuggestedRemedy*

Propose 1.1477.15:9 in the first row of Table 45-133c in the Bit(s) column.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.168d** *P* **97** *L* **13** # 555

Nicholl, Shawn — AMD

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Currently, in the 1.1478.13 row, the Description column contains some incorrect text that is carried over from another table.

1 = PCS lane synchronization is complete. This bit indicates that all_locked_mux is true and deskewed
0 = local_rx_ready or remote_rx_ready is false on any lane of the interface

*SuggestedRemedy*

Propose the following text:

1 = PCS lane synchronization is complete. This bit indicates that all_locked_mux is true and deskew is complete.
0 = PCS lane synchronization is not complete.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.175** *P* **97** *L* **44** # 158

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The 'inner FEC' TimeSync registers are also used for ER1 FEC

*SuggestedRemedy*

Change "... PMA/PMD and inner FEC." to "...PMA/PMD, inner FEC, and ER1 FEC."

In table 45-139, change "inner FEC" to "inner FEC or ER1 FEC" in the Name and Description columns of rows 1.1800.7 through 1.1800.4

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.177a** *P* **99** *L* **5** # 159

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The 'inner FEC' TimeSync registers are also used for ER1 FEC

*SuggestedRemedy*

Change the title to "TimeSync FEC sublayer transmit path delay (Registers 1.1813 through 1.1818)"

Add a new first sentence to the first paragraph: "The TimeSync FEC sublayer transmit path data delay registers are used with Inner FEC sublayers and the ER1 FEC sublayer."

Change the rest of the existing text and table to replace 'inner FEC' with 'FEC sublayer'.

Make similar changes to 45.2.1.177b.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.216** *P* **101** *L* **24** # 557

Nicholl, Shawn — AMD

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Missing a note that this Table 45-180 was amended in 802.3ck-2022.

Missing a new section after the table that describes the new field that is added to the table in P802.3dj.

*SuggestedRemedy*

Proposed text: "Change Table 45-180 (as amended by IEEE Std 802.3ck-2022) as follows:"

Also propose to add new section:

Insert 45.2.1.216aa before 45.2.1.216.a as follows:

45.2.1.216.aa IFEC degraded SER enable (1.2200.4)

Bit 1.2200.4 enables the IFEC decoder to indicate the presence of a degraded SER when the ability is supported. When set to a one, this variable enables degraded SER detection. When set to a zero, degraded SER detection is disabled. Writes to this bit are ignored and reads return a zero if the IFEC does not have the ability to signal the presence of a degraded SER.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.216** *P* **101** *L* **33** # 556

Nicholl, Shawn — AMD

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Missing a space in Table 45-180, row 1.2200.4 description column.

Current text: "1 =IFEC decoder"

*SuggestedRemedy*

Proposed text: "1 = IFEC decoder"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.217.6a** *P* **103** *L* **3** # 558

Nicholl, Shawn — AMD

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

802.3-2022 Clause 152 defines the Inverse RS-FEC sublayer for 100GBASE-R, 100GBASE-P, and 100GBASE-Z PHYs. Sub-Clause "152.6 Inverse RS-FEC MDIO function mapping" contains many references to IFEC. "Table 152-2 -- MDIO/Inverse RS-FEC status variable mapping" contains references to 1.2201 register.

P802.3dj Sub-Clause "186.7 Management variables" also contains references to IFEC. "Table 186-8 -- 800GBASE-ER1 FEC status variables and MDIO mapping" contains references to 1.2201 register.

Since there are (at least) two IFEC receivers (i.e. one that is described in Clause 152 and one that is describe in Clause 186), it would help the reader to enhance the description found in "45.2.1.217.6a IFEC received local degraded (1.2201.5)" to clarify that this field pertains only to the Clause 186 IFEC. Same comment for "45.2.1.217.6b IFEC received remote degraded (1.2201.4)".

*SuggestedRemedy*

Proposed text (for 45.2.1.217.6a): "Bit 1.2201.5 is set to one when the 800GBASE-ER1 IFEC receiver detects the value ... consecutive 800GBASE-ER1 FEC frames. Bit 1.2201.5 is set to zero ..."

Note that in the above text, besides adding "800GBASE-ER1", it is also necessary to correct the typo 1.2201.4 (current text) to 1.2201.5 (proposed text).

Proposed text (for 45.2.1.217.6b): "Bit 1.2201.4 is set to one when the 800GBASE-ER1 IFEC receiver detects the value ... consecutive 800GBASE-ER1 FEC frames. Bit 1.2201.4 is set to zero ..."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.222** *P* **104** *L* **8** # 559

Nicholl, Shawn AMD

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

With the inclusion of lanes up to lane 31, the legacy text no longer reads smoothly in the P802.3dj draft.

Current text: "FEC lane 1, lower 16 bits are shown in register 1.2212; FEC lane 1, upper 16 bits are shown in register 1.2213; FEC lane 2, lower 16 bits are shown in register 1.2214; through register 1.2217 for FEC lane 3, upper 16 bits; and so on."

*SuggestedRemedy*

Current text: "FEC lane 1, lower 16 bits are shown in register 1.2212; FEC lane 1, upper 16 bits are shown in register 1.2213; FEC lane 2, lower 16 bits are shown in register 1.2214; FEC lane 2, upper 16 bits are shown in register 1.2215; etc."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.258** *P* **109** *L* **3** # 7

Marris, Arthur Cadence Design Systems

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Correct table name

*SuggestedRemedy*

Change "Table 45-212g-PMA/PMD status 1 register bit definitions" to "Table 45-212g-Inner FEC status 1 register bit definitions"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.258** *P* **109** *L* **22** # 560

Nicholl, Shawn AMD

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Sub-Clause "177.5.5 Inner FEC decode" defines Inner_FEC_corrected_cw_counter, Inner_FEC_uncorrected_cw_counter, Inner_FEC_total_bits_counter, and Inner_FEC_corrected_bits_counter. "Table 177-8 -- Inner FEC status variables and MDIO mapping" also uses these terms.

Currently, the description column of "Table 45-212h -- Inner FEC corrected codewords counter bit definitions" contains FEC_corrected_cw_counter. And the Name column contains "FEC corrected codewords". It is inconsistent with Sub-Clause 177 as it is missing the word "Inner" in both columns.

The same issue exists in "Table 45-212i -- Inner FEC uncorrected codewords counter bit definitions", "Table 45-212j -- Inner FEC total bits register bit definitions", and "Table 45-212k -- Inner FEC corrected bits register bit definitions".

*SuggestedRemedy*

Propose updating the description column of "Table 45-212h -- Inner FEC corrected codewords counter bit definitions" to Inner_FEC_corrected_cw_counter and the Name column to "Inner FEC corrected codewords".

Propose similar updates in "Table 45-212i -- Inner FEC uncorrected codewords counter bit definitions", "Table 45-212j -- Inner FEC total bits register bit definitions", and "Table 45-212k -- Inner FEC corrected bits register bit definitions".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.262** *P* **111** *L* **12** # 561

Nicholl, Shawn AMD

*Comment Type* **T** *Comment Status* **A** *(Logic) FEC bin counters*

Several previous sublayers contains FEC_corrected_cw_counter, FEC_uncorrected_cw_counter, FEC_cw_counter, FEC_codeword_error_bin_i (1 <= i <= 15).

802.3df-2024 172.3.5 FEC_cw_counter defines a 48-bit counter that counts once for each FEC codeword received ... is mapped to registers defined in 45.2.3.48a (3.300 to 3.302).

802.3df-2024 172.3.6 FEC_codeword_error_bin_i defines FEC_codeword_error_bin_i, where i=1 to 15, ... mapped to registers defined in 45.2.3.48b (3.340 to 3.369).

802.3ck-2022 161.6.21 FEC_cw_counter defines a 48-bit counter that counts once for each FEC codeword received ... is mapped to the registers defined in 45.2.1.120a (1.207 to 1.209).

802.3ck-2022 161.6.17 FEC_codeword_error_bin_i defines FEC_codeword_error_bin_i, where i=1 to 15, ... mapped to the registers defined in 45.2.1.131a (1.340 to 1.369).

P802.3dj draft contains "Table 45-212l -- Inner FEC codeword error bin register definitions" which includes inner_FEC_codeword_error_bin_0 (i.e. codewords with no bit errors). At the same time, there is no FEC_cw_counter that count once for each Inner FEC codeword received.

It would be better to be consistent with the definition of FEC statistics found in other 802.3 Clauses

*SuggestedRemedy*

Propose adding a new 48-bit register FEC_cw_counter that counts once for each Inner FEC codeword received.

Propose deleting the inner_FEC_codeword_error_bin_0 register, since it becomes redundant if FEC_cw_counter is defined.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

It was previously decided to add RS FEC counters to clause 119 and clause 175 in the the same format as previously defined RS FEC counters in clauses 161 and 172 without a bin_0 counter. The bin_0 value can be dervied from (total_cw - corrected_cw - uncorrected_cw).

The new bin_0 counter (inner_FEC_codeword_error_bin_0) was defined in the current draft for all new Inner FEC clauses and the PMA test block counters as a convience for the user. Therefore, inner_FEC_codeword_error_bin_0 should not be deleted.

The Inner FEC clauses 177 and 184 currently define these counters on a per lane basis:
Inner_FEC_corrected_cw_counter
Inner_FEC_uncorrected_cw_counter
Inner_FEC_total_bits_counter
Inner_FEC_corrected_bits_counter
Inner_FEC_codeword_error_bin_k

Adding a total number of codewords ( "Inner_FEC_cw_counter") to the new Inner FEC counters would be a useful addition.

In Clause 45, 177, and 184:
Add "Inner_FEC_cw_counter" to report the total number of Inner FEC codewords received (on a per lanes basis in Clause 177). Implement with editorial license.

*Cl* **45** *SC* **45.2.1.262** *P* **111** *L* **12** # 562

Nicholl, Shawn AMD

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Currently, the description column of "Table 45-212l -- Inner FEC codeword error bin register definitions" contains inner_FEC_codeword_error_bin_0 through inner_FEC_codeword_error_bin_4, while "Table 177-8 -- Inner FEC status variables and MDIO mapping" contains Inner_FEC_codeword_error_bin_k. In other words, the first letter is capitalized in one case, but not in the other case.

*SuggestedRemedy*

Propose updating the description column of "Table 45-212l -- Inner FEC codeword error bin register definitions" to contain Inner_FEC_codeword_error_bin_0 through Inner_FEC_codeword_error_bin_4 to enhance searchability of the document.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
When referring to the Inner FEC sublayer the "I" in "Inner" should be capitalized.
Capitalize the word "Inner" in the entries in the description column, that is change "inner" to "Inner".

*Cl* **45** *SC* **45.2.1.264** *P* **111** *L* **49** # 723

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **R** *(Logic) (bucket)*

PMAL - not defined, and somehow unmemorable. If it were to be kept, it would need to be added to the abbreviations list, but PMA lane / PMAL is used so much less often than PCS lane / PCSL that it's not worth coining an abbreviation for it.

*SuggestedRemedy*

Change PMAL to PMA lane, throughout the draft

*Response* *Response Status* **C**

REJECT.
The term PMAL is defined in 176.1.3 and used extensively throughout the 802.3dj standard.

[Editor's note: changed subclause from 45.2.1.26 to 45.2.1.264]

*Cl* **45** *SC* **45.2.1.264** *P* **112** *L* **5** # 295

Brown, Matt Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket) possesive*

Use of possesive grammar is inconsistent with similar phrases used through this draft and is unecessary here.

*SuggestedRemedy*

Change "Lane 0's" to "Lane 0"
Change "Lane 1's" to "Lane 1"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.1.269** *P* **115** *L* **45** # 10

Marris, Arthur Cadence Design Systems

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Change "lower" to "bottom" to match Annex 178B nomenclature

*SuggestedRemedy*

Change "lower AUI" to "bottom AUI" in two places

*Response* *Response Status* **C**

ACCEPT.

*Cl* **45** *SC* **45.2.3.1** *P* **116** *L* **37** # 724

Dawe, Piers Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Editor's note (to be removed after first working group ballot): doesn't respect SA balloters

*SuggestedRemedy*

Change to: Editor's note (to be removed after first SA ballot):
11 times

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change to: Editor's note (to be removed after first Standards Association ballot): 11 times

*Cl* **45** *SC* **45.2.3.2** *P* **117** *L* **43** # 445

Ran, Adee Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Common) AN timeout*

The timeout for link_fail_inhibit_timer, minimum 60 seconds, creates an unacceptably long minimum time to retry AN.

A proposal to enable faster restart of AN was presented in https://www.ieee802.org/3/dj/public/25_05/ran_3dj_02a_2505.pdf.

The changes proposed to clause 45 appear on slide 7 of ran_3dj_02a_2505.

*SuggestedRemedy*

Implement the changes to clause 45 per slide 7 of ran_3dj_02a_2505, with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the 802.3dj task force at the May Interim meeting:
https://www.ieee802.org/3/dj/public/25_05/ran_3dj_02a_2505.pdf

Implement the suggested remedy with editorial license, except use slide 8 instead of slide 7.

[Editor's note: CC 73, 119, 172, 175]

*Cl* **45** *SC* **45.2.3.8** *P* **119** *L* **23** # 160

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Per the style guide, when inserting new subclauses before the first existing subclause, the nomenclature is 'X.Y.Z.a' rather than 'X.Y.Za"

*SuggestedRemedy*

Change the editing instruction to say "Insert 45.2.3.8.a and 45.2.3.8.b before 45.2.3.8.1"

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **69** *SC* **69.1.2** *P* **128** *L* **50** # 471

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket)*

Changes to 69.1.2 are missing.

*SuggestedRemedy*

Amend Figure 69-5 from 802.3df to add on 1.6T the same stack as 800G.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **69** *SC* **69.2.1** *P* **128** *L* **50** # 472

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket)*

Changes to 69.2.1 are missing.

*SuggestedRemedy*

Amend 69.2.1 to add in the Clause 170 RS and 1.6TMII to the list of MIIs. This clause was amended in 802.3.df.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **69** *SC* **69.2.3** *P* **128** *L* **50** # 473

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket)*

Changes to 69.2.3 are missing.

*SuggestedRemedy*

Need new paragraph talking about the new PHYs. Add this paragraph after the one 11th paragraph that was amended by 802.3df.
"Backplane Ethernet also specifies 200GBASE-KR1, 400GBASE-KR2, 800GBASE-KR4, and 1.6TBASE-KR8. The 200GBASE-KR1 embodiment employs the PCS defined in Clause 119, the PMA defined in Clause 176, and the PMD defined in Clause 178, and specifies 200 Gb/s operation using 4-level PAM over one differential paths in each direction. The 400GBASE-KR2 embodiment employs the PCS defined in Clause 119, the PMA defined in Clause 176, and the PMD defined in Clause 178, and specifies 400 Gb/s operation using 4-level PAM over two differential paths in each direction. The 800GBASE-KR4 embodiment employs the PCS defined in Clause 172, the PMA defined in Clause 176, and the PMD defined in Clause 178, and specifies 800 Gb/s operation using 4-level PAM over four differential paths in each direction. The 1.6TBASE-KR8 embodiment employs the PCS defined in Clause 175, the PMA defined in Clause 176, and the PMD defined in Clause 178, and specifies 1.6 Tb/s operation using 4-level PAM over eight differential paths in each direction."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **69** *SC* **69.2.3** *P* **128** *L* **50** # 474

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket)*

Changes to 69.2.3 are missing.

*SuggestedRemedy*

Add reference to Table 174-3 to the last paragraph of 69.2.3 as ameded by 802.3df.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **69** *SC* **69.4** *P* **128** *L* **50** # 475

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket)*

The delay constrain references are missing.

*SuggestedRemedy*

Add the following 69.3 in the appropriate locations:

For 200GBASE-KR1, normative delay specifications may be found in 117.1.4, 119.5, 176.8, and 178.6, and also referenced in 80.4.

For 400GBASE-KR2, normative delay specifications may be found in 117.1.4, 119.5, 176.8, and 178.6, and also referenced in 80.4.

For 800GBASE-KR4, normative delay specifications may be found in 170.1.4, 172.5, 176.8, and 178.6, and also referenced in 169.4.

For 1.6TBASE-KR4, normative delay specifications may be found in 170.1.4, 175.5, 176.8, and 178.6, and also referenced in 174.4.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **69** *SC* **69.5** *P* **128** *L* **50** # 476

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket)*

Add dj clauses to the list of clauses the PICS cover. It appears we insert only the "FEC" and "PMD" Clauses in this list.

*SuggestedRemedy*

Insert in the list of Clauses in the first paragraph of 69.5 as amended by 802.3df: "Clause 175, Clause 178,"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **73** *SC* **73.4.1** *P* **129** *L* **26** # 56

Jones, Chad — Cisco Systems, Inc.

*Comment Type* **E** *Comment Status* **R** *(Logic) (bucket)*

Use of "may".

*SuggestedRemedy*

replace "may be" with "are".

*Response* *Response Status* **C**

REJECT.
The comment does not provide justification for the suggested remedy.

The IEEE SA standards style manual states "The word may is used to indicate a course of action permissible within the limits of the standard (may equals is permitted to)".

The use of the word "may" in the text referred to in 73.4.1 "Multiple technologies may be advertised by the Auto-Negotiation process simultaneously" is appropriate because it is indicating that it is permitted to advertise multiple technologies simultaneously.

*Cl* **73** *SC* **73.4.1** *P* **129** *L* **31** # 439

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

"but will not transmit an ability it does not possess"

"will" is not suitable - it is a requirement, not a statement of fact.

"advertise" is typically used for abilities, and is preferable over "send" here.

*SuggestedRemedy*

Change to "but it shall not advertise an ability it does not possess".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Draft 2.0 deletes the following text in 73.6.2.4: "Multiple technologies may be advertised in the link codeword. A device shall support the data service ability for a technology it advertises. It is the responsibility of the Arbitration function to determine the common mode of operation shared by a link partner and to resolve multiple common modes."

The first and third sentences of the deleted text were moved to "73.4.1 Technology ability" however the second sentence was not moved into 73.4.1 because of the existing "but will not transmit an ability it does not possess" legacy text in 73.4.1.

Becasue the deleted sentence contains the word "shall" it is apropriate to change "will" to "shall" as indicated in the suggested remedy.

Implement suggested remedy and update PICS item LE8 in 73.11.4.3 to point to 73.4.1.

Implement with editorial license and update other Clause PICS subclause references if necessary.

*Cl* **73** *SC* **73.4.2** *P* **130** *L* **13** # 161

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

"An Auto-Negotiation able device shall recognize." is awkward wording.

*SuggestedRemedy*

Change to "A device capable of Auto-Negotiation shall recognize."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **73** *SC* **73.4.2** *P* **130** *L* **15** # 296

Brown, Matt — Alphawave Semi

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

Use of possesive grammar is inconsistent with similar phrases used through this draft and is unecessary here.

*SuggestedRemedy*

Change "link partner's" to "link partner"
Also on page 131 line 51

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Reduce the usage of possessive where it can be avoided, with editorial license.

*Cl* **73** *SC* **73.4.3** *P* **130** *L* **27** # 538

Levin, Itamar — Altera corp.

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

20msec are allocated for the signals at the MDI to conform to all of the PHY specifications when the PHY is connected to the MDI through the "Transmit Switch function". The clause is not clear about the event that starts this time period.

*SuggestedRemedy*

State in line 27 "When a PHY is connected to the MDI through the Transmit Switch function, the signals at the MDI shall
conform to all of the PHY specifications within 20 ms of the AN-GOOD_CHECK state entry.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The relevant state name is "AN_GOOD_CHECK".
Implement suggested remedy with editorial license.

*Cl* **73** *SC* **73.5.1** *P* **131** *L* **9** # 455

He, Xiang — Huawei

*Comment Type* **TR** *Comment Status* **R** *(Electrical)*

Max transmit differential peak-to-peak output voltage for DME should be the same for all rates for compatibility reasons.

*SuggestedRemedy*

Remove case 2.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **73** *SC* **73.6.2.4** *P* **134** *L* **1** # 477

Slavick, Jeff — Broadcom

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The table is showing up on the next page which is fine, but the next section begins first and table inserts itself in the middle of list.

*SuggestedRemedy*

Can you force the table to occur before the next sub-section?

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **73** *SC* **73.6.2.5** *P* **133** *L* **50** # 440

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

"FEC capability (F4, F2, F3, F0, F1) is encoded in bits D43:D47"
three of these bits encode requests, rather than capabilities.

*SuggestedRemedy*

Change to "FEC capability and request bits (F4, F2, F3, F0, F1) are encoded in bits D43:D47"

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **73** *SC* **73.8** *P* **140** *L* **6** # 727

Dawe, Piers — Nvidia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Cramped table title

*SuggestedRemedy*

Make its box full width

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **73** *SC* **73.10.2** *P* **142** *L* **13** # 444

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Common) AN timeout*

The timeout for link_fail_inhibit_timer, minimum 60 seconds, creates an unacceptably long minimum time to retry AN.

A proposal to enable faster restart of AN was presented in https://www.ieee802.org/3/dj/public/25_05/ran_3dj_02a_2505.pdf.

The changes proposed to clause 73 appear on slide 7 of ran_3dj_02a_2505.

*SuggestedRemedy*

Bring in subclause 73.9.1.1 from the base standard and implement the changes to clause 73 per slide 7 of ran_3dj_02a_2505, with editorial license.
(Affected subclauses: 73.9.1.1 and 73.10.2, Table 73-7)

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the 802.3dj task force at the May Interim meeting:
https://www.ieee802.org/3/dj/public/25_05/ran_3dj_02a_2505.pdf

Implement the suggested remedy with editorial license, except use slide 8 instead of slide 7.

[Editor's note: CC 45, 119, 172, 175]

*Cl* **73A** *SC* **73A.1a** *P* **657** *L* **6** # 42

Lusted, Kent — Synopsys

*Comment Type* **TR** *Comment Status* **A** *(Common) AN host types*

There are now three CR host loss classes for 200 Gb/s per lane PHYs: HL, HN, HH. For interoperability, a host needs to know the host loss class of the partner to determine if the two host end points can support the inserted cable assemble. The local CR host knows apriori of its host class. The local host also can access the cable assemble class via management means such as CMIS contents inside the plug end. However, the partner's host class remains elusive.

Contribution planned for July session.

*SuggestedRemedy*

Define two new bits in the Extended FEC and Technology Ability Message code link codeword in location D42:43 as "CR Host Class for 200 Gb/s per lane PHYs". Abbreviated EH0:1

D42 D43 Class
0 0 Host Nominal HN
0 1 Host Loss HL
1 0 Host High HH
1 1 Reserved

change the second paragraphs as follows:
"Extended Technology Ability bits EA0:EA27 map to bits D16:D41 (U0:U25), CR Host Class for 200 Gb/s per lane PHYS D42:D43 (U26:U27) and Extended FEC capability bits EF0:EF3 map to bits D44:D47 (U28:31). Reserved fields are sent as zero and ignored on receive."

Update Table 73A-1a appropriately.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In support of this comment, the following contribution was presented to the "Joint logic/optical/electrical ad hoc" on the 26th June:
https://www.ieee802.org/3/dj/public/adhoc/optics/0625_OPTX/lusted_3dj_adhoc_01a_250626.pdf

The following related contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/lusted_3dj_02_2507.pdf

Implement the changes outlined on slides 7 and 8 of lusted_3dj_02_2507.

Specify that it is optional to set the value of the bits to a value other than "00".

Implement with editorial license.

*Cl* **116** *SC* **116.1.4** *P* **148** *L* **1** # 232

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **R** *n) ILT PHY tables (bucket2p)*

ILT is mandatory for 200G/lane PHYs and AUIs. 178B appears in the tables in the 200G/lane PMD clauses as Required. As such, it should appear in the tables in the introduction as well.

*SuggestedRemedy*

Update Table 116-3 to show that 178B is conditionally required (based on whether 200G AUIs are used), 116-3aa so show that 178B is mandatory, 116-3a o show it as conditional, 116-3b to show it as mandatory, 116-4 to show it as conditional,116-4a to show it as mandatory, 116-5 to show it as conditional, and 116-5a to show it as mandatory. There may be older 200G and 400G PMD clauses that also need to be updated to indicate the optional use of the 200G/lane AUIs and conditional use of ILT

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **116** *SC* **116.1.4** *P* **148** *L* **6** # 728

Dawe, Piers — Nvidia

*Comment Type* **E** *Comment Status* **R** *(Common) (bucket)*

2 or 4 -> two or four

*SuggestedRemedy*

Change
PHY type and clause correlation (200GBASE copper with 2 or 4 lanes)
to
PHY type and clauses (200GBASE copper with two or four lanes)
and similarly for other tables

*Response* *Response Status* **C**

REJECT.
The style guide allows some flexibility especially allowing for consistency. The digits 2 and 4 are used here to be consistent with the title of Figure 116-5 which includes "16" that would not be stated in words: "Table 116-5-PHY type and clause correlation (400GBASE optical with 4, 8, or 16 lanes)"

*Cl* **116** *SC* **116.1.4** *P* **148** *L* **10** # 729

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **R** *(Common) (bucket2p)*

There must be a BM PMA below any SM PMA

*SuggestedRemedy*

Move 176 and 176C to between 119 and 120. Also in 116-3a 4 and 5.

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

REJECT.

*Cl* **116** *SC* **116.1.4** *P* **148** *L* **26** # 730

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **R** *(Common) (bucket)*

I don't see why the SM PMA is shown as conditional. It might be needed if one wants a 200GAUI-1 C2C, but that's not to do with the PMD.

*SuggestedRemedy*

Change C to O and/or revise the footnote. Also in 116-3a 4 and 5.

*Response* *Response Status* **C**

REJECT.
The SM-PMA is never optional. It is mandatory given some conditions (e.g., there is a 200GAUI-1 C2C or C2M) and not required at all given other conditions (e.g., there is no 200GAUI-1 C2C or C2M).

*Cl* **116** *SC* **116.1.4** *P* **149** *L* **34** # 162

Huber, Thomas Nokia

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket2)*

The clause numbers in Table 116-3a are incorrect and the columns are not in the right order. Auto-Negotiation is clause 73 rather than 116, and should be the left-most column. (the text was correct in the table inserted by 802.3ck, so the errors were introduced here in 802.3dj)

*SuggestedRemedy*

Change 116 to 73, and swap the order of the first two columns so 73 comes first.

*Response* *Response Status* **C**

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

*Cl* **116** *SC* **116.2.9** *P* **155** *L* **35** # 731

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Common) (bucket2)*

If IS stands for inter-sublayer (116.3) and and ISL for inter-sublayer link (178B), this would be ISLT. However, the "IS_" in the primitives has outlived its usefulness and should be removed, and optical PHYs do not have what one would recognise as training, even if there is a start-up protocol that uses training frames.

*SuggestedRemedy*

Find a better name for this, such as ISS (inter-sublayer startup), or remove 178B.

*Response* *Response Status* **U**

REJECT.

The acronyms ISL and ILT were chosen based a great deal of task force discussion and compromise. However, recent discussions have indicated some concern with the clarity of the naming and descriptions. Further work on this is necessary.

ILT is a mandatory feature for many PMD types so removing Annex 178B would not be an appropriate way to resolve the concern expressed in the comment regarding naming.

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

*Cl* **116** *SC* **116.2.9** *P* **155** *L* **37** # 732

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Common) ILT terminology*

Un-introduced, undefined jargon: inter-sublayer link, network path, peer, DATA mode. Also I suspect that "transmitter states, receiver states" misuse "transmitter" "receiver".

*SuggestedRemedy*

Rewrite this, with appropraite references, or remove 178B. Similarly in e.g. 169.2.10, 174.2.12

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Indeed there are several terms used in the subclause that are defined only in Annex 178B or are not defined at all. Some clarification would be helpful here.
In the second paragraph references to transmitters, receivers, states, and modes are defined in the referenced Annex 178B. Comment #191 proposes a specific qualification to the term "DATA mode".

Change the first paragraph in 116.2.9 to the following:
"Inter-sublayer link training (ILT) facilitates the orderly start-up of an inter-sublayer link (ISL) and coordinates the start-up of a series of ISLs along a path. ILT, ISL, and path are defined in 178B.3 ."
Delete the second paragraph.
Update 169.2.10 and 174.2.12 in a similar way.
Implement with editorial license.

*Cl* **116** *SC* **116.2.9** *P* **155** *L* **42** # 163

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **A** *mon) DATA/TRAINING mode*

While it is clear what "DATA mode" is intended to mean here in the context of ILT, that term has specific meaning for 1000BASE-T PHYs that differs from what is intended here (see 1.4.278) Annex 178B.5 indicates that in the context of ILT, "data mode" means the variable tx_mode has the value 'data', which is associated with being in the PATH_UP state per figure 178B-8. As such, it would be more clear if the text in 116.2.9 referred to the PATH_UP state.

*SuggestedRemedy*

Change "coordinate the transition to DATA mode." to "coordinate the transition to the PATH_UP state (see Figure 178B-8)."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #732.

*Cl* **116** *SC* **116.2.9** *P* **155** *L* **44** # 733

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **A** *ɔmmon) ILT description types*

is supported by - yuk

*SuggestedRemedy*

These PHY types include an ILT sublayer:
Also in 169.2.10 and 174.2.12.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Note that ILT is not a sublayer, but rather it is a function within a PMD or AUI component.
Resolve using the response to comment #53.

*Cl* **116** *SC* **116.2.9** *P* **155** *L* **45** # 164

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **A** *ɔmmon) ILT description types*

ILT is supported by any PHY that uses a 200GAUI-1 or 400GAUI-2. What's listed here are PMDs that support ILT.

*SuggestedRemedy*

If the intent is to list the PMDs that support ILT, change 'PHY' to 'PMD'. If the intent was to indicate PHYs that can support ILT, replace the sentence that introduces the dashed list with "ILT is supported by any 200GBASE-R PHY that uses a 200GAUI-1. any 400GBASE-R PHY that uses a 400GAUI-2, or any PHY that uses one of the following PMD types:"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #53.

*Cl* **116** *SC* **116.2.9** *P* **155** *L* **155** # 53

D'Ambrosia, John — Futurewei, U.S. Subsidiary of Huawei

*Comment Type* **TR** *Comment Status* **A** *ɔmmon) ILT description types*

This subclause mistakenly notes ILT for PHY types solely based on what the PMD can do. A PHY may also support ILT if using 200Gb/s based AUIs or the physical layer can support ILT if an extender based on a 200 Gb/s AUI is used.
The same is also true for 169.2.10, and 174.2.12

*SuggestedRemedy*

Implement language on Page 6 of https://www.ieee802.org/3/dj/public/adhoc/electrical/25_0605/dambrosia_3dj_elec_02_250605.pdf with editorial license for each of the subclauses noted.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The suggested remedy appears to point to the wrong contribution. The correct URL is: https://www.ieee802.org/3/dj/public/adhoc/electrical/25_0605/dambrosia_3dj_elec_01_250605.pdf

Slide 3 of dambrosia_3dj_elec_01_250605 proposes text relating to inclusion of ILT in the form:
Physical layer implementations support ILT if any of the following is included:
PMDs: <list of PMD types>
AUIs: <list of AUI types>

However, ILT is a function within a PMD or AUI component. Referencing it in terms of the entire Physical Layer implementation may imply more than intended. It is sufficient to merely guide readers in right direction.

Instead use the form:
ILT is used by the following PMD and AUI types:
<list of PMD types and AUI types>

Change the ILT/PHY support statements in 116.2.9 third paragraph, 169.2.10 second paragraph, and 174.2.12 second paragraph to the form shown above including the PMD and AUI types listed in slide 3 of dambrosia_3dj_elec_01_250605.

Implement with editorial license.

*Cl* **116** *SC* **116.3.2** *P* **156** *L* **14** # 671

Dawe, Piers — Nvidia

*Comment Type* **T** *Comment Status* **R** *(Common) (bucket2)*

Now that we are used to these generic primitives, the IS_ is redundant

*SuggestedRemedy*

Remove it, so that we have e.g. PMA:UNITDATA_i.request. This may need a maintenance request.

*Response* *Response Status* **C**

REJECT.
The "IS_" prefix on these primitives is consistent with multiple generations of PHY types. Within this project it is not possible to change this for 200G, 400G, or 800G Ethernet. Making changes for 1.6T would make the naming inconsistent and would therefore cause more problems than it solves.

*Cl* **116** *SC* **116.3.2** *P* **156** *L* **48** # 8

Marris, Arthur — Cadence Design Systems

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

Strikethrough and underlining not correct on line 48

*SuggestedRemedy*

Correct underlining and strike throughs to indicate change from "in Figure 116-2 and Figure 116-3," to "in Figure 116-2 through Figure 116-3a". That is strikethrough "and Figure 116-3" and underline "through Figure 116-3a"

*Response* *Response Status* **C**

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

*Cl* **116** *SC* **116.3.2** *P* **157** *L* **6** # 672

Dawe, Piers — Nvidia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

Primitives for other instances, of inter-sublayer interfaces, are

*SuggestedRemedy*

Too many commas

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Remove both commas using appropriate editorial mark-up.
Implement with editorial license.

*Cl* **116** *SC* **116.3.3.3.1** *P* **161** *L* **4** # 165

Huber, Thomas Nokia

*Comment Type* **ER** *Comment Status* **A** *(bucket) ILT service interface*

The text regarding the values of the SIGNAL_OK parameter is not sufficiently clear in a number of aspects. As the first paragraph states, IN_PROGRESS and READY are only supported if ILT is supported. The paragraphs about the OK and FAIL values refer to "if the service interface supports the values IN_PROGRESS and READY", which is needlessly complex wording; the condition is more succinctly expresed as "if ILT is supported", rather than if the states that ILT uses are supported. Further, since the meanings of OK and FAIL are different depending on whether ILT is used, instead of saying 'here are four values of SIGNAL_OK', and embedding in those definitions the details of whether ILT is used or not, it would be more clear to say 'SIGNAL_OK has these values if ILT is used, and these values if ILT is not used'.

*SuggestedRemedy*

Replace the second through fifth paragraphs with this text (text spills beyond the bottom of the cell):
If ILT is not used:
A value of OK indicates that communication with the next lower sublayer is established (but does not guarantee that valid data is being presented to the next higher sublayer).
A value of FAIL indicates that the sublayer has not established commuication to the next lower sublayer, and data is not being presented to the next higher sublayer (the rx_symbol parameters are undefined).
If ILT is used:
A value of OK indicates that valid data is being presented by the sublayer to the next higher sublayer in the rx_symbol parameters.
A value of READY indicates that commuication is established with the next lower sublayer, but communication with the peer interface is not fully established yet. The rx_symbol parameters presented to the next higher sublayer do not respresent traffic data and might be invalid. Management intervention is not required.
A value of IN_PROGRESS indicates that the sublayer is establishing communication with the next lower subalyer. Data is not being presented by the sublayer to the next higher sublayer (the rx_symbol parameters are unspecified). Management intervention.is not required.
A value of FAIL indicates that an attempt to communicate with the next lower sublayer has failed. Data is not being presented to the next higher sublayer (rx_symbol parameters are unspecified)

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.

Note that this comment is proposing to rearrange the text so that it is easier to parse. The proposed changes are an improvement to the clarity of the draft.

Some of the details, such as the context of ILT, might be affected by resolution of other D2.0 comments.

Implement the suggested remedy with editorial license with consideration of other related comments.

*Cl* **116** *SC* **116.3.3.3.1** *P* **161** *L* **16** # 673

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket2)*

communication *with* ... lower sublayer

*SuggestedRemedy*

I think this means from, not with. Needs clarification.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

For the cases where ILT is supported by the sublayer(s), the value OK indicates that two-way communication with the other sublayer is established. Thus "with" is appropriate.

Note that the resolved comment #165 separates the definitions for the case where a sublayer participates in ILT and a sublayer does not participate in ILT, which will result in improved clarity for the referenced text.

While implementing the resolution to comment #165, clarify the wording cited in this comment (#673), as appropriate.

*Cl* **116** *SC* **116.5** *P* **167** *L* **32** # 456

Slavick, Jeff Broadcom

*Comment Type* **ER** *Comment Status* **A** *(Common) (bucket)*

Footnote D is new but not underlined. The new references in the Notes sections are appropriately underlined.

*SuggestedRemedy*

Underline footenote d and its references in Table 116-8

*Response* *Response Status* **C**

ACCEPT.

*Cl* **116** *SC* **116.5** *P* **167** *L* **32** # 457

Slavick, Jeff — Broadcom

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

The laundry list of PMA types that do odd lane skew is more clear if it's a comma separated list instead of using multiple "or" options.

*SuggestedRemedy*

Change "by the 200GBASE-R 1:8 or 8:1 PMA or 400GBASE-R 2:16 or 16:2 PMA if the PHY includes any of these PMA types."
To: "by the 200GBASE-R 1:8 PMA, 200GBASE-R 8:1 PMA, 400GBASE-R 2:16 PMA and 400GBASE-R 16:2 PMA if the PHY includes any of these PMA types. "

*Response* *Response Status* **C**

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

*Cl* **116** *SC* **116.5** *P* **168** *L* **9** # 674

Dawe, Piers — Nvidia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

106.25 GBd PMD lane
In footnotes: at PMD lane signaling rate

*SuggestedRemedy*

106.25 GBd lane ... at lane signaling rate (3 times, presumably not for 113.4375 GBd).
Also in Table 169-6.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The comment is pointing out that the columns and related footnotes (113.4375 GBd excepted) are relevant to AUI lanes as well as PMD lanes, so it should refer generically to "lanes".
Implement the suggested remedy with editorial license.
[Editor's note: CC: 116, 169]

*Cl* **119** *SC* **119.2.1** *P* **174** *L* **9** # 675

Dawe, Piers — Nvidia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

data-units

*SuggestedRemedy*

data units

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

It is noted that in the published draft in the context of the service interface, some clauses use "data units" whereas other clauses use "data-units". Clause 119 uses "data-units".

In the second sentence of 119.2.1 change "data units" to "data-units" to be consistent with the first sentence in 119.2.1, and with the rest of subclause 119.2.1 in the published draft.

*Cl* **119** *SC* **119.2.4.1** *P* **174** *L* **27** # 339

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **TR** *Comment Status* **A** *:S stateless encoder/decoder*

NOTE - this comment also applies to the same statement in 192.2.5.8 (for the decoder).
It seems that the existing text, which correctly describes the behavior being in the state diagram has been replaced by improper text which imputes that the state diagram BEHAVIOR specified in 802.3 is an IMPLEMENTATION.
"using the state-diagram encoder" and "using the alternative stateless encoder"- would specify an implementation, not a behavior. IEEE Std 802.3 specifies behaviors. Any implementation (including magic) that produces the same behavior is acceptable. I note this is a descriptive statement, not a shall. If you fix the language, you don't need all that "alternative stateless encoder" stuff, which I presume produces the same output. (see next comment on that). I can understand that it may be useful to also describe the behavior as a stateless encoding, but that behavior is without a requirement tying to it.
The "shall" - the requirement that this describes, appears to be in 119.2.6.3 (in the base standard, not modified), where it says "The PCS shall perform the functions of alignment marker lock, PCS synchronization, Transmit, and Receive as specified in the respective state diagrams." (Figures 119-14 and 119-15 are the Transmit and Receive state diagrams respectively).
The original text simply needs to be augmented with a pointer to the stateless descriptioin.
Also, if you do this, the alternative stateless encoder/decoder just becomes a description of the state diagram and there is no scope issue I can see that would limit the phy types.
The notion that the two are considered implementations is reflected in the PICS.

Note that the suggested remedy is written assuming the two specifications produce the same result. If they don't then there is an interoperability issue and the option and differences in the output of "stateless decoder" and the state diagram need to be described and fully specified.

Also note that hte same defect exists, uncaught in IEEE Std 802.3df. When this is properly addressed here, it will need to be addressed there in maintenance.

*SuggestedRemedy*

119.2.4.1
Reverse the strikeout of P174 L27 through 30.
Replace lines 31 through 50 ("The transmit PCS..." through the editor's note) with:
"The same encoding is described as a stateless encoder in 119.2.4.1.1." (note this is now 119.2.4.1.2 but will be 119.2.4.1.1 after these edits)
Delete 119.2.4.1.1 heading and contents
Change title of 119.2.4.1.2 (now 119.2.4.1.1) to Stateless encoder description

119.2.5.8
KEEP strikeout of P175 L36.
Move P176 L13&14 (body text of 119.2.5.8.1) to P175 L37,
Delete header 119.2.5.8.1.
Replace P175 L37 ("The receive PCS..." ) through P176 L6 (end of editor's note) with:
"The same decoding is described as a stateless decoder in 119.2.5.8.1" (note this is now 119.2.5.8.2 but after these edits will be xx.1)"
Change title of 119.2.5.8.2 (now 119.2.5.8.1) to Stateless decoder description.

119.7.4.1 (Page 180) Delete option "*SE" Uses stateless encoder row
Change TF2 to "Transmit 64B/65B complies with Figure 119-14", change subclause reference to 119.2.6.3, change Status to M
Delete TF3 row.
119.7.4.2 (page 181) Delete option "*SD" Uses stateless decoder row
Change row RF7 Feature to Complies with Figure 119-14, subclause reference to 119.2.6.3, change status to M
Delete RF8 row

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #669.

*Cl* **119** *SC* **119.2.4.1** *P* **174** *L* **32** # 676

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **A** *:S stateless encoder/decoder*

alternative stateless encoder - there is only one kind of stateless encoder, per speed, I hope, and it's called "stateless encoder"

*SuggestedRemedy*

Delete "alternative, here and in 119.2.5.8

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #669.

*Cl* **119** *SC* **119.2.4.1** *P* **174** *L* **32** # 584

Nicholl, Gary Cisco Systems

*Comment Type* **T** *Comment Status* **A** *:S stateless encoder/decoder*

Since the new stateless encoder is optional and fully backwards compatible / interoperable with the legacy state-diagram encoder there is no need to restrict it's use to the new PHY types being defined in 802.3dj. The stateless encoder should be allowed to be used for all 200GBASE-R and 400GBASE-R PHY types.

Same comment for the stateless decoder in 119.2.5.8.

*SuggestedRemedy*

Update the description in 119.2.4.1 and 119.2.5.8 to allow the stateless encoder and stateless decoder , respecively, to be used for all 200GBASE-R and 400GBASE-R PHY types.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #669.

*Cl* **119** *SC* **119.2.4.1** *P* **174** *L* **33** # 431

Ran, Adee Cisco Systems

*Comment Type* **T** *Comment Status* **A** *:S stateless encoder/decoder*

Limiting the stateless encoder/decoder to only new PHYs is not required for interoperability, since they are interoperable with the previously defined state-diagram functions.

Additionally, the additional wording makes interpreting the standard more cumbersome.

The stateless encoder and decoder are likely to be required in the already-defined PHYs for support of Ethernet metadata (expected new project) so at some point these non-inclusive lists will go away. Why not do it now.

*SuggestedRemedy*

Delete the list of PHYs in 119.2.4.1 and in 119.2.5.8, to enable the stateless functions to be used in all PHYs that use the Clause 119 PCSs.
Implement with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #669.

*Cl* **119** *SC* **119.2.4.1** *P* **174** *L* **52** # 67

Bruckman, Leon Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Missing dot

*SuggestedRemedy*

Add a dot at the end of the phrase (after "payload")

*Response* *Response Status* **C**

ACCEPT.

*Cl* **119** *SC* **119.2.4.1.2** *P* **174** *L* **17** # 331

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **ER** *Comment Status* **A** *:S stateless encoder/decoder*

The description here for the stateless decoder - presumably meant to add clarity to the state diagram - leads the reader on a wandering trip through several places in IEEE Std 802.3 and adds more confusion than clarity. It is not a requirement, because the state diagram is a requirement, so it should be written for clarity, if at all. Note it took a long time to wind through this description - much longer than it was worth.

119.2.4.1.2 leads to 119.2.6.2.2 seemingly for a very short description of tx_raw, which could have been stated directly. Then it sends you to Table 172-1 for the mapping itself (which is still in 802.3df, not 802.3-2022), which has little content except to point to the function "ENCODE" in 172.2.6.2.3, which itself points to 119.2.6.2.3, which then says "the ENCODE function shall encode the block as specified in 119.2.3.", which is 9 subsections describing the 64B/65B encoding, and itself mostly points to 82.2.3.x (various subsections). When you're done, it is difficult to see exactly where the stateless encoding/decoding map ends up. If the stateless description is to provide clarity, it is lost on me. It appears to be largely teh mapping in 82.2.3, which could be pointed to directly, and any changes described directly.

*SuggestedRemedy*

Change the text of 119.2.4.1.2 to read:
The stateless encoder generates 66-bit blocks based only on the current and preceding 200GMII/400GMII
transfers. Each 200GMII/400GMII transfer is mapped into a 72-bit vector tx_raw<71:0>, by placing TXC<0> thorough TXC<7> in tx_raw<0> through tx_raw<7>, respectively, and TXD<0> thorugh TXD<63> in tx_raw<8> through tx_raw<71>, respectively. The encoder uses the constants LBLOCK_T and EBLOCK_T and the variables reset, tx_raw, and tx_coded defined in 119.2.6.2.1. When reset is one, the encoder outputs the value of LBLOCK_T, and when an invalid block type is specified (see Table 172-1) it outputs EBLOCK_T. Otherwise the encoding follows 119.2.3, which uses the control codes and mappings specified in Table 82-1.

Similarly change text of 119.2.8.2 as above for the decoder.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #669.

*Cl* **119** *SC* **119.3.1** *P* **177** *L* **20** # 68

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Logic) FEC bin counters*

Bin counters are defined for 1 to 15 errors, no bin for 0 errors. In 45.2.1.264 the PMA test block error bin counters are defined for 0 to 15.

*SuggestedRemedy*

Define the FEC codeword error bin counters to be 0 to 15 errors

*Response* *Response Status* **C**

REJECT.
The existing PCS clauses 161 and 172 do not contain a FEC bin counter for 0 errors (bin_0). The FEC bin counters being added to clauses 119 and 175 follow the same approach (so that the FEC error reporting is consistent across all clauses using RS FEC). A FEC bin count for zero errors can be derived from the other counters as (total _cw - corrected_cw - uncorrected_cw).

*Cl* **119** *SC* **119.6** *P* **178** *L* **19** # 441

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Common) AN timeout*

The timeout for link_fail_inhibit_timer, minimum 60 seconds, creates an unacceptably long minimum time to retry AN.

A proposal to enable faster restart of AN was presented in https://www.ieee802.org/3/dj/public/25_05/ran_3dj_02a_2505.pdf.

The changes proposed to clause 119 appear on slides 5-6 of ran_3dj_02a_2505.

*SuggestedRemedy*

Implement the changes to clause 119 per slides 5-6 of ran_3dj_02a_2505, with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the 802.3dj task force at the May Interim meeting:
https://www.ieee802.org/3/dj/public/25_05/ran_3dj_02a_2505.pdf

Implement the suggested remedy with editorial license.

[Editor's note: CC 45, 73, 172, 175]

*Cl* **120** *SC* **120.1.4** *P* **184** *L* **11** # 677

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Logic) (bucket)*

Confusion between output and transmit side (possibly also in items 5 and 6)

*SuggestedRemedy*

Change " the signaling rate range for a ... PMA output" to " the signaling rate range in the transmit direction for a ... PMA"

*Response* *Response Status* **C**

REJECT.
For a PMA connected to an xAUI-n in the same "package" as the PCS, the PMA output can only be in the transmit direction. The text is correct as written.

*Cl* **120F** *SC* **120F.1** *P* **662** *L* **1** # 539

Levin, Itamar — Altera corp.

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucket)*

In light of the approved channel reach for C2C it may not be sufficient to content with optional TXEQ. There are different TX tuning mechanisms in C2C and C2M and also in the functional specifications (see 176C.3) which may cause confusion.

*SuggestedRemedy*

Align this sub-clause with annex 176C.3 functional specification

*Response* *Response Status* **C**

REJECT.
Annex 120F is for C2C at 100 Gb/s per lane and was added by 802.3ck-2022.
In 802.3ck, the 1.6TAUI-16 C2C maximum IL recommendation is 20 dB at 26.56 GHz (120F.4) and Tx equalization is included in the electrical specifications (120F.3.1.5).
This amendment adds a 16-lane interface, 1.6TAUI-16, but does not change any of the specifications other than the width.

*Cl* **120F** *SC* **120F.1** *P* **663** *L* **38** # 573

Nicholl, Shawn AMD

*Comment Type* **E** *Comment Status* **R** *(Electrical) (bucket)*

The legend for "Figure 120F-1 -- Example 100GAUI-1, 200GAUI-2, 400GAUI-4, 800GAUI-8, and 1.6TAUI-16 C2C relationship to the ISO/IEC Open System Interconnection (OSI) reference model and the IEEE 802.3 Ethernet model" is quite noisy (cluttered).

Readability could be enhanced with a more concise approach.

*SuggestedRemedy*

In the left-hand column of the legend, propose replacing "ATTACHMENT UNIT INTERFACE" with "AUI", replacing "MEDIA INDEPENDENT INTERFACE" with "MII", and replacing "PHYSICAL MEDIUM ATTACHMENT" with "PMA".

In the right-hand column of the legend propose adding "AUI = ATTACHMENT UNIT INTERFACE", adding "MII = MEDIA INDEPENDENT INTERFACE", adding "PMA = PHYSICAL MEDIUM ATTACHMENT".

There are other Figures throughout P802.3dj (especially in the Annexes) whose legend could be improved in a similar manner.

*Response* *Response Status* **C**

REJECT.
Figure 120F-1 exists in the base standard 802.3df and was only modified to add the new 1.6TAUI-16 C2C.
The suggested changes (in 120F and elsewhere in the draft) would make the figures different from numerous similar figures in existing clauses, would require significant editorial work and would not substantically improve the clarity of the figure.
Also, the suggested definitions for "AUI" and "MII" are inconsistent with existing defintions of these terms in 1.4.198 and 1.4.393, which are specific to 10 Mb/s and 100 Gb/s, respectively.

*Cl* **169** *SC* **169.1.3** *P* **186** *L* **10** # 678

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **R** *(Common) (bucket)*

800 Gb/s PHY using - they all are, it's in the text that introduces the table, and its title. This table is too long and wordy; it uses sentence construction rather than columns. At least make a start.

*SuggestedRemedy*

Change "800 Gb/s PHY using" to "Uses"

*Response* *Response Status* **C**

REJECT.
The reference text is a complete definition of a PHY type. A significant characteristic of the PHY type is that it supports 800 Gb/s data rate. The definition as written is consistent with many other definitions for previously defined PHY types of many different data rates.

*Cl* **169** *SC* **169.1.4** *P* **187** *L* **1** # 233

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **R** *ı) ILT PHY tables (bucket2p)*

ILT is mandatory for 200G/lane PHYs and AUIs. 178B appears in the tables in the 200G/lane PMD clauses as Required. As such, it should appear in the tables in the introduction as well.

*SuggestedRemedy*

Update table 169-2 to show 178B as mandatory for the KR4 and CR4 PHYs and conditional for the KR8/CR8. Update table 169-3 to show 178B as mandatory for xR4 (including FR4-500) and conditional for xR8. Update table 169-3a to include 178B as conditional for all PHYs. It may be necessary to also update the PMD clauses that were updated in 802.3df (for the 800GBASE-xR8 PHYs) to show the new AUIs as optional and ILT as conditional

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **169** *SC* **169.2.4a** *P* **189** *L* **47** # 679

Dawe, Piers Nvidia

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

*The* 800 Gb/s Attachment Unit Interface (800GAUI-n) ... . *The* 800GAUI-n is defined for chip-to-chip (C2C) and chip-to-module (C2M) implementations.
*The* 800GAUI-n C2C *is* specified in Annex 120F and Annex 176C.
*The* 800GAUI-n C2M *is* specified in Annex 120G and Annex 176D.

*SuggestedRemedy*

*An* 800 Gb/s Attachment Unit Interface (800GAUI-n) ... . 800GAUI-n is defined for chip-to-chip (C2C) and chip-to-module (C2M) implementations.
Two types of 800GAUI-n C2C are specified, in Annex 120F and Annex 176C.
Two types of 800GAUI-n C2M are

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change:
The 800 Gb/s Attachment Unit Interface (800GAUI-n) provides an electrical interface within an 800GBASE-R PHY or 800GMII Extender. The 800GAUI-n is defined for chip-to-chip (C2C) and chip-to- module (C2M) implementations.
To:
An 800 Gb/s Attachment Unit Interface (800GAUI-n) provides an electrical interface within an 800GBASE-R PHY or 800GMII Extender. 800GAUI-n are defined for chip-to-chip (C2C) and chip-to-module (C2M) implementations.

Change
"The 800GAUI-n C2C is specified in Annex 120F and Annex 176C.
The 800GAUI-n C2M is specified in Annex 120G and Annex 176D."
To:
"The 800GAUI-8 C2C is specified in Annex 120F.
The 80GAUI-8 C2M is specified in Annex 120G.
The 800GAUI-4 C2C is specified in Annex 176C.
The 800GAUI-4 C2M is specified in Annex 176D."

*Cl* **169** *SC* **169.2.4b** *P* **190** *L* **3** # 680

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **R** *(Common) (bucket)*

In the title: FEC sublayer -> plural, or spell them out

*SuggestedRemedy*

800GBASE-R Inner FEC, 800GBASE-LR1 Inner FEC and 800GBASE-ER1 FEC sublayers

*Response* *Response Status* **C**

REJECT.
The subclause defines a general category of FEC sublayers, similar to the way 169.2.4a defines a set of two 800GAUI-n types. It is clear when reading the content of the subclause that there are multiple types as listed in the suggested remedy.
The proposed change does not improve the clarity or accuracy of the draft.

*Cl* **169** *SC* **169.2.9** *P* **190** *L* **25** # 57

Jones, Chad Cisco Systems, Inc.

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

Use of "may".

*SuggestedRemedy*

change "may optionally support" to "optionally supports"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **169** *SC* **169.2.10** *P* **190** *L* **35** # 681

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Common) ILT terminology*

ILT jargon again.

*SuggestedRemedy*

See an earlier comment

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #732.

*Cl* **169** *SC* **169.2.10** *P* **190** *L* **41** # 166

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *mon) DATA/TRAINING mode*

While it is clear what "DATA mode" is intended to mean here in the context of ILT, that term has specific meaning for 1000BASE-T PHYs that differs from what is intended here (see 1.4.278) Annex 178B.5 indicates that in the context of ILT, "data mode" means the variable tx_mode has the value 'data', which is associated with being in the PATH_UP state per figure 178B-8. As such, it would be more clear if the text in 169.2.10 referred to the PATH_UP state.

*SuggestedRemedy*

Change "coordinate the transition to DATA mode." to "coordinate the transition to the PATH_UP state (see Figure 178B-8)."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #732.

*Cl* **169** *SC* **169.2.10** *P* **190** *L* **42** # 297

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *ɔmmon) ILT description types*

ILT is supported not just in the PHYs, but also in the xMII extenders and not limited to the PHY types listed here.

*SuggestedRemedy*

Change to:
A physical layer implementation supports ILT if any of the following are implemented: 800GBASE-KR4, 800GBASE-CR4, 800GBASE-DR4, 800GBASE-FR4-500, 800GBASE-DR4-2, 800GBASE-FR4, 800GBASE-LR4, 800GAUI-4 C2C, 800GAUI-4 C2M.
Update 116.2.9 and 174.2.12 similarly.
Implement with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #53.

*Cl* **169** *SC* **169.2.10** *P* **190** *L* **43** # 167

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *ɔmmon) ILT description types*

ILT is in principle supported by any 800GBASE-R PHY that uses a 200G/lane AUI. The dashed list here is the PMDs that can support ILT.

*SuggestedRemedy*

If the intent is to list the PMDs that support ILT, change 'PHY' to 'PMD'. If the intent was to indicate PHYs that can support ILT, replace the sentence that introduces the dashed list with "ILT is supported by any 800GBASE-R PHY that uses an 800GAUI-4 or one of the following PMD types:"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #53.

*Cl* **169** *SC* **169.2.10** *P* **190** *L* **52** # 546

Maki, Jeffery — Juniper Networks

*Comment Type* **TR** *Comment Status* **R** *ɪmon) ILT coherent (bucket2p)*

800GBASE-LR1, 800GBASE-ER1-20, and 800GBASE-ER1 are missing in the list. There is no reason to exclude coherent PHY types from using ILT. They will benefit from optical receiver adaption and thus ability to receive Ready To Send signaling for the bring up of the entire link (PHY) as is the case for IMDD PHY types.

*SuggestedRemedy*

Add 800GBASE-LR1, 800GBASE-ER1-20, and 800GBASE-ER1 (See additional comments that correct missing mandatory ILT support for these PHY types.)

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #418.

*Cl* **169** *SC* **169.3.2** *P* **191** *L* **17** # 563

Nicholl, Shawn — AMD

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket)*

Current text: "... between the Inner FEC or Segmented FEC, and the PMA, PCS ..."

This is the first (and only) mention of "Segmented FEC" in P802.3dj document.

*SuggestedRemedy*

Proposed text: "... between the Inner FEC or 800GBASE-ER1 FEC and the PMA, PCS ..."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to commet #168.

*Cl* **169** *SC* **169.3.2** *P* **191** *L* **17** # 168

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

While the ER1 FEC is an example of a segmented FEC, that term isn't being used elsewhere in the text, so probably better to call it the ER1 FEC here.

*SuggestedRemedy*

Change "Segmented FEC" to "ER1 FEC":

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Subclause 169.2.4b defines generically the FEC sublayer which is inclusive of all of these and perhaps others to be added in future amendments.
Change "Inner FEC or Segmented FEC" to "FEC sublayer (see 169.2.4b)".

---

*Cl* **169** *SC* **169.3.2** *P* **191** *L* **17** # 682

Dawe, Piers — Nvidia

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

missing commas: the PHY 800GXS above isn't called the PMA service interface

*SuggestedRemedy*

Insert comma

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolved comment #168 replaces "Inner FEC or Segmented FEC" with "FEC sublayer (see 169.2.4b)"

change:
for primitives issued on the interface between the Inner FEC or Segmented FEC, and the PMA, PCS, or PHY 800GXS above called the FEC service interface
to:
for primitives issued on the interface between the FEC sublayer (see 169.2.4b), and the PMA, PCS, or PHY 800GXS above, which is called the FEC service interface

Implement with editorial license.

---

*Cl* **169** *SC* **169.3.2** *P* **193** *L* **38** # 564

Nicholl, Shawn — AMD

*Comment Type* **T** *Comment Status* **R** *(Common) (bucket)*

There is no figure showing 800GBASE-R inter-sublayer service interfaces including 800GBASE-ER1 FEC.

*SuggestedRemedy*

After "Figure 169-2a-800GBASE-R inter-sublayer service interfaces including 800GBASE-R Inner FEC" add a new figure "800GBASE-R inter-sublayer service interfaces including 800GBASE-ER1 FEC".

*Response* *Response Status* **C**

REJECT.
The paragraph on page 191 line 26 points to Figure 187-2, which indeed includes the 800GBASE-ER1 FEC sublayer and the FEC service interface above.

---

*Cl* **169** *SC* **169.4** *P* **196** *L* **12** # 341

de Koos, Andras — Microchip Technology

*Comment Type* **T** *Comment Status* **R** *(Common) PLI Delay*

The main reason for specifying the max delay constraints is to accommodate PAUSE reach - given the delays in the near-end and far-end physical layers, and given the buffer depth on the near-end, there is a maximum length of medium that can be supported while guaranteeing no buffer overflow when using link PAUSE.
What are the max delays through the near-end and far-end physical layers? It is not at all clear.
Would the near-end buffer device be designed with some awareness of the near-end physical layer's composition? Maybe, maybe not.
There is never any awareness of the far-end physical layer's componsition. Crucially, the far end may or may not have an MII extender, which adds 2*800ns due to the extra PCSs (plus the delays through the extra PMA layers).
As written, the standard is not very helpful in figuring out the maximum possible delay through the entirety of the physical layer given the range of possible physical layer stacks.
To be fair, this deficiency has existed since MII-Extenders were introduced for 200G and 400G PHYs. Before MII extenders, the range of physical layer stacks were quite limited, so the delay error-bars due to an extra AUI+PMA, for example, were small.

Same comment can apply to 200Gb/s, 400Gb/s and 1.6Tb/s clauses.

*SuggestedRemedy*

Consider adding the values that an implementor needs, i.e. the worst-case delay (i.e. over ALL possible physical layer stacks) through the entire physical layer, per PMD type.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **169** *SC* **169.5** *P* **198** *L* **14** # 169

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

In Figures 169-4 and 169-5, it needs to be more clear that "Inner FEC" can also be the ER1 FEC.

*SuggestedRemedy*

Replace "Inner FEC" in both figures with "Inner FEC or ER1 FEC".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Neither sublayer stack in Figure 169-4 is representative of PHY types that include the FEC sublayer defined in Clause 184 or Clause 186.
The right-hand sublayer stack is quite specific to the Inner FEC defined in Clause 177 in that the PMA is n:4, whereas the PMA above the Clause 184 and Clause 186 FEC sublayers is n:32.
Update the figure to be inclusive of PHY types using the FEC sublayer defined in Clause 184 and Clause 186.

*Cl* **169** *SC* **169.5** *P* **199** *L* **1** # 565

Nicholl, Shawn — AMD

*Comment Type* **ER** *Comment Status* **A** *(Common) (bucket)*

Text above "Figure 169-5 -- 800GBASE-R Skew points for a PHY with two 800GAUI-n" contains a typo.

Current text: "Replace Figure 169-4 with the following figure:"

*SuggestedRemedy*

Proposed text: "Replace Figure 169-5 with the following figure:"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **169** *SC* **169.5** *P* **201** *L* **36** # 327

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

In Table 169-6, footnotes a and b are identical.

*SuggestedRemedy*

Merge footnote a and b into a single footnote.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Footnote a and b are indeed the same. However, footnote a is incorrect.
Change footnote a to the following:
"The symbol ~~ indicates approximate equivalent of maximum Skew Variation in bits based on 1 bit time equals 37.64706 ps at PCS lane bit rate of 26.5625 Gb/s."

*Cl* **169** *SC* **169.8** *P* **201** *L* **48** # 170

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

Subclause 169.8 (PICS summary) needs to be updated to refer to new PMD clauses added by 802.3dj.

*SuggestedRemedy*

Bring in clause 169.8

Add this editing instruction:
Change the first paragraph of subclause 169.8 (as added by IEEE Std 802.3df-2024) as follows

Copy in the first paragraph of the existing 169.8, and change "Clause 170 through Clause 173" to "Clause 170 through Clause 173 or Clause 176 through Clause 187:"

*Response* *Response Status* **C**

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

*Cl* **170** *SC* **170.1** *P* **202** *L* **12** # 683

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket2p)*

This clause defines the characteristics of the Reconciliation Sublayer (RS) ... *The* RS, characteristics

*SuggestedRemedy*

the behavior of the 800 Gb/s Reconciliation Sublayer (RS) for
800 Gb/s and 1.6 Tb/s

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the first sentence of 170.1
From:
"This clause defines the characteristics of the Reconciliation Sublayer (RS), and the 800 Gb/s Media Independent Interface (800GMII), and the 1.6 Tb/s Media Independent Interface (1.6TMII)."
To:
"This clause defines the characteristics of the Reconciliation Sublayers (RS) for 800 Gb/s and 1.6 Tb/s, the 800 Gb/s Media Independent Interface (800GMII), and the 1.6 Tb/s Media Independent Interface (1.6TMII)."

*Cl* **170** *SC* **170.4.3** *P* **207** *L* **7** # 684

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Logic) (bucket2p)*

There should be major options for MAC rate, as in 81.5.2.3 and 171.9.3

*SuggestedRemedy*

Split this item into two

*Response* *Response Status* **U**

REJECT.
The current approach in 170.4.3 (800GbE and 1.6TbE) is consistent with subclause 117.5.3 (200GbE and 400GbE). The comment points out that 81.5.2.3 also defines two major options for the different MAC rates (40GbE and 100GbE) in a slightly different format, but an updated format was used for Clause 117 which is now being carried forward for PICS in 170.4.3.

*Cl* **171** *SC* **171.1** *P* **211** *L* **24** # 566

Nicholl, Shawn AMD

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

In the legend for Figure 171-1 -- "800GXS and 1.6TXS relationship to the ISO/IEC Open System Interconnection (OSI) reference model and the IEEE 802.3 Ethernet model" several lines are wrapping onto a second line. It decreases readability.

Currently "1.6TAUI-n = 1.6 Tb/s n-LANE ATTACHMENT UNIT INTERFACE" is wrapping.
Currently "800GAUI-n = 800 Gb/s n-LANE ATTACHMENT UNIT INTERFACE" is wrapping.

*SuggestedRemedy*

Propose the following text:

Option1) Propose modifying the legend to move the second column (i.e. DTE, MAC, MDI, etc.) further to the right. That should allow space to avoid the text wrap. See "Figure 171-3a -- Example 1.6TBASE-R PMA layering with 1.6TXS" for an example of this solution.

Option2) Propose using the term AUI in the legend of the figure. The term AUI is already defined in Sub-Clause 1.4.198 "Attachment Unit Interface (AUI)" of 802.3-2022. In other words, for Figure 171-1, propose the legend say "1.6TAUI-n = 1.6 Tb/s n-LANE AUI" and "800GAUI-n = 800 Gb/s n-LANE ATTACHMENT UNIT INTERFACE". Optionally (if deemed necessary by the editors), add a new entry (above DTE) "AUI = ATTACHMENT UNIT INTERFACE" to the legend.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Rearrange appropriately to fix the text wrap.

*Cl* **171** *SC* **171.1a** *P* **212** *L* **14** # 685

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Common) MII FLR*

An 800GMII/1.6TMII Extender is expected to meet the frame loss ratio specifications in 174A.4": is partly out of scope

*SuggestedRemedy*

A 800GMII Extender using SM-PMAs or a 1.6TMII Extender is expected to meet the frame loss ratio specifications in 174A.4

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The constraint is necessary to ensure the FLR budget between a pair of MACs is met.
The specific FLR is inherently met with significant margin if the xAUI-n in the xMII extender are compliant the coresponding specifications.
However, it would be helpful to point this out.
Add an informative note in 171.1a as follows:
"Note--The 800GMII or 1.6TMII Extender inherently meets the expected frame loss ratio if the 800GAUI-n or 1.6TAUI-n are compliant."

Also, in 174A.3 to 174A.7, add a reference to the summary tables in 174A.12.

*Cl* **171** *SC* **171.3.3** *P* **216** *L* **2** # 686

Dawe, Piers Nvidia

*Comment Type* **T** *Comment Status* **R** *(Logic) (bucket2p)*

average data rate on the 800GMII - there are two 800GMIIs. Similarly in 171.3.3a

*SuggestedRemedy*

the average data rate across the 800GMII in the PHY 800GXS
Similarly in 171.3.3

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **171** *SC* **171.3.3a** *P* **216** *L* **25** # 687

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **R** *(Logic) (bucket)*

will is deprecated

*SuggestedRemedy*

Change will be to is - several places

*Response* *Response Status* **C**

REJECT.
The use of will in some contexts is deprecated as stated in the IEEE SA Style Manual: "The word will is deprecated and shall not be used when stating mandatory requirements; will is only used in statements of fact." The use of "will" in this case is appropriate as it is a statement of fact, not a requirement.

*Cl* **171** *SC* **171.9.5.1** *P* **231** *L* **47** # 688

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

For the PHY XS, this may be a misuse of "Transmit"

*SuggestedRemedy*

Use separate items for PHY XS and DTE XS

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.

For the table in 171.9.5.1 change the text in the feature column for PICS items TF1 and TF2 from "Transmit 64B/66B encoder .." to "64B/66B encoder .."

For the table in 171.9.5.2 change the text in the feature column for PICS items RF13 and RF14 from "Receive 64B/66B decoder .." to "64B/66B decoder .."

*Cl* **172** *SC* **172** *P* **236** *L* **0** # 240

Cox, Ian Broadcom

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The header on pages 236-243 reads P802.3df and not dj.

*SuggestedRemedy*

Change the header from 802.3df to 802.3dj

*Response* *Response Status* **C**

ACCEPT.

*Cl* **172** *SC* **172.2.5.2** *P* **242** *L* **9** # 171

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The text here was modified from "PMA service interface lanes" to "service interface lanes", since the sublayer below the PCS may be a FEC or a PMA. But just saying "service interface lanes" is not sufficiently clear that it is the service interface from the next lower layer.

*SuggestedRemedy*

Change the first sentence to read:
"The PCS lanes might be received in any order from the service interface below the PCS."

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **172** *SC* **172.2.5.2** *P* **242** *L* **18** # 432

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *:S stateless encoder/decoder*

As shown in https://www.ieee802.org/3/dj/public/25_05/ran_3dj_03a_2505.pdf, there is a potential for corrupted data reaching the PCS client after uncorrectable codeword is processed, due to error multiplication due to scrambler error multiplication that occurs separately in flow 0 and flow 1.

For the 800GBASE-R PCS, this can be addressed by adding a requirement that the Reed-Solomon decoder applies error extension, as described on slides 23 and 24 of ran_3dj_03a_2505.

Since this PCS is already defined, this comment may raise questions of scope. It is provided to facilitate discussion of the technical change separately from the scope of the project. If necessary, a maintenance request will be submitted in the future.

*SuggestedRemedy*

Bring 172.2.5.3 from 802.3df-2024 into this amendment, and add an exception to the list, that if an uncorrectable codeword is detected in any of the two flows, the 257b block following the uncorrectable codeword is replaced, after processing by the descrambler of that flow, by a block corresponding to 4 EBLOCK_R blocks (or 16 error characters). Implement with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #669.

---

*Cl* **172** *SC* **172.6** *P* **242** *L* **35** # 442

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Common) AN timeout*

The timeout for link_fail_inhibit_timer, minimum 60 seconds, creates an unacceptably long minimum time to retry AN.

A proposal to enable faster restart of AN was presented in https://www.ieee802.org/3/dj/public/25_05/ran_3dj_02a_2505.pdf.

The changes proposed to clause 172 appear on slides 5-6 of ran_3dj_02a_2505.

*SuggestedRemedy*

Implement the changes to clause 172 per slides 5-6 of ran_3dj_02a_2505, with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the 802.3dj task force at the May Interim meeting:
https://www.ieee802.org/3/dj/public/25_05/ran_3dj_02a_2505.pdf

Implement the suggested remedy with editorial license.

For CRG discussion.

---

*Cl* **172** *SC* **172.6** *P* **242** *L* **36** # 172

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **R** *(Logic) (bucket)*

The PMDs for which AN is mandatory are already explained in the tables in clause 169, so there is no need to repeat all of them here. At the same time, it is maybe useful to at least note that the requirements apply to CRn and KRn PMDs.

*SuggestedRemedy*

Replace "800GBASE-CR8, 800GBASE-CR4, 800GBASE-KR8, or 800GBASE-KR4 PMD" with "800GBASE-CRn or 800GBASE-KRn PMD"

*Response* *Response Status* **C**

REJECT.
The text is accurate as written and consistent with what was done in previous drafts and similar clauses (e.g. Clause 119). Changing CR8/CR4 to CRn , etc., does not improve the readability of the draft.

*Cl* **172** *SC* **172.7.4.7** *P* **243** *L* **17** # 173

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **R** *(Logic) (bucket)*

Easier to say CRn/KRn rather than enumerate all the CRn and KRn PMDs in the PICS

*SuggestedRemedy*

Replace "800GBASE-CR8, 800GBASE-CR4, 800GBASE-KR8, or 800GBASE-KR4 PMD" with "800GBASE-CRn or 800GBASE-KRn PMD"

*Response* *Response Status* **C**

REJECT.
The text is accurate as written and consistent with what has been done in previous drafts and similar clauses (e.g. Clause 119). Changing CR8/CR4 to CRn , etc., does not improve the readability of the draft.

---

*Cl* **173** *SC* **173.1.1** *P* **244** *L* **18** # 689

Dawe, Piers — Nvidia

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

forms

*SuggestedRemedy*

types

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 173.1.1, change the sentence on page 244 line 18
From: "This clause specifies forms of the Physical Medium Attachment (PMA) sublayer that uses bit-multiplexing for 800GBASE-R Physical Layer implementations."
To: "This clause specifies the Physical Medium Attachment (PMA) sublayer types that use bit-multiplexing for 800GBASE-R Physical Layer implementations."

In 120.1.1, change line 19 on page 183
From: "This clause specifies forms of the Physical Medium Attachment (PMA) sublayer that use bit-multiplexing for 200GBASE-R and 400GBASE-R Physical Layer implementations."
To: "This clause specifies the Physical Medium Attachment (PMA) sublayer types that use bit-multiplexing for 200GBASE-R and 400GBASE-R Physical Layer implementations."

---

*Cl* **173** *SC* **173.1.1a** *P* **244** *L* **35** # 690

Dawe, Piers — Nvidia

*Comment Type* **T** *Comment Status* **R** *(Logic) (bucket2)*

supports

*SuggestedRemedy*

connects to

*Response* *Response Status* **C**

REJECT.
The text referred to in the comment is consistent with text in 120.1.1 and is correct as written.

---

*Cl* **173** *SC* **173.1.1a** *P* **244** *L* **35** # 691

Dawe, Piers — Nvidia

*Comment Type* **T** *Comment Status* **R** *(Logic) (bucket)*

any ... in Table 169-2 *and* Table 169-3.

*SuggestedRemedy*

any ... in Table 169-2 *or* Table 169-3.

*Response* *Response Status* **C**

REJECT.

In this case "and" is accurate since the PMA supports any PMD that is listed in tables 169-2 and 169-3

---

*Cl* **173** *SC* **173.4.2** *P* **244** *L* **46** # 174

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

If a conversion from BM to SM PMA is needed, the 8:32 PMA could also connect to a 32:4 PMA (e.g., an 800GBASE-LR4 module that has an 800GAUI-8 host-side interface would need to do this since the optical interface requires the clause 177 inner FEC - so the stack would be 800GBASE-R PCS, 32:8 PMA, [800GAUI-8], 8:32 PMA, 32:4 PMA, 800GBASE-R Inner FEC, 800GBASE-LR4 PMD).

*SuggestedRemedy*

Add "32:4 SM-PMA, " after PHY 800GXS.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add "800GBASE-R 32:4 SM-PMA" to the list.
Implement with editorial license.

*Cl* **173** *SC* **173.4.2** *P* **245** *L* **36** # 175

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

Figure 173-3 is missing the possibility that a 32:4 PMA could be connected. Also, the explanatory notes b and c seem unnecessary. It should be quite obvious to any reader that 'inst' is PHY_XS when the sublayer below the PMA is a PHY 800GXS and FEC when it is a FEC sublayer (or PMA when it is a PMA).

*SuggestedRemedy*

At the bottom of the figure, just under the 32 output lanes and 32 input lanes, add "or 32:4 PMA" after PHY 800GXS, and in the explanation of "inst", add "or PMA" after PHY_XS. Delete notes b and c and the references to them in the explanation of 'inst'.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Update Fig 173-3 to add "800GBASE-R SM-PMA" to the list of sublayers below the PMA.
Update the footnotes below the figure as appropriate.
Implement with editorial license.

---

*Cl* **174** *SC* **174.1.4** *P* **248** *L* **1** # 234

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **R** *n) ILT PHY tables (bucket2p)*

ILT is mandatory for 200G/lane PHYs and AUIs. 178B appears in the tables in the PMD clauses as Required. As such, it should appear in the tables in the introduction as well.

*SuggestedRemedy*

Update tables 174-2 and 174-3 to include 178B as conditional for all PMDs

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

REJECT.

This comment was WITHDRAWN by the commenter.

---

*Cl* **174** *SC* **174.1.4** *P* **248** *L* **30** # 176

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

Table 174-3 is missing clause 73 Auto-Negotiation

*SuggestedRemedy*

Add a column for Clause 73 Auto-Negotiation and indicate it as Mandatory for both 1.6TBASE-KR8 and 1.6TBASE-CR8.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **174** *SC* **174.1.4** *P* **248** *L* **32** # 528

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

Clause 73 auto-negotiation is missing from the electrical Phys in table 174-3. (Compare table 169-2 and tables 116-3 amd 116-3a.

*SuggestedRemedy*

Add it.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **174** *SC* **174.2.1** *P* **248** *L* **48** # 423

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket)*

"MII" is defined in 1.4.393 with reference to Clause 22, which is 100 Mb/s. It is irrelevant for this project. Saying that "The MII is not intended to be physically instantiated" does not match this definition.

"MII" has been used in other clauses in a way that contradicts the definition. This is wrong, and should not be carried on.

The text can say that 1.6T Ethernet uses a specific interface between the RS and the PCS, the 1.6TMII. Or simply use 1.6TMII everywhere instead of MII.

*SuggestedRemedy*

Change "MII" to "1.6TMII", and change the expanded acronym accordingly, across this clause, with editorial license.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **174** *SC* **174.2.1** *P* **248** *L* **51** # 692

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Common) (bucket2)*

physically instantiated

*SuggestedRemedy*

exposed

*Response* *Response Status* **C**

REJECT.
For data rates 40 Gb/s and higher, the term "physically instantiated" is used consistently within 802.3 to describe interfaces that are exposed and measurable.
As an example, in 120.5.3 "The limits for Skew and Skew Variation at physically instantiated interfaces are specified at Skew points ."

*Cl* **174** *SC* **174.2.5** *P* **249** *L* **39** # 693

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **A** *Common) PMD instantiations*

instantiations - are like placements in IC design one PMA, one placement, one instantiation. 176B.7 describes combinations of PMAs

*SuggestedRemedy*

Change instantiations to combinations

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The xAUI-n are often introduced as and referred to as "physical instantiations" of the PMA service interface. Thus the word "instantiation" is appropriate based on that convention.

Annex 176B provides guidance on how a set of xAUI-n is to be instantiated within a physical layer implementation and, in particular, how each is delimited with particular PMA types. Changing the word away from "instantiation" would require a great deal of rework.

However, the wording in this regard within 176B.7 can be improved.

Change: "The 1.6TAUI-n instantiations are described in 176B.7."
To: "The 1.6TAUI-n may be instantiated within a Physical Layer implementation as described in 176B.7."

Make a similar update in 169.2.4a.

Implement with editorial license.

*Cl* **174** *SC* **174.2.11** *P* **250** *L* **26** # 58

Jones, Chad Cisco Systems, Inc.

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

Use of "may".

*SuggestedRemedy*

change "may optionally support" to "optionally supports"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **174** *SC* **174.2.12** *P* **250** *L* **42** # 177

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **A** *mon) DATA/TRAINING mode*

While it is clear what "DATA mode" is intended to mean here in the context of ILT, that term has specific meaning for 1000BASE-T PHYs that differs from what is intended here (see 1.4.278) Annex 178B.5 indicates that in the context of ILT, "data mode" means the variable tx_mode has the value 'data', which is associated with being in the PATH_UP state per figure 178B-8. As such, it would be more clear if the text in 174.2.12 referred to the PATH_UP state.

*SuggestedRemedy*

Change "coordinate the transition to DATA mode." to "coordinate the transition to the PATH_UP state (see Figure 178B-8)."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #732.

*Cl* **174** *SC* **174.6** *P* **259** *L* **34** # 178

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

Clause 182 is also relevant to 1.6TBASE-R.

*SuggestedRemedy*

Change "Clause 175 through Clause 180" to "Clause 175 through Clause 180 or Clause 182"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **174A** *SC* **174A** *P* **677** *L* **21** # 292

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(Common) Error ratio figure*

Diagrams showing the various paths or domains described in 174A.3 through 174A.7 would be very helpful to the reader of the annex.

*SuggestedRemedy*

Add a diagrams illustrating the paths described in 174A.3 through 174A.7.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 174A.12, add the figure on slides 7, 10, and 11 in the following contribution:
https://www.ieee802.org/3/dj/public/25_07/brown_3dj_03_2507.pdf

Add a similar figure for the xMII extender.

For the MAC to MAC FLR, draw the arrow from the interface between the RS and MAC. Also, add the FLR arrow in the optical and electrical PHY diagrams.

Implement with editorial license.

*Cl* **174A** *SC* **174A.3** *P* **677** *L* **35** # 590

Shrikhande, Kapil — Marvell

*Comment Type* **T** *Comment Status* **A** *(Common) (bucketp)*

In the subclause title "Error ratio allocation for an Ethernet network path", the term "network path" is a bit vague. Network path may mean a multi-hop network path (e.g. End Host to Switch to End host). Should search for a more descriptive term to use instead of "network path". Since the error allocation is from the PLS service interface of one RS to the PLS service interface of the other RS, suggest using "RS-to-RS" ? or MAC-to-MAC ? This is similar to PHY-to-PHY, PCS-to-FEC, etc. terminology used in other sections of this annex.

*SuggestedRemedy*

Replace "network path" in the subclause title with "RS-to-RS".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Ultimate the path is from MAC to MAC. Also, RS can easily be misinterpreted as meaning RS-FEC.
Change "network path" to "MAC-to-MAC path".

*Cl* **174A** *SC* **174A.3** *P* **677** *L* **44** # 105

Bruckman, Leon — Nvidia

*Comment Type* **ER** *Comment Status* **R** *(Common) (bucket2)*

The note regarding FLR is repeated several times

*SuggestedRemedy*

Remove the notes regarding the FLR not being normative for any sublayer. Add a general sentence at the end of 74A.2 with the note's text.

*Response* *Response Status* **C**

REJECT.
Each note is specific to the path covered in the subclause. Using a common note elsewhere would not be as helpful. The notes in the current locations are more helpful.

*Cl* **174A** *SC* **174A.4** *P* **678** *L* **3** # 36

Salvekar, Atul — Cadence Design Systems

*Comment Type* **TR** *Comment Status* **R** *(Common) (bucket)*

Uncorrelated is iid for Gaussian Distributions. However, I believe this not to be the case generally. I believe the correct term to put is in independent and identically distributed (iid) with a Binomial Distribution.

*SuggestedRemedy*

Change "If the errors at the
input of the RS-FEC are uncorrelated"

to

"If the errors at the
input of the RS-FEC are iid with a Binomial Distribution"

Change other places in 174A with editorial discretion.

*Response* *Response Status* **C**

REJECT.
Uncorrelated means that the probability of any bit or symbol being errored is independent of errors on any other symbol. This term is used broadly throughout 802.3.
A binomial distribution is a statistical representation probability the number of errors expected within a set of bits or symbols.

*Cl* **174A** *SC* **174A.5** *P* **678** *L* **10** # 106

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Common) Error ratio figure*

A figure will make this much more clear

*SuggestedRemedy*

Add a figure to show the link in 174A.5, 174A.6 and 174A.7

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the repsonse to comment #292.

*Cl* **174A** *SC* **174A.5** *P* **678** *L* **17** # 591

Shrikhande, Kapil Marvell

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

Cross reference to 174A.6 is missing.

*SuggestedRemedy*

Add cross reference

*Response* *Response Status* **C**

ACCEPT.

*Cl* **174A** *SC* **174A.6** *P* **678** *L* **28** # 585

Nicholl, Gary Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Common) FLR allocation*

FLR allocation for 800GBASE-ER1/ER1-20.

During the March plenary the consensus was to adopt option# 2 of https://www.ieee802.org/3/dj/public/25_03/brown_3dj_04a_2503.pdf, for the FLR allocation for 800GBASE-ER1/ER1-20.

Also, see the final response to comment #16 in https://www.ieee802.org/3/dj/comments/D1p4/8023dj_D1p4_comments_final_clause.pdf.

An implication of this decision is that 800GBASE-ER1/ER1-20 PHYs are different from other 802.3dj PHYs, in that you are only allowed to have AUIs in the PHY or Extender, but not both (see slide 18 of brown_3dj_04a_2503). For other 802.3dj PHYs you are allowed to have AUIs in both the PHY and the Extender.

This means it is possible to have a host design that contains two AUIs (one in an Extender and one in the PHY) that would not support an 800GBASE-ER1/ER1-20 PHY, but would support all other 802.3dj PHYs.

I don't tihnk that an 800GBASE-ER1/ER1-20 PHY should be treated as a special case.

I propose changing the FLR allocation for the 800GBASE-ER1/ER1-20 PHY to be consistent with all other 802.3dj PHYs, such that there are no restriction on which hosts an 800GBASE-ER1/ER1-20 PHY can be deployed in.

This is essentially option #3 in brown_3dj_04a_2503, where the FLR of a 800GBASE-ER1/ER1-20 PHY, with or without an AUI, is defined as 6 x 10-11 (consistent with all other 802.3dj PHYs). This in turn means reducing the FLR for the ER1-to-ER1 FEC link from 6 x 10-11 to 5.8 x 10-11.

*SuggestedRemedy*

Change the FLR allocation for 800GBASE-ER1/ER1-20 to implement option #3 in https://www.ieee802.org/3/dj/public/25_03/brown_3dj_04a_2503.pdf.

Make the necessary changes in clauses 187 and 174A.

A suuporting presentation will be provided.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/nicholl_3dj_02_2507.pdf

Implement the suggested remedy with editorial license.

*Cl* **174A** *SC* **174A.8** *P* **679** *L* **24** # 402

Mi, Guangcan Huawei Technologies Co., Ltd

*Comment Type* **ER** *Comment Status* **A** *(Common) (bucket)*

This clause discusses the error ratio tests for 200Gb/s per lane ISLs, whereas this sentence says "A method for constraining the error ratio of a PHY based on error masks using PMA measurements ...".. The test method for PHY is to be discussed in the later subclause of 174A.10

*SuggestedRemedy*

change the word "PHY" to "ISL" in the mentioned sentence.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **174A** *SC* **174A.8** *P* **679** *L* **25** # 401

Mi, Guangcan Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **R** *(Common) block error ratio*

two method were proposed for block error evaluation. Either by examining the block error histogram being below the Hmax histogram mask, or checking block error ratio being smaller than 1.45e-11. however, when using the Hmax to calculate its corresponding block error ratio, I arrived at 1.55e-11, which is not passing the block error ratio requirement.

*SuggestedRemedy*

I am strongly confused by this now. no suggested remedy at this time. I will reach out to Adam for help.

*Response* *Response Status* **C**

REJECT.
The suggested remedy does not provide suffcient detail to implement.

*Cl* **174A** *SC* **174A.8.1** *P* **679** *L* **38** # 403

Mi, Guangcan Huawei Technologies Co., Ltd

*Comment Type* **ER** *Comment Status* **A** *subclause hierarchy (bucket)*

There is only one sub-clause under 174A.8, which is 174A.8.1, no need to have this level in the hierachy.

*SuggestedRemedy*

remove the hierachy of 174A.8.1, make its sub-clauses 174A.8.x

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The subclause hierarchy could indeed be improved. See related slides in the following editorial contribution:
<URL>/brown_3dj_03_2507

*Cl* **174A** *SC* **174A.8.1.2** *P* **681** *L* **3** # 586

Shrikhande, Kapil Marvell

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

Stating "5 consecutive PAM4 symbols" is clear, but then the sentence goes on to say "or, equivalently, 10 consecutive bits" which could be confusing since 10 consecutive bits could come from 6 PAM4 symbols. I believe we want it to be 5 consecutive PAM4 symbols.

*SuggestedRemedy*

Change the sentence to be "Test symbols are defined as non-overlapping groups of 5 consecutive PAM4 symbols", period. I.e. remove the last part "or, equivalently, 10 consecutive bits".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
There is some ambiguity in the wording. However, it is helpful to point out that the set of 5 PAM4 symbols is 10 bits since the error checker is working with bits, not directly with PAM4 symbols.
Change: "Test symbols are defined as non-overlapping groups of 5 consecutive PAM4 symbols or, equivalently, 10

consecutive bits."
To: "Test symbols are defined as non-overlapping groups of 5 consecutive PAM4 symbols (10 bits total)."

*Cl* **174A** *SC* **174A.8.1.2** *P* **681** *L* **31** # 404

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **R** *(Common) block error ratio*

The total number of test blocks being measured and analyzed is requried as: " The value of test_block_total_count_i should be sufficiently large to reliably verify that the expected block
error ratio is met, either by direct measurement or statistical projection. The projection should provide an accurate prediction of the value of Hm(i)(k) that would be observed over longer-term testing or at least provide an upper bound on the value."

A statisitcal projection is an estimate of future events with level of confidence. It can not be accurate.
Reconsider the statement on "accurate prediction ".

H_m(k) is a statistical possibility which is observed over a window of measurement in a very long window if not infinite. It is unclear how to decide whether the measured data and the projection based on the data could represent the value of long-term observation or the upper bound on the value.

*SuggestedRemedy*

Recosider the state ment of the statistical projection.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **174A** *SC* **174A.8.1.3** *P* **681** *L* **18** # 107

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Common) (bucket)*

In Hm(i)(k) it is not clear what m represents.

*SuggestedRemedy*

Define "m"

*Response* *Response Status* **C**

REJECT.
The "m" is implicitly defined in the words that follow "Hm (i)(k) is a set of p *measured* 17-bin histograms". In other words, the "m" denotes measured. Note that the subscript m non-italic is a qualifier, not a variable.

*Cl* **174A** *SC* **174A.8.1.3** *P* **681** *L* **19** # 574

Nicholl, Shawn — AMD

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket)*

Current text: "... defined as follows:
- Hm (i)(k) where k < 16 is the is the probability of k test symbol errors in a test block for lane i.
- Hm (i)(16) is the probability of more than 15 test symbol errors in a test block for lane i."

*SuggestedRemedy*

Propose deleting the duplicate text ("is the is the") and align the text with 174A.8.1.2 and 174A.8.1.4 Sub-Clauses.

Propose the following text:

Option1 (most preferred by commenter): Introduce the term "ratio".

Proposed text: "... defined as follows:
- Hm (i)(k) where k < 16 is the ratio (to total number of test blocks analyzed) of k test symbol errors in a test block for lane i.
- Hm (i)(16) is the ratio (to total number of test blocks analyzed) of 16 or more test symbol errors in a test block for lane i."

Option2 (less preferred by commenter): Retain the term "probability".

Proposed text: "... defined as follows:
- Hm (i)(k) where k < 16 is the probability of k test symbol errors in a test block for lane i.
- Hm (i)(16) is the probability of 16 or more test symbol errors in a test block for lane i."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The current text is not incorrect after addressing the repeating text "is the".
Proposed option 2 is more helpful as it relates the definition to 16 errors rather than 15.
The H_m is indeed calculated as a ratio per the desciption in Option 1 but the result is the probability and this is the quality that we use to determine the statistics.
Implement option 2 in the suggested remedy with editorial license.

*Cl* **174A** *SC* **174A.8.1.4** *P* **681** *L* **50** # 575

Nicholl, Shawn AMD

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket)*

Current text: "... are 17-bin error histograms representing a count of the number of test blocks with k test symbol errors for k < 16 and a count of the number of test blocks with 16 or more test symbol errors for k = 16."

Reading this text, it sounds like these histograms are simply error counts, while an earlier section defined them as a ratio between error counts and total count.

*SuggestedRemedy*

Propose the following text:

Option1 (most preferred by commenter): Introduce the term "ratio".

Proposed text: "... are 17-bin error histograms representing the ratio (to total number of test blocks analyzed) of test blocks with k test symbol errors for k < 16 and the ratio (to total number of test blocks analyzed) of test blocks with 16 or more test symbol errors for k = 16.

Option2 (less preferred by commenter): Retain the term "probability".

Proposed text is: "... are 17-bin error histograms representing the probability of k test symbol errors in a test block for k < 16 and the probability of 16 or more test symbol errors in a test block for k = 16.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement option #2 (aligning the wording with 174A.8.1.3) in the suggested remedy with editorial license.

*Cl* **174A** *SC* **174A.8.1.5** *P* **682** *L* **17** # 576

Nicholl, Shawn AMD

*Comment Type* **ER** *Comment Status* **A** *(Common) (bucket)*

Current text: "For each lane i, measure the error histogram Hm(k) (see 174A.8.1.3) and assign Hm(k) to Hm (i)(k)." However, 174A.8.1.3 does not define Hm(k) -- rather it defines Hm(i)(k).

*SuggestedRemedy*

Propose to make the text more concise.

Proposed text: "For each lane i, measure the error histogram Hm(i)(k) (see 174A.8.1.3)."

*Response* *Response Status* **C**

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

*Cl* **174A** *SC* **174A.8.1.5** *P* **682** *L* **23** # 137

Noujeim, Leesa Google

*Comment Type* **T** *Comment Status* **R** *(Common) block error ratio*

Eqn 174A.5 is derived from randomly distributed error probabilities (at the specified BER) and so makes no allowance for burstiness of errors; this results in unreasonably tight mask limits especially for the higher bins.

*SuggestedRemedy*

Adjust the mask to increase the allowed ratio in bins 8-15, and reduce in bins ~1-4 accordingly

*Response* *Response Status* **C**

REJECT.
As noted in the opening paragraph, this test confirms a pass but does not necessarily indicate a fail. It indicates that if the lane fails this test then it is necessary to test with the more precise metric as defined in 174A.8.1.6.
Any other curve would be based upon some correlation assumption and would fail some cases with uncorrelated errors that should pass.
The suggested remedy does not provide sufficient detail to implement.

*Cl* **174A** *SC* **174A.8.1.5** *P* **682** *L* **26** # 38

Liu, Cathy Broadcom Inc.

*Comment Type* **T** *Comment Status* **R** *(withdrawn)*

The assumption of the equation 174A-6 of BER=1/2 of PAM4 symbol error ratio SER is not always true. When pre-coding is applied, or inner hamming decoding is applied, the assumption will not be hold which results in the error mask is higher.

*SuggestedRemedy*

Either we ingor the special cases with pre-coding or inner code decoding, but add a note to clarify the assumption. Or we can apply two cases to the equation 174A-6 as following: RSSER = 1 -(1 - 2BER)^5 for no precoding and inner code decoding; and RSSER = 1 -(1 - BER)^5 for precoding or inner code decoding.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **174A** *SC* **174A.8.1.6** *P* **682** *L* **37** # 577

Nicholl, Shawn AMD

*Comment Type* **ER** *Comment Status* **A** *(Common) (bucket)*

Current text: "For each lane i, measure the error histogram Hm(k) (see 174A.8.1.3) and assign Hm(k) to Hm (i)(k)." However, 174A.8.1.3 does not define Hm(k) -- rather it defines Hm(i)(k).

*SuggestedRemedy*

Propose to make the text more concise.

Proposed text: "For each lane i, measure the error histogram Hm(i)(k) (see 174A.8.1.3)."

*Response* *Response Status* **C**

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

*Cl* **174A** *SC* **174A.8.1.7** *P* **683** *L* **2** # 578

Nicholl, Shawn AMD

*Comment Type* **ER** *Comment Status* **A** *(Common) (bucket)*

Current text: "a) For each lane i, measure the error histogram Hm(k) (see 174A.8.1.3)."
However, 174A.8.1.3 does not define Hm(k) -- rather it defines Hm(i)(k).
Current text: "d) ... hconv(He(k) , Hm(k)) (see ..."

*SuggestedRemedy*

Propose to make the text more concise.

Proposed text: "a) For each lane i, measure the error histogram Hm(i)(k) (see 174A.8.1.3)."
Proposed text: "d) ... hconv(He(k) , Hm(i)(k)) (see ..."

*Response* *Response Status* **C**

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

*Cl* **174A** *SC* **174A.8.1.7** *P* **683** *L* **7** # 405

Mi, Guangcan Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **A** *ɔn) block error ratio (bucket2)*

In this section, the block error ratio method for a single lane is described. The block error counters are measured independently for each lane. In the determination of lane l, step d) says "For p times, iteratively assign the result of hconv(He(k) , Hm(k)) (see 174A.8.1.4) to He(k).", It is unclear what does the p times mean in this step.
To measure p times the lengths of blocks? and use the collected as 1 dataset?
To repeat the same measurement on the same lengths of blocks for p times? Should the histogram be averaged over the p times of measurement?

*SuggestedRemedy*

please clarify.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The text is 174A.8.1.7 requires some clarification.

Implement the changes, with editorial licnese, on the slide titled "Comment #405" (slide 35) in the following contribution:
https://www.ieee802.org/3/dj/public/25_07/brown_3dj_03b_2507.pdf

*Cl* **174A** *SC* **174A.9** *P* **683** *L* **17** # 108

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket)*

This section is not about 200GBASE-LR1

*SuggestedRemedy*

Change: "200GBASE-LR1" to "800GBASE-LR1"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **174A** *SC* **174A.9** *P* **683** *L* **18** # 579

Nicholl, Shawn AMD

*Comment Type* **ER** *Comment Status* **A** *(Common) (bucket)*

In the "174A.9 Error ratio tests for 800GBASE-LR1 ISLs", the text current says "... between a pair of 200GBASE-LR1 Inner FEC sublayers ...".

*SuggestedRemedy*

Propose to replace with "... between a pair of 800GBASE-LR1 Inner FEC sublayers ..."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #108.

*Cl* **174A** *SC* **174A.10.1.3** *P* **685** *L* **18** # 406

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **R** *(Common) block error ratio*

The total number of FEC codwords being measured and analyzed is requried as: " The value
of FEC_cw_counter should be sufficiently large to reliably verify that the expected block error ratio is met, either by direct measurement or statistical projection. The projection should provide an accurate prediction of the value of Hm(k) that would be observed over longer-term testing or at least provide an upper bound on the value."
A statisitcal projection is an estimate of future events with level of confidence. It can not be accurate.

H_m(k) is a statistical possibility which is observed over a window of measurement in a very long window if not infinite. It is unclear how to decide whether the measured data and the projection based on the data could represent the value of long-term observation or the upper bound on the value.

*SuggestedRemedy*

Recosider the state ment of the statistical projection.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **174A** *SC* **174A.10.1.3** *P* **685** *L* **40** # 407

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **ER** *Comment Status* **R** *(Common)*

typo of the word then in the sentence

*SuggestedRemedy*

change "the" to "then"

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **174A** *SC* **174A.10.1.3** *P* **685** *L* **45** # 408

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **ER** *Comment Status* **A** *(Common) (bucket)*

missing a word "to"

*SuggestedRemedy*

change to " expected to be less"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **174A** *SC* **174A.12** *P* **686** *L* **22** # 409

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **R** *(Common) block error ratio*

Table 174A-1, FLR was changed from 6.2e-11 to 6e-11. The reasoning seems to be the 0.2e-11 was allocated to the xMII extenders and PCS to FEC links illustrated in Table 174A-3. However, in reality, no such case as cascading two sets of two-part AUI link would exist. The title of Table 174A-1 "optical PHYs with no FEC sublayer or with an inner FEC sublayer" also indicating that Table 174A-3 does not apply. Essentially, Table 174A-1 doesn't apply to 800GBASE-ER1 and 800GBASE-ER1-20 with xMII extenders, but is using the allocation for such cases.

The change maynot affect the performance of a Ethernet device much, but may cause some confusion of the readers.

*SuggestedRemedy*

Change back to 6.2e-11 for Table 174A-1. Add another errro allocation table for the case of ER coherent PMDs

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **175** *SC* **175.1.3** *P* **261** *L* **5** # 588

Shrikhande, Kapil — Marvell

*Comment Type* **T** *Comment Status* **R** *(withdrawn)*

Will be better to state that transcoding is from four 66b blocks to 257 bit blocks. This follows the previous bullet which states that encoding is from eight 1.6TMII data octets to 66-bit blocks.

*SuggestedRemedy*

Change the second bullet to "Transcoding from (to) four 66-bit blocks to (from) 257-bit blocks (256B/257B)".

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

REJECT.

This comment was WITHDRAWN by the commenter.

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*Cl* **175** *SC* **175.1.3** *P* **261** *L* **10** # 69

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket2)*

"FEC degrade detection and signaling" is an optional function (see 175.3), no need to list it here. It is not listed in similar sections in 802.3df (88GBASE-R PCS) or the base standard (200G/400GBASE-R PCS)

*SuggestedRemedy*

Either delete the bullet: FEC degrade detection and signaling
Or add: (optional) to the end of the text for this bullet

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

FEC degrade signaling is required. Only the FEC degrade detection is optional.
Change
From: "FEC degrade detection and signaling"
To: "FEC degrade signaling"

---

*Cl* **175** *SC* **175.2.1** *P* **263** *L* **10** # 70

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

PMA is also a sublayer, and inner FEC shall be capitalized

*SuggestedRemedy*

Change: "PMA or inner FEC sublayer" to: "PMA or Inner FEC sublayers"
And in line 13 change: "inner FEC" to "Inner FEC"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The PCS communicates with either a PMA sublayer or an Inner FEC sublayer (not both at the same time); therefore, the singular "sublayer" is correct. The context is:
"When communicating with the PMA or inner FEC sublayer, the 1.6TBASE-R PCS uses..."
When referring to the Inner FEC sublayer, the "I" should indeed be capitalized.
Change instances of "inner FEC" to "Inner FEC" throughout the draft when referencing an Inner FEC sublayer.
Implement with editorial license.
[Editor's note: CC: 45, 175, 184]

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*Cl* **175** *SC* **175.2.4.1** *P* **264** *L* **24** # 670

Opsasnick, Eugene — Broadcom

*Comment Type* **T** *Comment Status* **A** *:S stateless encoder/decoder*

The 64B/66B TX encoder function in 175.2.4.1 is allowed to use the stateless encoder defined in 172.3.4.1.2 or the state-diagram based encoder defined in Figure 119-14. This stateless encoder does some, but not all, of block sequence checking that is performed by the state-diagram based encoder. However, a 1.6TbE PCS is always co-located with an ethernet MAC above it which by definition only sends valid block sequences to the PCS. Therefore, the stateless 64B/66B encoder can be simplified to just encode the current 64B block and does not need to also look at the previous incoming block to validate the sequence of blocks sent by the MAC TX function.

*SuggestedRemedy*

Change the stateless 64B/66B encoder from the current definition in Table 172-1 to something like:

"When reset is asserted, tx_coded is set to LBLOCK_T, otherwise tx_coded = ENCODE(tx_raw) where LBLOCK_T is defined in 175.2.6.2.1 and the ENCODE function is defined in 175.2.6.2.3." or a much simplified table closer in form to Table 172-1.

Implement with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comments #669.

*Cl* **175** *SC* **175.2.4.6** *P* **265** *L* **17** # 454

He, Xiang — Huawei

*Comment Type* **TR** *Comment Status* **A** *(Logic) AM padding*

The term "free running" is not defined clearly in the standard. One interpretation is that it is "continuously-running" whenever there is a clock (two adjacent pads are not continuous); another interpretation based on the context is that if we extract all the pads and concatenate them you will get a "continuously-running" PRBS9 sequence; and finally there is also an interpretation of the word "free" to be each PRBS9 segment could have its own random seed.
I understand this language was used in previous standards, and the pad is discarded on receive side, but there are testers out there testing these pad and warning bit slips if the don't match how the testers were designed. Explaning this to end users is very difficult especially to the non-English speaking regions. It would be a nice thing to define this clearly or define in a way that showing we really don't care.

*SuggestedRemedy*

Change "The initial value of the PRBS9 pattern generators may be any pattern other than all zeros." to "The initial value of the PRBS9 pattern generators in each pad may be any pattern other than all zeros."

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.

The second paragraph of 175.2.4.6 does not make clear what is meant by a "free-running PRBS pattern" for the padding added to the alignment markers and what is acceptable if there is actually more than one interpretation. The current draft also states "The initial value of the PRBS9 pattern generators may be any pattern other than all zeros", which should be interpreted as the the state of the PRBS9 generators out of reset, not the initial state for each alignment marker, but is also somewhat ambiguous.

As currently written, it would be acceptable to allow the "free running pattern" to be continously updated in every clock cycle of an implementation or to allow a concatination of pad values to be a continuous PRBS9 pattern. However, it would not be a correct (or desirable) interpretation that every pad be allowed to have the same 133-bit pattern, which would be allowed with the change proposed in the suggested remedy since it would allow the pad of each alignment marker to have the same initial value.

In addition, the term "free running" should be hyphenated.

The CRG reviewed slides #28-33 of the editorial presentation at:
https://www.ieee802.org/3/dj/public/25_07/nicholl_3dj_01_2507.pdf

The consensus is to update 175.2.4.6 with option 3 as shown on slide #33 of nicholl_3dj_01_2507.

*Cl* **175** *SC* **175.2.4.6** *P* **265** *L* **28** # 298

Brown, Matt — Alphawave Semi

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

Use of possesive grammar is inconsistent with similar phrases used through this draft and is unecessary here.

*SuggestedRemedy*

Change "PCS lane's" to "PCS lane"

*Response* *Response Status* **C**

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

*Cl* **175** *SC* **175.2.4.6.1** *P* **266** *L* **10** # 694

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Logic)*

This is a specification, not a school lecture. am_x is not an example, we are defining its name here. 179 linear fit has "define", which is better although we don't usually write in the imperative.

*SuggestedRemedy*

Change
Let am_x<119:0> be the alignment marker for PCS lane x, x=0 to 15, where bit 0 is the first bit transmitted.
to
The alignment marker for PCS lane x, where x=0 to 15, is defined as am_x<119:0>. Bit 0 is the first bit transmitted.
Make similar changes elsewhere.

*Response* *Response Status* **U**

REJECT.

This wording is identical to wording in other PCS subclauses describing AM insertion such as 91.5.2.6, 119.2.4.4.1, 119.2.4.4.2, 134.5.2.6, 152.5.3.6, and 161.5.2.6.1. There are many examples of the phrasing "Let <some variable> be or represent or equal something" throughout the base standard and amendments.

*Cl* **175** *SC* **175.2.4.10** *P* **272** *L* **13** # 37

Salvekar, Atul — Cadence Design Systems

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Put in Generator Polynomial

*SuggestedRemedy*

Change "X^58 scrambler" to "G(x) =1 + x^39 + x^58"

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.
The "X^58 scrambler" on this page is just a label for this functional block in the figure - using the polynomial itself as the block label would lose the reference that the block is the "scrambler". It would be more appropriate to use the name of the function as defined in the title of subclause 175.2.4.5 "Scrambler" on page 264. The polynomial to be used in the scrambler is defined in the text in that subclause by reference to Equation 49-1.

In figure 175-7, on page 272, change the block labels at line 12
from:
"X^58 scrambler"
to:
"Scrambler"

*Cl* **175** *SC* **175.2.5.3** *P* **273** *L* **40** # 433

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *:S stateless encoder/decoder*

As shown in https://www.ieee802.org/3/dj/public/25_05/ran_3dj_03a_2505.pdf, there is a potential for corrupted data reaching the PCS client after uncorrectable codeword is processed, due to scrambler error multiplication that occurs separately in flow 0 and flow 1.

For the 1.6TBASE-R PCS, this can be addressed by adding a requirement that the Reed-Solomon decoder applies error extension, as described on slides 23 and 25 of ran_3dj_03a_2505.

*SuggestedRemedy*

Add an exception that if an uncorrectable codeword is detected in any of the two flows, the 257b block following the uncorrectable codeword is replaced (after the descrambler) by a block corresponding to 16 error characters.
Implement with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #669

*Cl* **175** *SC* **175.2.5.3** *P* **273** *L* **41** # 669

Opsasnick, Eugene — Broadcom

*Comment Type* **TR** *Comment Status* **A** *:S stateless encoder/decoder*

In ran_3dj_03a_2505.pdf, it was shown that the 64B/66B stateless decoder defined in 175.2.5.9, by reference to 172.2.5.9.2, may allow a corrupted 66-bit block to pass through to the MAC with a small probability. This can occur due to the error propagation of the de-scrambler from an uncorrectable FEC codeword into the first block the the following good FEC codeword. The 64B/66B stateless decoder does mark every block following an ERROR block as an ERROR which was originally intended to cover the de-scrambler error propagation, but it does not work as intended due to the merging of data streams from the two parallel RX flows prior to the 64B/66B decoding.

*SuggestedRemedy*

The Reed-Solomon FEC decoder within each RX flow of the 1.6TbE PCS, by reference to to 119.2.5.3, causes every 66-block within two interleaved RS-FEC codewords to be set to an error block when one or both of the codewords is found to be uncorrectable. This should be extended to the four 66-bits blocks that make up the first 257-bit block of the following codeword to account for the errors possibly being propagated by the de-scrambler that follows within each flow.

In addition, the 64B/66B stateless decoder in 175.2.5.9 can and should be simplified to not set each 66-block after an error block to also be set to an error block since this does not work as intended and the correct marking can be done more easily in the RE-FEC decoder within each RX flow.

The RS decoder in 200GbE, 400GbE and 800GbE PCS clauses 119.2.5.3 and 172.2.5.3 should also be updated to extend the marking of error blocks to the four 66-bits blocks that make up the first 257-bit block that follows an uncorrectable FEC codeword for all PHYs that can use the stateless 64B/66B decoder.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slides #7-27 of the editorial presentation at:
https://www.ieee802.org/3/dj/public/25_07/nicholl_3dj_01_2507.pdf

Update Clauses 119, 172, and 175 as described on slides 14, 16-18, 20-22, 24-25, and 27 of nicholl_3dj_01_2507, and update PICS as required.

Implement with editorial license.

*Cl* **175** *SC* **175.2.5.3** *P* **273** *L* **50** # 71

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

There may be undetected errors

*SuggestedRemedy*

Change: "errors that were not corrected"
to: "errors that were detected but not corrected"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **175** *SC* **175.2.6.2.2** *P* **276** *L* **20** # 72

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic)*

The behavior of hi_ser is specified in 175.2.5.3. No need to detail it in the variables definitions.

*SuggestedRemedy*

Change the definition of hi_ser to: "Boolean variable that is set to true if hi_ser is asserted (see 172.2.5.3). Otherwise, this variable is set to false."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The suggested remedy is a circular definition using "hi_ser" to define "hi_ser". This could be changed to something like "Boolean variable that is asserted as defined in 175.2.5.3"; however, the definition is correct as written and is worded almost exactly the same as the definition of hi_ser in 119.2.6.2 - it only removes the MDIO mapping description - so that the reader can quickly see that it behaves the same as in the 200G/400G PCS.

In 175.2.6.2.2, change the definition of hi_ser to:

"This variable is set to one as defined in 175.2.5.3 and is set to zero otherwise."

*Cl* **175** *SC* **175.2.6.2.4** *P* **277** *L* **17** # 73

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Logic) (bucket)*

The text of the definition of this counter is different from the one in 119.2.6.2.4

*SuggestedRemedy*

Change the definition of amp_counter to: "This counter counts the interval of 32768 FEC codewords containing normal alignment marker payload sequences."

*Response* *Response Status* **C**

REJECT.
This counter definition is indeed worded slightly differently from the counter of the same name in 119.2.6.4. However, it matches the wording of the same counter in 172.2.6.2.4. This was discussed at length and the wording was carefully refined during the comment resolution of the 802.3df standard. See comment #I-80 in <https://www.ieee802.org/3/df/comments/D3p0/8023df_D3p0_comments_final_clause.pdf>. Therefore, no change should be made.

*Cl* **175** *SC* **175.5** *P* **280** *L* **4** # 589

Shrikhande, Kapil — Marvell

*Comment Type* **T** *Comment Status* **A** *(Logic) PCS delay constraint*

The 1.6TbE PCS and XS delay constraint value chosen in 802.3dj (400ns) is half of that specified for 800GE (800ns). There isn't a strong justification for cutting the delay constraint in half for 1.6TbE (compared to 800GE) : both 1.6TE and 800GE use the same FEC, and functional blocks within the PCS are the same. While there is a small reduction in FEC codeword accumulation latency since 1.6TbE uses 4x400G FEC while 800GE uses 4x200G FEC, this reduction is only ~ 12.5ns. Additionally, the delay constraint for 800GE PCS is the same as 400GE and 200GE PCS (~800ns). To enable a broad base of designs, across end-hosts as well as modules, recommend changing the 1.6TbE PCS/XS delay constraint value to match 800GE/400GE/200GE.

*SuggestedRemedy*

Change the delay constraint for 1.6TbE PCS (and XS) to be the same as 800GE (800ns or 2500 pause quanta).

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slides #34-38 of the editorial presentation at:
https://www.ieee802.org/3/dj/public/25_07/nicholl_3dj_01_2507.pdf

Change the 1.6TbE PCS delay contraint to 800ns to match the delay contraints for the 200GbE, 400 GbE, and 800GbE PCSs.

Update the PCS delay contraint in subclause 175.5 and the summary table, Table 174-4, from 400ns to 800ns (equivlent to 1,280,000 bit times, or 2500 pause quanta).

Implement with editorial license.

[Editor's note: CC 175, 174]

*Cl* **175** *SC* **175.6** *P* **280** *L* **17** # 340

de Koos, Andras — Microchip Technology

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

phrasing is awkward: ". path delays are reported as if ., and the PCS_timesync_multilane_ability variable is asserted.
Does this mean that path data delays are reported as if the PCS_timesync_multilane_ability variable is asserted?
The text says "report as if A, and B" when it should say "when B is true, report as if A".

*SuggestedRemedy*

Rephrase as the sentence as:
When the PCS_timesync_multilane_ability variable is asserted, the transmit and receive path data delays are reported as if the DDMP (data delay measurement point) is at the start of the set of four interleaved RS-FEC codewords (see 90.7)

*Response* *Response Status* **C**

ACCEPT.

*Cl* **175** *SC* **175.7** *P* **280** *L* **30** # 443

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Common) AN timeout*

The timeout for link_fail_inhibit_timer, minimum 60 seconds, creates an unacceptably long minimum time to retry AN.

A proposal to enable faster restart of AN was presented in https://www.ieee802.org/3/dj/public/25_05/ran_3dj_02a_2505.pdf.

The changes proposed to clause 175 appear on slides 5-6 of ran_3dj_02a_2505.

*SuggestedRemedy*

Implement the changes to clause 175 per slides 5-6 of ran_3dj_02a_2505, with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the 802.3dj task force at the May Interim meeting:
https://www.ieee802.org/3/dj/public/25_05/ran_3dj_02a_2505.pdf

Implement the suggested remedy with editorial license.

[Editor's note: CC 45, 73, 119, 172]

*Cl* **176** *SC* **176.1.1** *P* **288** *L* **18** # 695

Dawe, Piers Nvidia

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

Three types of the - delte the, as in 173

*SuggestedRemedy*

Delete the, as in 173

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 176.1.1, change text
From:
"Within this clause, the term PMA refers specifically to the SM-PMA.
Three types of the 200GBASE-R SM-PMA are defined in this clause: 8:1 PMA, 1:8 PMA, and 1:1 PMA.
Three types of the 400GBASE-R SM-PMA are defined in this clause: 16:2 PMA, 2:16 PMA, and 2:2 PMA.
Three types of the 800GBASE-R SM-PMA are defined in this clause: 32:4 PMA, 4:32 PMA, and 4:4 PMA.
Four types of the 1.6TBASE-R SM-PMA are defined in this clause: 16:8 PMA, 8:16 PMA, 8:8 PMA, and 16:16 PMA."
To:
"Within this clause, the term PMA refers specifically to an SM-PMA.
Three types of 200GBASE-R SM-PMA are defined in this clause: 8:1 PMA, 1:8 PMA, and 1:1 PMA.
Three types of 400GBASE-R SM-PMA are defined in this clause: 16:2 PMA, 2:16 PMA, and 2:2 PMA.
Three types of 800GBASE-R SM-PMA are defined in this clause: 32:4 PMA, 4:32 PMA, and 4:4 PMA.
Four types of 1.6TBASE-R SM-PMA are defined in this clause: 16:8 PMA, 8:16 PMA, 8:8 PMA, and 16:16 PMA."

In 173.1.1, make a similar change,
From:
"Within this clause the term PMA refers specifically to the BM-PMA.
Three types of the 800GBASE-R BM-PMA are defined: 32:8 PMA, 8:32 PMA, and 8:8 PMA."
To:
"Within this clause the term PMA refers specifically to a BM-PMA.
Three types of 800GBASE-R BM-PMA are defined: 32:8 PMA, 8:32 PMA, and 8:8 PMA."

Implement with editorial license.

*Cl* **176** *SC* **176.1.4** *P* **290** *L* **35** # 74

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Logic) (bucket)*

Not all functions are required in all cases described in this clause, but specific restrictions are only indicated for: Delay alternating PCSLs by two RS-FEC codewords

*SuggestedRemedy*

If this is a list of general function that are not necessarily needed in all cases then delete: "for 200GBASE-R and 400GBASE-R PMAs".
If it is a full list with restrictions then indicate for which cases each function is used according to the relevant sections.

*Response* *Response Status* **C**

REJECT.

The intent is to list the general functions used by the SM PMAs. The two RS-FEC codeword delay is specific to the 200GBASE-R and 400GBASE-R PMAs to achieve four-way RS-FEC codeword interleaving and is called out for that reason. The other primary functions are used by all SM PMAs when required.

*Cl* **176** *SC* **176.1.5** *P* **291** *L* **23** # 75

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic)*

In tables 176-1 and 176-2 no need for a foot note to limit the xAUI-m to a single value.

*SuggestedRemedy*

In tables 176-1 and 176-2 change: xAUI-m instances that are tagged with the footnote "a" to 1.6TAUI-16 and remove footnote

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The tables 176-1 and 176-2 support all four rates using variable "x". If 1.6TAUI-16 is inserted into the tables as in the suggested remedy, it is only valid for the x=1.6T SM-PMAs.

The tables can be made more clear with some small changes.

In Tables 176-1 and 176-2, change footnote (a) from:
"1.6TAUI-16 only"
To:
"When x = 1.6T"

and in the tables replace "xAUI-m" with "1.6TAUI-16".

*Cl* **176** *SC* **176.2** *P* **292** *L* **51** # 76

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket2p)*

Inconsistent naming with the paragraphs above. See similar paragraph in section 176.3 (page 294 line 8)

*SuggestedRemedy*

Change: "from the sublayer above the PMA" to: "from the client sublayer"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176** *SC* **176.3** *P* **294** *L* **12** # 77

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket2p)*

It is not clear which SIGNAL_OK is being considered. In the similar paragraph of section 176.2 the description is more deltailed.

*SuggestedRemedy*

Change: "the received SIGNAL_OK value."
to: "the received SIGNAL_OK parameter from the sublayer above the PMA (PMA:IS_SIGNAL.request(SIGNAL_OK))."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176** *SC* **176.4.1** *P* **296** *L* **8** # 78

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

Missing arrowhead

*SuggestedRemedy*

Add the arrowhead to the input to the PAM4 decode process

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176** *SC* **176.4.2.3.1** *P* **298** *L* **3** # 79

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket2p)*

The same information is provided in the text and in the eqautions below

*SuggestedRemedy*

Delete: "For the 200GBASE-R 8:1 PMA, it equals N × 272 RS-FEC symbols, and for the 400GBASE-R 16:2 PMA, it equals N × 136 RS-FEC symbols, where N is an integer."
After the bullets add this text: "where N is an integer."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 176.4.2.3.1, change the text immediately above the dashed list.

From:
"After the 4-codeword deskew is complete, the remaining inter-lane skew between the alignment markers of the PCSLs is in multiples of four codewords. For the 200GBASE-R 8:1 PMA, it equals N × 272 RS-FEC symbols, and for the 400GBASE-R 16:2 PMA, it equals N × 136 RS-FEC symbols, where N is an integer."
To:
"After the 4-codeword deskew is complete, the remaining inter-lane skew between the alignment markers of the PCSLs is in multiples of four codewords, where N is an integer: "

Implement with editorial license.

*Cl* **176** *SC* **176.4.2.4** *P* **298** *L* **37** # 179

Huber, Thomas Nokia

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

In the second paragraph, the phrases that start with "which employ." are not necessary to understand the sentence (they are additional explanatory information), so they should be separated by commas both before and after the phrases.

*SuggestedRemedy*

Add a comma after 800GBASE-R 32:4 PMAs and after 1.6TBASE-R 16:8 PMA, so it reads as follows:

This delay function is used by the 200GBASE-R 8:1, 400GBASE-R 16:2, and 800GBASE-R 32:4 PMAs, which employ symbol-pair multiplexing, but not by the 1.6TBASE-R 16:8 PMA, which employs symbol-quartet multiplexing.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176** *SC* **176.4.2.4.2** *P* **300** *L* **29** # 180

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The first sentence has a list of two items separated with a comma rather than 'and'.

*SuggestedRemedy*

Change the sentence to read: This delay is performed for the 200GBASE-R 8:1 and 400GBASE-R 16:2 PMAs.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **176** *SC* **176.4.3** *P* **304** *L* **46** # 299

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The would "may" is to be used for the context "is allowed to".

*SuggestedRemedy*

Change "is allowed to" to "may".
Implement same in 179.9.5.2.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
On page 304, line 46:
change: "the full set of PCS lanes is allowed to proceed though "
to: "the full set of PCS lanes proceeds though "

In subclause 179.9.5.2, on page 406, line 8:
change: "The receiver is allowed to control the"
to: "The receiver may control the"

[Editor's note: CC: 176, 179]

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*Cl* **176** *SC* **176.4.3.2** *P* **305** *L* **16** # 80

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

In the receive function there are processes not steps

*SuggestedRemedy*

Change: "to the next steps" to: "to the next steps processes"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change from "to the next steps in the receive function flow" to "to the next process in the receive function".

---

*Cl* **176** *SC* **176.4.3.2.1** *P* **305** *L* **28** # 696

Dawe, Piers — Nvidia

*Comment Type* **T** *Comment Status* **R** *(Logic)*

round-robin and round robin

*SuggestedRemedy*

alternating, in rotation

*Response* *Response Status* **C**

REJECT.

Round-robin is a common term that has been used in multiple clauses in the standard (e.g. clauses 23, 46, 81, 82, 91, 119, 134, 148, 149, 152, 175, 176, 177, 184, and 186) and is a well-known industry term.

---

*Cl* **176** *SC* **176.7.1.2** *P* **316** *L* **11** # 181

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **R** *(Logic) (bucket)*

If the precoder is configured either based on ILT (as in the penultimate paragraph) or is "set as required by the implementation" (as in the last paragraph), what is the purpose of having the set of "precoder_{tx|rx}_{in|out}_enable_i" variables to enable and disable it for each lane/direction? It doesn't sound like the user has any need to control these settings.

*SuggestedRemedy*

Either remove the variables entirely, or treat them as status variables that report the configuration if there is some value in the user knowing what the configuration is Or, if the intent in the case that ILT is not being used is that the user needs to figure out whether to enable the precoder on a per-lane basis, make that more clear.

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #186
[Editor's note: CC: 176, 177]

*Cl* **176** *SC* **176.7.1.2** *P* **316** *L* **24** # 449

He, Xiang — Huawei

*Comment Type* **TR** *Comment Status* **R** *(Logic) (bucket)*

If ILT is disabled by management, how would precoding request signals get carried over to the transmitter side? I understand this is the language we used to define the precoding config before ILT was introduced. Combining this wilt 178B, when bring up a link while disabling the ILT, a Rx without precoding may not be able to start the link with a Tx with precoding turned on?

*SuggestedRemedy*

For PMDs that require to implement precoding on the transmit side, when ILT is disabled, a default mode should be defined to have precoding disabled, either in 176 or 178B.

*Response* *Response Status* **C**

REJECT.

Resolve using the response to comment #186

[Editor's note: CC: 176, 177]

*Cl* **176** *SC* **176.7.2** *P* **316** *L* **28** # 81

Bruckman, Leon — Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Missing word

*SuggestedRemedy*

Change: "When local loopback mode enabled" to: "When local loopback mode is enabled"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176** *SC* **176.7.4.2** *P* **317** *L* **16** # 9

Marris, Arthur — Cadence Design Systems

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket2)*

The PRB31Q pattern needs decoding before being sent to the PRBS31 checker, not after it has been sent to the checker.

*SuggestedRemedy*

Change the word "followed" to "preceded" in "The PRBS31Q test pattern checking is provided by the PRBS31 checker (see 176.7.4.1), followed by inverse precoding (if enabled), and inverse Gray mapping in the PAM4 decoder (see 176.4.3.5)." Also consider using similar wording in 177.6.2.2

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change line 16 on page 317 in 176.7.4.2,
From: "The PRBS31Q test pattern checking is provided by the PRBS31 checker (see 176.7.4.1), followed by inverse precoding (if enabled), and inverse Gray mapping in the PAM4 decoder (see 176.4.3.5)."
To: "The PRBS31Q test pattern checking is provided by the PRBS31 checker (see 176.7.4.1). PRBS31Q data is first processed by inverse precoding (if enabled) and inverse Gray mapped in the PAM4 decoder (see 176.4.3.5), prior to the PRBS31 pattern checker."

No updates are necessary in 177.6.2.2 because wording is different and the suggested remedy does not apply.

*Cl* **176** *SC* **176.8** *P* **318** *L* **7** # 567

Nicholl, Shawn — AMD

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

The entries in "Table 176-7 -- Delay constraints" also pertain to 200GBASE-R, 400GBASE-R, and 1.6TBASE-R. They don't just pertain to 800GBASE-R.

Current text: "... the definitions for bit times and pause_quanta can be found in 169.4."

*SuggestedRemedy*

Proposed text: "... the definitions for bit times and pause_quanta can be found in 116.4, 169.4, and 174.4"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change from
"... the definitions for bit times and pause_quanta can be found in 169.4"
to
"... the definitions for bit times and pause_quanta can be found in 116.4, 169.4, and 174.4".

*Cl* **176B** *SC* **176B** *P* **699** *L* **12** # 263

Ofelt, David — Juniper Networks

*Comment Type* **TR** *Comment Status* **R** *(Common) legacy 50 ppm*

We have changed the ppm tolerance of the 200Gb/s SERDES to be 50ppm in all cases. This leads to interoperability issues when plugging an older PMD (generated with 25Gb/s or 50Gb/s SERDES) into a new 200Gb/s SERDES-based receiver or when a new 802.3dj PMD is plugged into an older box using 25Gb/s or 50Gb/s SERDES due to the fact one end of those links generates data at 100ppm and the receive side can only handle 50ppm. The solution is to insert an XS to do rate matching. At the moment, I believe this interop issue is not called out anywhere in the draft. I'd like to add in something in the draft to bring the reader's attention to the fact that this issue exists. Adding the required XS also will cause PTP accuracy to suffer. Note that this was not an issue in the 100Gb/s SERDES because they were specified to tolerate 100pm at the receiver, so there were no multi-generational interop issues. This is also not a problem when 100Gb/s source and 200Gb/s sourced PMDs are connected because the 100Gb/s SERDES are specified to have transmitters that are 50ppm.

*SuggestedRemedy*

Unhelpfully, I don't have fully worked out edit, but will be happy to work with the editorial team in finding a solution. One approach would be to add two examples in clause 176B showing the stack with an included XS for an existing 100ppm-based PMD plugged into a new 200Gb/s-based host and a new 200Gb/s sourced PMD plugged into an older system. We should also include a comment that PTP performance will be impacte due to the requirement for that XS to add or delete idles to match the rates. Another apporach would be to add a comment to all the places that 50ppm receiver tolerance is specified, but there are a lot of those and the way 176B is structured seems to lend itself well to documenting this issue.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **176B** *SC* **176B.2** *P* **700** *L* **8** # 270

Wang, Xuebo — Huawei

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

"of" is missing between "the number" and "upper".

*SuggestedRemedy*

Add "of" between "the number" and "upper".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176B** *SC* **176B.2** *P* **701** *L* **40** # 271

Wang, Xuebo — Huawei

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

Typo: "my" should be changed to "may".

*SuggestedRemedy*

Change "my" to "may".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176B** *SC* **176B.3** *P* **702** *L* **22** # 272

Wang, Xuebo — Huawei

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

"4:32 BM-PMA" should be changed to "4:32 SM-PMA", as the PMA above it is an SM-PMA.

*SuggestedRemedy*

Change "4:32 BM-PMA" to "4:32 SM-PMA".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176B** *SC* **176B.4** *P***702** *L***40** # 266

Wang, Xuebo Huawei

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

The current content of PMA instantiations seems to include interfaces with all possible data rates per lane. However, for 200 Gb/s and 400 Gb/s physical layer implementations in Annex 176B.4 and Annex 176B.5, some cases are missing. For example, some interfaces with 25 Gbps per lane and 50 Gbps per lane are not included for now. For a complete presentation, it is suggested to add those missing cases.

*SuggestedRemedy*

1. On Page 702, Line 42: change the title "8:1 and 8:2 PMA instantiations for 200GBASE-R PHYs" to "8:4, 8:2 and 8:1 PMA instantiations for 200GBASE-R PHYs" to include PMD with four 50 Gb/s physical lanes.
2. On Page 703, Line 11: change "n = 2 or 4" to "n = 2, 4 or 8" to include 200GAUI-8 interface.
3. On Page 704, Line 21 and 22: change "{n,p}" to "p". This change is consistent with the style used in Table 176B-1 and avoids the trouble of listing all possible values of n.
4. On Page 704, Line 35, change "120E (C2M)" to "120D (C2C)". This should be a typo.
5. On Page 704, Line 44, change "n = 2 or 4" to "n = 2, 4 or 8" to include 200GAUI-8 interface.
6. On Page 705, Line 11, change "120E (C2M)" to "120D (C2C)". This should be a typo.
7. On Page 705, Line 17, change "n = 2 or 4" to "n = 2, 4 or 8" to include 200GAUI-8 interface.
8. On Page 705, Line 23 and 24: change "{n,p}" to "p". This change is consistent with the style used in Table 176B-1 and avoids the trouble of listing all possible values of n.
9. On Page 707, Line 30, change the title "16:8, 16:4, and 16:2 PMA instantiations for 400GBASE-R PHYs" to "16:16, 16:8, 16:4, and 16:2 PMA instantiations for 400GBASE-R PHYs" to include 400GBASE-SR16 PMD.
10. On Page 707, Line 36, change "p is 2, 4, or 8" to "p is 2, 4, 8, or 16".
11. On Page 708, Line 4, change " 16:{4,8,16}:{4,8}, 16:4:4" to "16:{4,8,16}:{4,8,16}".
12. Change "{4,8}" in table titles to "{4,8,16}" in Line 21 on Page 708, Line 4 and Line 28 on Page 709, Line 4 and Line 30 on Page 710.
13. On Page 708, Line 8, change "n=4" to "n=4, 8, or 16" to include 400GAUI-8 and 400GAUI-16 interfaces.
14. On Page 708, Line 14, change "p=4" to "p=4, 8, or 16" to include PMDs with 8 and 16 physical lanes.
15. On Page 708, Line 34, change "p=4: or 8" to "p=4, 8, or 16" to include PMD with 16 physical lanes.
16. In Line 49 on Page 709 and Line 53 on Page 710, change "p=4 or 8" to "p=4, 8, or 16" to include PMD with 16 physical lanes.
17. On Page 710, Line 15 and 16, change "{m, n}" to "m" since n is not used.
18. On Page 710, Line 17, change "n=4 or 8" to "n=4, 8, or 16" to include 400GAUI-16 interface.
19. On Page 710, Line 20, add "n=16: 120C (C2C)" to include 400GAUI-16 C2C.
20. On Page 710, Line 23, change "{n,p}=4 or 8" to "{n,p}=4, 8, or 16".

A contribution covering all the remedies will be provided.

*Response* *Response Status* **C**

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

*Cl* **176B** *SC* **176B.4.2** *P***706** *L***1** # 278

Wang, Xuebo Huawei

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

The title should not include "200GBASE-R PHYs" as the sub-clause only talks about Extender. The same issue happens in Line 1 on Page 711 of CL176B.5.2 and Line 27 on Page 715 of CL176B.6.2.

*SuggestedRemedy*

Delete "200GBASE-R PHYs" in Line 1 on Page 706;
Delete "400GBASE-R PHYs" in Line 1 on Page 711;
Delete "800GBASE-R PHYs" in Line 27 on Page 715.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
For 200G and 400G, there are no defined PHY types that would use the instantiations defined in this subclause. However, there is one defined 800G PHY type that may use these instantiations as noted in the sentence "These instantiations are also relevant to the 800GBASE-R PHY type defined in Clause 185 and shown (with Inner FEC) in Figure 176B-2."
Delete "200GBASE-R PHYs" in Line 1 on Page 706;
Delete "400GBASE-R PHYs" in Line 1 on Page 711;

*Cl* **176B** *SC* **176B.4.2** *P***706** *L***3** # 273

Wang, Xuebo Huawei

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

"Figure 176B-2" should be changed to "Figure 176B-3", as the Extender is shown in Figure 176B-3 instead of 176B-2. The same issue happens in Line 3 on Page 711.

*SuggestedRemedy*

Change "Figure 176B-2" to "Figure 176B-3" in Line 3 on Page 706 and Line 3 on Page 711.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176B** *SC* **176B.5.1** *P***710** *L***10** # 280

Wang, Xuebo Huawei

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

A colon is missing between m=2 and 176. The same happens in Line 16, 19, 24, 36, 42, 45, and 51 on Page 710.

*SuggestedRemedy*

Add a colon between 2 and 176 in Line 10, 16, 19, 24, 36, 42, 45, and 51 on Page 710.

*Response* *Response Status* **C**

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

*Cl* **176B** *SC* **176B.6.1** *P***713** *L***28** # 274

Wang, Xuebo Huawei

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

The note should describe how an n:p PMA is formed instead of an m:n PMA

*SuggestedRemedy*

Change the sentence "The combination of m:32 PMA and 32:n PMA forms an m:n PMA" to "The combination of n:32 PMA and 32:p PMA forms an n:p PMA".

*Response* *Response Status* **C**

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

*Cl* **176B** *SC* **176B.6.2** *P***715** *L***39** # 279

Wang, Xuebo Huawei

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

PMD does not exist in Extender. The example should be like: an instantiation with a one S 800GAUI-n and one B 800GAUI-n is denoted "SB" or "BS".

*SuggestedRemedy*

Change "one B PMD" to "one B 800GAUI-n".

*Response* *Response Status* **C**

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

*Cl* **176B** *SC* **176B.6.2** *P***715** *L***44** # 275

Wang, Xuebo Huawei

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket)*

The symbol-multiplexed interfaces and bit-multiplexed interfaces are denoted by "S" and "B", respectively, per CL176B.6.2. However, "S" and "B" are missing in the titles of Table 176B-25. The same issue happens in the titles of 176B-26 and 176B-27 in Line 4 and 24 on Page 716. The missing also does not fit with the title style of other tables in Annex 176B.

*SuggestedRemedy*

Change the title of Table 176B-25 "800 Gb/s 32:4:32 and 32:8:32 PMA instantiations" to "800 Gb/s 32:4:32 and 32:8:32 (S or B) PMA instantiations";
Change the title of Table 176B-26 "800 Gb/s 32:8:8:32 and 32:4:4:32 (n = m) PMA instantiations" to "800 Gb/s 32:8:8:32 and 32:4:4:32 (n = m, BB or SS) PMA instantiations";
Change the title of Table 176B-27 "800 Gb/s PMA 32:4:8:32 and 32:8:4:32 (n?m) instantiations" to "800 Gb/s 32:4:8:32 and 32:8:4:32 (n?m, SB or BS) PMA instantiations".

*Response* *Response Status* **C**

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

*Cl* **176B** *SC* **176B.7.1** *P***717** *L***2** # 276

Wang, Xuebo Huawei

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

"or 8" is redundant.

*SuggestedRemedy*

Delete "or 8" in Line 2 on Page 717.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176B** *SC* **176B.7.2** *P***718** *L***24** # 277

Wang, Xuebo Huawei

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket)*

"n=16" and "n=8" should be changed to "m=16" and "m=8", as the corresponding row is of 1.6TAUI-m.

*SuggestedRemedy*

Change "n=16" to "m=16" in Line 24 on Page 718;
Change "n=8" to "m=8" in Line 25 on Page 718.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176C** *SC* **176C.2** *P* **720** *L* **5** # 39

Liu, Cathy — Broadcom Inc.

*Comment Type* **E** *Comment Status* **R** *(Electrical) BER_added*

The BER_added is defined as 2.841 x 10 ^ -4. It is three-bit decimal. Other places in the document are two-bit decimal.

*SuggestedRemedy*

Change to 2.84 x 10 ^ -4

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #41.

*Cl* **176C** *SC* **176C.3** *P* **721** *L* **15** # 40

Liu, Cathy — Broadcom Inc.

*Comment Type* **T** *Comment Status* **A** *ctrical) (bucket) C2C channel*

The figure 176C-2 has one mated connector illustrated as the C2C channel. The C2C channel could have no connector or up to one connector. The figure might misleading the readers to "must have one connector" for the C2C interconnect.

*SuggestedRemedy*

Add a note to clarify that the connector is optional.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176C** *SC* **176C.6.2** *P* **723** *L* **17** # 614

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

All impedance values should be 92.5 ohms

*SuggestedRemedy*

Change reference impedance to 92.5 ohms

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **176C** *SC* **176C.6.2** *P* **723** *L* **18** # 66

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The reference impedance for measurement should align with the test fixture reference.

*SuggestedRemedy*

Change line to:

The reference impedance for differential specifications is 92.5 ohms. The reference impedance for common-mode specifications is 23.125 ohms.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **176C** *SC* **176C.6.3** *P* **723** *L* **39** # 504

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(Electrical) AC CM*

The max value of Low Frequency AC common mode noise is 30mV for KR but 32mV for C2C with a tighter Block Error ratio requirement. There isn't a reasonable justification for this difference.

*SuggestedRemedy*

Change the C2C value to 30mV in table 176C-2.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #506.

*Cl* **176C** *SC* **176C.6.3** *P* **723** *L* **46** # 493

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) RLdc and RLcd*

The common-mode to differential-mode output return loss specifications is missing for C2C

*SuggestedRemedy*

Add this specification to Table 176C-2 using the same values as in equation 176C-1. As this link does not have a minimum loss consider as an alternative using the values proposed in a separate comment for C2M for both this new specification and the differential-mode to common-mode input return loss specification in equation 176C-1

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed the contribution <https://www.ieee802.org/3/dj/public/25_07/dudek_3dj_01_2507.pdf>.

Add a specification for C2C transmitter common-mode to differential return loss, and change the specificaiton for receiver differential to common-mode return loss, both using Equation 178-4 (Figure 178-5).

Implement with editorial license.

*Cl* **176C** *SC* **176C.6.3** *P* **724** *L* **22** # 362

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) Package class*

J4U03 has two values, package A and package B, not clear what determines actual DUT package as Class A or Class B. Is it total loss? What happens if one has Class B package with short trace, is that class A?

*SuggestedRemedy*

Please provide how to determine DUT package is Class A or B.
Also add reference to table 176C-7

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slide 38 of <https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01c_2507.pdf>.

Table 176C-7 (mentioned in the suggested remedy) is not a definition of package classes - it defines parameters of the reference package model for COM calculation, and is not a helpful reference.

The existence of two package classes is stated in the last paragraph of 176C.3 (Functional specification), including the fact that they have different electrical specifications:
"This annex defines specifications for two classes of C2C transmitters and two classes of C2C receivers, identified by transmitter package class and receiver package class, respectively. The package is either class A or class B. Devices conform to electrical specifications of either class A or class B."
However, these statements do not belong in the functional specifications. In Clause 178, the similar paragraph appears in 178.1 (Overview subclause).

Move the last paragraph of 176C.3 to 176C.1.
Ensure that PICS tables have package class as a major option.
Implement with editorial license.

*Cl* **176C** *SC* **176C.6.3.1** *P* **724** *L* **35** # 109

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Electrical) (bucket) ILT*

There is no Type E defined in Annex 178B

*SuggestedRemedy*

Change: "Type E"
to: "Type E1"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **176C** *SC* **176C.6.3.1** *P* **724** *L* **35** # 462

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket) ILT*

There is ILT has a Type E1 not type E.

*SuggestedRemedy*

Change Type E to Type E1.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #109.
[Editor's note: Changed subclause/page from 176C.5.3.1/706 to 176C.6.3.1/724]

---

*Cl* **176C** *SC* **176C.6.3.5** *P* **726** *L* **18** # 606

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The C2C specification should use 92.5 ohm impedance for transmitter and receiver ERL

*SuggestedRemedy*

add line in Table 176C-3 to specify 92.5 ohm impedance

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

---

*Cl* **176C** *SC* **176C.6.3.5** *P* **726** *L* **38** # 62

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

ERL impedance should be aligned to Rd and 179B.

*SuggestedRemedy*

Add line:
The reference differential impedance for the test fixture ERL computation shall be 92.5 ohms.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

---

*Cl* **176C** *SC* **176C.6.4.2** *P* **727** *L* **9** # 535

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) C2C channel*

There isn't a minimum loss specified for the C2C channel. Inserting the the minimum channel loss from the KR interference tolerance test isn't appropriate.

*SuggestedRemedy*

Consider whether using the same minimum loss used for the interference tolerance test is appropriate. If so add to 176C.7.2. The recommended minimum channel insertion loss is 13dB.
On page 727 line 9 replace "using a channel with the minimum insertion loss specified in 178.9.3.4" with "using an amplitude tolerance test channel" Add a sentence to the end of the paragraph. The loss of the amplitude tolerance test channel including the package loss of the compliant transmitter used in the test is equal to the Test 1 loss in table 176C-5 .
If not then replace "using a channel with the minimum insertion loss specified in 178.9.3.4" with "using a minimal loss channel"

*Response* *Response Status* **U**

REJECT.

The suggested remedy includes an option that disconnects the minimum loss of the channel from the low-loss channel used in the receiver interference tolerance test.

There was general agreement to this direction but a detailed proposal is required. Future contribution in this area is encouraged.

---

*Cl* **176C** *SC* **176C.6.4.4** *P* **727** *L* **33** # 365

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) RLdc and RLcd*

The more critical return loss is common mode to differential, but for some reason in clause 176C instead RLcd is defined

*SuggestedRemedy*

Change RLcd to RLdc (common mode to differential)

*Response* *Response Status* **U**

REJECT.

Receiver differential-to-common mode return loss specified for KR and AUI C2C is consistent with prior specifications in the 802.3ck standard.
The comment states that RLdc is more critical, but does not explain why.
The comment does not provide sufficient justification to support the proposed change.
There is no consensus to implement the change suggested.

*Cl* **176C** *SC* **176C.6.4.4** *P* **727** *L* **33** # 366

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *lectrical) (bucketp) RL masks*

802.3ck common mode to differential return loss frequency was up to 50 GHz

*SuggestedRemedy*

We should at least extend the RLdc to 67 GHz.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #363.

---

*Cl* **176C** *SC* **176C.6.4.5.3** *P* **729** *L* **48** # 532

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) precoding*

The C2C receeiver should be able to determine whether pre-coding is used.

*SuggestedRemedy*

Change "test transmitter equalizer using the ILT function" to "test transmitter equalizer and precoder using the ILT function" Also for KR on page 368 line 22

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #534.

---

*Cl* **176C** *SC* **176C.7** *P* **731** *L* **13** # 482

Healey, Adam — Broadcom, Inc.

*Comment Type* **T** *Comment Status* **A** *(Electrical) C2C channel*

There is potential confusion about what channel insertion loss covers. While 176C.3 defines the "channel" to be from TP0d to TP5d, the input to the COM calculation is the portion between TP0 and TP5 and the input to the ERL calculation is a measurement at TP0 or TP5.

*SuggestedRemedy*

To eliminate the possibility of any confusion, state the channel insertion loss recommendation is for TP0d to TP5d (similar to what is done in Table 178-11).

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #536.

---

*Cl* **176C** *SC* **176C.7** *P* **731** *L* **13** # 536

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(Electrical) C2C channel*

It isn't clear what the channel includes. (including where the Ildd is measured from).

*SuggestedRemedy*

Change the description in table to "Maximum insertion loss from Tp0d to Tp5d, ILdd, at 53.125 GHz (recommended)" (as used for KR).

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

---

*Cl* **176C** *SC* **176C.7** *P* **731** *L* **17** # 503

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) C2C channel*

There is no specification for differential-mode to common-mode conversion for the C2C channel, which would allow a very large amount of common mode to be input to the Rx.

*SuggestedRemedy*

Add a specification to the channel specification for differential-mode to common-mode conversion with the same equation as used for KR (equation 178-6) or as used for CR cable (equation 179-28)

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slide 48 in <https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01b_2507.pdf>.

In Table 176C-6, add rows for ILcd and ILdc with respect to ILdd, referring to the same equations as in Table 178-11.
Implement with editorial license.

*Cl* **176C** *SC* **176C.7.1** *P* **731** *L* **18** # 323

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(Electrical) AC coupling*

In Table 176C-6 (C2C channel characteristics), the "Maximum AC-coupling 3 dB corner frequency" is specified as 50 kHz, whereas the corner for KR (Table 178-11), CR (179.11), and C2M (176D.6.4) is 100 kHz.

*SuggestedRemedy*

Change "50 kHz" to "100 kHz".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #543.

*Cl* **176C** *SC* **176C.7.1** *P* **733** *L* **4** # 259

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, quantization noise parameters should be added to Table 176C-8.

*SuggestedRemedy*

Add two quantization noise parameters with suggested values to the table. Please refer to slide 17 of the accompanying document for the proposed change.
Also, see shakiba_3dj_elec_01_250626.pdf.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **176C** *SC* **176C.7.1** *P* **733** *L* **10** # 238

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *ctrical) Reference impedance*

Adjust COM voltage to 46.25 ohms measurement reference.

*SuggestedRemedy*

Change
A_vt̄o 0.415
A_fet̄o 0.415
A_net̄o 0.610

*Response* *Response Status* **C**

REJECT.

Resolve using the response to comment #237.

*Cl* **176C** *SC* **176C.7.1** *P* **733** *L* **46** # 258

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, an updated value for One-sided noise spectral density in Table 176C-8 is needed.

*SuggestedRemedy*

Change One-sided noise spectral density parameter value in the table (line 46). Please refer to slide 17 of the accompanying document for the proposed change.
Also, see shakiba_3dj_elec_01_250626.pdf.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **176C** *SC* **176C.7.1** *P* **734** *L* **9** # 540

Levin, Itamar — Altera corp.

*Comment Type* **T** *Comment Status* **R** *Electrical) (bucket) COM FFE*

The table says the highest allowed tap index is 56 while footnote (b) says the latest post-cursor position for a floating tap is 50. Given that the number of flating taps per group is 4, there is a discerpency between the comment and highest allowed tap index

*SuggestedRemedy*

either fix the comment and highest index to be 54 or add clarifying text in the comment explaining the aparent discerpency.

*Response* *Response Status* **C**

REJECT.
Tap index 1 is the first precursor tap, and there are 5 precursor + 1 cursor (main) taps.
Thus tap index 56 is the 50th postcursor tap, as in the footnote.
See <https://ieee802.org/3/dj/public/25_01/ran_3dj_01_2501.pdf#page=24>.

*Cl* **176C** *SC* **176C.7.3** *P* **734** *L* **43** # 607

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The C2C specification should use 92.5 ohm impedance for channel ERL

*SuggestedRemedy*

add line in Table 176C-9 to specify 92.5 ohm impedance

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **176D** *SC* **176D.2** *P* **741** *L* **5** # 41

Liu, Cathy — Broadcom Inc.

*Comment Type* **E** *Comment Status* **R** *(Electrical) BER_added*

The BER_added is defined as 2.681 x 10 ^ -4. It is three-bit decimal. Other places in the document are two-bit decimal.

*SuggestedRemedy*

Change to 2.68 x 10 ^ -4

*Response* *Response Status* **C**

REJECT.
The current value 2.681e-4 was adopted by the response to comment #143 against D1.1. See <https://www.ieee802.org/3/dj/comments/D1p1/8023dj_D1p1_comments_final_clause.pdf#page=42>. Justification for the value can be found in <https://www.ieee802.org/3/dj/public/24_09/brown_3dj_04_2409.pdf#page=7>.
(Note that the comment above is listed as being against Annex 176E, but following reordering of annexes it is the current Annex 176D)

The BER_added values for AUIs are provided with three-digit decimal fraction (resolution of 1e-7) because they are the difference between the KP4 FEC random BER correction capability (calculated as 2.921e-4, to a resolution of 1e-7) and the AUI random BER allocation. Since the AUI random BER allocation is in the order of 1e-6, the resolution has a larger effect on calculation of block error ratio for the AUIs, compared to PMDs.

The same argument applies to this comment (C2M) and comment #39 (C2C).

*Cl* **176D** *SC* **176D.3** *P* **741** *L* **19** # 324

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(Electrical) ILT*

The requirement that the C2M interface includes ILT is buried within a paragraphs. Also, the sentence is prefixed with the word "Specifically," as though ILT was related to the service interface defined in the previous sentence. C2M interface is defined as being equivalent functionally to a CR interface. The ILT is a rather major function and deserves specification in the same way as done for CR (see 179.8.9) and KR (see 178.8.9). It may also be time to subdivided the C2M functional specifications into subclauses.
The same applies for C2C in Annex 176C.

*SuggestedRemedy*

Create a new subclause similar 178.8.9 and 179.8.9 in Annex 176C.3.
Consider organizing the functional specification into subclauses.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The functional specification part of AUI-C2M in 176D.3 is short and mostly refers to the corresponding PMD subclause 179.8 because, as stated, it is functionally equivalent. There is no need to repeat the content of 179.8 or use its subclause structure.
However, the sentences about ILT should appear together, and the word "specifically" is not required. If the ILT specification is different then it should be noted as an exception.
Note that comment #666 suggests having the same initialize value for PMDs and AUIs. If #666 is accepted, then no exception will be necessary.
Similarly for 176C.3.

Edit the 3rd and 4th paragraphs in both 176D.3 and 176C.3 to separate the ILT-related content. Emphasize the fact that ILT is required and write an exception, if necessary, to the ILT specification in 179.

Implement with editorial license, and considering the response to comment #666.

[Editor's note: CC: 176C, 176D]

*Cl* **176D** *SC* **176D.6.3** *P* **745** *L* **16** # 506

Dudek, Mike
Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) AC CM*

The module AC common-mode input tolerance is 80mV max full band and 32mV for the low frequency. The allowed host output AC common-mode full band is however 85mV max (and 30mV max for the low frequency). The host output value should not be higher than the module input tolerance full band, and there isn't a reason why the module should tolerate more than the host outputs at low frequency.

*SuggestedRemedy*

Change the full band AC common-mode output voltage for the host from 85mV to 80mV. Consider also changing the low frequency from 30mV to 32mV to match the module tolerance.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
There are several comments related to the AC common mode voltage.

The CRG reviewed slides 3-6 of
<https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01a_2507.pdf>.

Implement the changes suggested on slide 6 of ran_3dj_01a_2507 with editorial license.

*Cl* **176D** *SC* **176D.6.3** *P* **745** *L* **21** # 492

Dudek, Mike
Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) RLdc and RLcd*

The differential-mode to common mode input return loss module specification in combination with the common-mode to differential-mode return loss specification for the host output are inadequate, allowing for an interfereing signal that is only 16dB below the wanted signal at frequencies above 35GHz. (The specifications are probably adequate for the original purpose in CR because there is a minimum loss of 16dB at Nyquist between these points). These specifications are also weaker than the specifications for 100G chip to module in 802.3ck

*SuggestedRemedy*

Replace the references to equations 179-20 in tables 176D-2 and 176D-3 and equation 179-27 in tables 176D-4 and 176D-5 with references to new equations. The equations should be 25-22(f/106.25) from 0.05 to 53.12 GHz and 19-10(f/106.25) from 53.12 to 67 GHz which are the same equations as used for 100G C2M scaled in frequency. In addition to this change in order to measure this the common-mode to differential-mode return loss for the mated compliance boards need to be improved. Change equation 179B-8 and Figure 179B-5 to 30-26(f/106.25) from 0.05 to 53.12 GHz and 22-10(f/106.25) from 53.12 to 67 GHz

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed the contribution
<https://www.ieee802.org/3/dj/public/25_07/dudek_3dj_01_2507.pdf>.

For C2M host and module input and output specifications, and for mated test fixtures, implement the suggested changes on slide 7 of dudek_3dj_01_2507.

Change the specifications for CR transmitter and receiver and cfor CR cable assembly to the same equations.

Implement with editorial license.

*Cl* **176D** *SC* **176D.6.3** *P* **745** *L* **38** # 352

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) VEC*

We currenlty have no effective output compliance test method for C2M or input caliburtion of stressor. We replaced VEC with with JRMS, EOJ, and J4U back in Sept 2024 and it has been more than 9 months without any proof that using jitter alone is sufficent for receive compliance.

*SuggestedRemedy*

TDECQ/EECQ already captrues the jitter as shown in ghiasi_3dj_01a_2409 but also captures amplitude penalty and the effect of PM to AM conversion in thre same way as receiver will observe the penalty. In COM we use reference equalizer to determine compliance, in 802.3ck we used VEC/VEO with a reference equalizer and in OIF Linear and RTLR we use EECQ with reference equalizer for compliance. We have not proven that discrete jitter measurements without a referecne equalizer is sufficent for C2M compliance. Task force need to investigate either show that current methdology works otherwise replace it with CKmethod or OIF EECQ before going to SA ballot.

*Response* *Response Status* **U**

REJECT.

It should be noted that the CRG has previously considered similar comments, the recent one being comment #261 against D1.3 (see <https://www.ieee802.org/3/dj/comments/D1p3/8023dj_D1p3_comments_final_clause.pdf#page=35>). As noted in the response to that comment, there was no support for the suggested changes. This by itself is not a reason to reject this comment, but it is relevant information on this topic.

The response also noted that TDECQ is not a specification of AUI-C2M, but of optical transmitters. Although TDECQ is irrelevant for AUI-C2M, it should be noted that the claims made in previous comments and repeated here (in the suggested remedy) have been refuted; there is no consensus that TDECQ of optical transmitters captures the effect of jitter (the referenced presentation was about EECQ, defined outside of 802.3 for linear optical modules, and used with a high-loss host channel; the resulting signal does not represent the output of optical PMDs defined in P802.3dj, nor the module output in C2M).

The C2M methodology of previous 802.3 projects, mentioned in the suggested remedy ("VEC/VEO"), assumes a transmitter with fixed equalization. The AUI-C2M specified in Annex 176D includes Tx equalization that is adjustable by the peer (host or module) receiver using ILT. Thus, a single "stressed eye" test signal calibrated with VEC/EH is irrelevant. The introduction of adjustable Tx equalization required a change in specification methodology; the well-established CR compliance methodology was adopted by comments #186-#189 against D1.0 (see <https://www.ieee802.org/3/dj/comments/D1p0/8023dj_D1p0_comments_final_id.pdf#page=42>).

Note that the EECQ method mentioned in the suggested remedy is not suitable for adjustable Tx equalization and is thus irrelevant for this project.

Tx jitter measurements and Rx jitter tolerance are part of the CR compliance methodology. Discrete jitter frequencies are used in jitter tolerance testing, to create a verifiable set of requirements, in several previous clauses.

The comment claims that "We currenlty have no effective output compliance test method for C2M or input caliburtion of stressor". These claims are counterfactual; output compliance is defined by Table 176D-2 and Table 176D-3, and input compliance is defined by Table 176D-4 and Table 176D-5. For both input and output, all parameters are testable using the methodology in 176D.8. Specifically, "stress" for input interference tolerance is calibrated using COM as specified in 176D.8.12.

This methodology of transmitter and receiver specifications has been shown to work by successful deployment of multiple generations of CR, KR, and C2C devices and links up to at 100 Gb/s with demonstrated interoperability across multiple products. The EECQ alternative mentioned in the suggested remedy has been used only for LPO, as defined by OIF, and was only recently ratified.

The comment does not provide any data to show that there is a problem that needs solving.

*Cl* **176D** *SC* **176D.6.4** *P* **745** *L* **47** # 447

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **R** *(Electrical) AC coupling*

AC coupling in modules using capacitors is becoming a challenge to signal integrity at 200G per lane. At the same time, modules are build using DSPs which use advanced CMOS processes just like the host ASICs.

It is common to have on-die AC coupling in the receiver, which works well assuming the common mode is limited to the same range on both sides. if both sides have this feature, it is possible to avoid external AC coupling in modules (both Tx and Rx), but it is currently an explicit requirement.

We should consider removing this requirement.

This would require:
- Adding DC common mode range specifications for module output and input. These can be consistent with the host's respective specifications..
- Adding DC common mode tolerance specifications for host input and output. These can be consistent with the module's respective specifications.
- Changing text and figures to remove the AC coupling requirements.

*SuggestedRemedy*

Add common mode range and tolerance specifications and update the text and figures as listed in the comment, with editorial license.

*Response* *Response Status* **C**

REJECT.

The following straw poll was taken:
Straw poll #E-1 (directional)
I would support the direction of allowing modules to have no AC copling, with necessarity additional specifications.
Y: 12 N: 20

There is no consensos for making the proposed change.

*Cl* **176D** *SC* **176D.6.4** *P* **746** *L* **24** # 412

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **A** *(Electrical) R_peak*

The current value Rpeak of module output in AUI-C2M is set too high, which can not be met by the reference COM model as shown by the COM simulation result in P9 of mellitz_3dj_03_2505.

*SuggestedRemedy*

change Rpeak to 0.456 as a starting point. A contribution will be provided.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed the following presentation:
<https://www.ieee802.org/3/dj/public/25_07/mi_3dj_02a_2507.pdf>.

In Table 176D–3, change the value of "Linear fit pulse peak ratio, Rpeak (min)" from 0.567 to 0.456.

*Cl* **176D** *SC* **176D.6.4** *P* **746** *L* **34** # 414

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **A** *(Electrical) SNDR*

As Ali's contribution ghiasi_3dj_02b_2505, dSNDR is a complicated parameter. Rich's contribution further proposed to set a set of SNDR_ref values.

For module vendors, both SNDR and dSNDR are newly introduced, and dependent on the IL at the host side. It is not practical for the module vendors to test for all the IL variations.

*SuggestedRemedy*

The AUI C2M methodology affects both the SERDES/euqipment and the optical module community. The newly introduced parameters need to be open for consideration from both sides, and find consensus in simplfying the measurements.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #481.

*Cl* **176D** *SC* **176D.6.4** *P* **746** *L* **38** # 353

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) VEC*

We currenlty have no effective output compliance test method for C2M or input caliburtion of stressor. We replaced VEC with with JRMS, EOJ, and J4U back in Sept 2024 and it has been more than 9 months without any proof that using jitter alone is sufficent for receive compliance.

*SuggestedRemedy*

TDECQ/EECQ already captrues the jitter as shown in ghiasi_3dj_01a_2409 but also captures amplitude penalty and the effect of PM to AM conversion in thre same way as receiver will observe the penalty. In COM we use reference equalizer to determine compliance, in 802.3ck we used VEC/VEO with a reference equalizer and in OIF Linear and RTLR we use EECQ with reference equalizer for compliance. We have not proven that discrete jitter measurements without a referecne equalizer is sufficent for C2M compliance. Task force need to investigate either show that current methdology works otherwise replace it with CKmethod or OIF EECQ before going to SA ballot.

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #352.

*Cl* **176D** *SC* **176D.6.5** *P* **747** *L* **12** # 354

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **T** *Comment Status* **A** *(Electrical) AC CM*

In 802.3ck VCM(LF) was 32 mV which is more than 2x larger than limit in the DJ draft at TP4 with only 15 mV

*SuggestedRemedy*

Given that Module/TP4 would be the larget source of VCM(LF), recommend increasing to 20 mV

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #506.

*Cl* **176D** *SC* **176D.6.5** *P* **747** *L* **13** # 507

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(Electrical) AC CM*

The Host AC common-mode input tolerance is 80mV max full band . The allowed module output AC common-mode full band is however only 60mV max . There isn't a reason why the host should tolerate more than the module outputs.

*SuggestedRemedy*

Change the host AC common-mode input tolerance full band from 80mV to 60mV

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #506.

*Cl* **176D** *SC* **176D.6.6** *P* **747** *L* **35** # 141

Hidaka, Yasuo — Credo Semiconductor, Inc.

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucketp)*

Module input specification should refer to TP1, not TP1a.

*SuggestedRemedy*

Change TP1a to TP1 in the caption of Table 176D-5.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Delete the words "at TP1a" from the title.

*Cl* **176D** *SC* **176D.6.6** *P* **747** *L* **36** # 505

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) (bucketp)*

The input specifications are best measured at the input to the compliance board as is specified in 176D.6.1 page 744 line 23 and as is done for the host in section 176D.6.5 not at TP1a. (Note however that 176D.8.10 specifically calls out AC common mode voltage tolerance at TP1a).

*SuggestedRemedy*

Change from "specifications at TP1a" to "Specifictions at TP1"

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #141.

*Cl* **176D** *SC* **176D.7.1** *P* **748** *L* **25** # 654

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *(Electrical) Host connector*

Figure 176D-6 includes a connector, which is actually a mated connector, though that is not clear.

*SuggestedRemedy*

Draw a vertical line down the center of the rectangle labeled connector to indicate that both parts of the mated connector are included in the 28.2dB Host channel loss. Compare with figures 176D-4 and 176D-5. Change "Connector" to "Mated Connector" in the figure so it is clear that the loss of the mated connector is included on the Host channel loss.

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.
The current figure, which has no vertical line, results from the resolution of comment #115 against D1.1 (see <https://www.ieee802.org/3/dj/comments/D1p1/8023dj_D1p1_comments_final_clause.pdf#page=43>) and can be found in the related presentation <https://www.ieee802.org/3/dj/public/24_09/ran_3dj_03a_2409.pdf>.
The box in the figure is not a mated connector pair but only the connector in the host, which is part of the host channel for loss budgeting purposes, as indicated by the arrow at the top of the figure. Therefore, the vertical middle line, which existed in previous drafts, has been removed.
This figure matches the architectural diagram in Figure 176D-2.
However, the intent of the figure can be clarified in the text.

Add the following informative NOTE after Figure 176D-6:
NOTE---For loss budgeting purposes, the connector is considered part of the host.
Implement with editorial license.

Further contributions to improve clarity are encouraged.

*Cl* **176D** *SC* **176D.7.1** *P* **748** *L* **37** # 413

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **A** *(Electrical) Host connector*

In the reference insertion loss budget of AUI-C2M, the connector loss was not specified. However, in CL179A.4 for CR channel parameter, a 2.45dB of mated connector insertion loss was assumed. Since the CR can be implemented as DAC, which has been using the same mated connector and packaging formfacotr as many of the IMDD pluggable modules, the same connector loss could be used in the reference channel model of AUI-C2M for a clear illustration.

*SuggestedRemedy*

indicate a connector loss of 2.45dB in the drawing of Figure 176D-6, add appropriate description to the text.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The connector loss has been deliberately omitted from Figure 176D-6 as a result of comments #115, #515, and #566 against D1.1 (see <https://www.ieee802.org/3/dj/comments/D1p1/8023dj_D1p1_comments_final_clause.pdf#page=43>) as can be seen in the related presentation <https://www.ieee802.org/3/dj/public/24_09/ran_3dj_03a_2409.pdf>.
As stated in comment #566 against D1.1, "the connector loss is significant and will not be the same for all connectors <...> the connector is part of the host and its loss should be included".
The response to comment #654 adds a NOTE that clarifies this intent further.

The connector loss should not be mentioned in 179A.4 either, because it is part of the host channel and is not "assumed". Instead, the HCB (assumed/reference) loss should be mentioned. This is addressed by comment #502.
Resolve using the responses to comments #654 and #502.

*Cl* **176D** *SC* **176D.7.1** *P* **750** *L* **17** # 261

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, quantization noise parameters should be added to Table 176D-7.

*SuggestedRemedy*

Add two quantization noise parameters with suggested values to the table. Please refer to slide 18 of the accompanying document for the proposed change.
Also, see shakiba_3dj_elec_01_250626.pdf.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **176D** *SC* **176D.7.1** *P* **751** *L* **23** # 260

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, an updated value for One-sided noise spectral density in Table 176D-7 is needed.

*SuggestedRemedy*

Change One-sided noise spectral density in Table 176D-7 (page 751, line 23) value.
Please refer to slide 18 of the accompanying document for the proposed change.
Also, see shakiba_3dj_elec_01_250626.pdf.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **176D** *SC* **176D.7.2** *P* **748** *L* **45** # 655

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *ctrical) C2M COM (bucket2p)*

"COM calculation, as defined in 178A.1, is also used for calibration of noise in the interference
tolerance test (see 176D.8.12)." What is the meaning of "also", that is, in addition to what? It is not clear, as no other purpose was mentioned here.

*SuggestedRemedy*

Clarify (This may be the purpose of the note on p. 749, line 9. If that is the case, I believe the text of the note belongs in the main text as a sentence leading into the sentence in question.)

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
As noted in the first paragraph of 176D.7.2, the COM _model_ "defines the assumed capabilities of the transmitter and receiver functions of the C2M components". Separately from that, COM calculation (which uses the model, but is not the model) is used for calibration <...>., as noted in the second paragraph.

Move the quoted sentence from the first paragraph to the beginning of the second paragraph, omitting the word "also".
Implement with editorial license.

*Cl* **176D** *SC* **176D.7.2** *P* **748** *L* **51** # 350

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucket)*

The partial channel is only needed for cable assembly CR and not for C2M which has the complete S-Parameters

*SuggestedRemedy*

Partial channel not need for C2M COM and should be removed

*Response* *Response Status* **C**

REJECT.
The CRG has previously considered similar comments, the recent one being comment #151 against D1.4 (see <https://www.ieee802.org/3/dj/comments/D1p4/8023dj_D1p4_comments_final_clause.pdf#page=27>, which was rejected.
As noted in the response to that comment, the host channel model, which is used in dSNDR (176D.8.7) and in host interference tolerance test calibration (176D.8.12.2), includes the partial channel (subject of this comment) and physical MCB and HCB, (see, e.g., Figure 176D-7b).
The partial host channel constitutes most of the 32 dB IL which is the consenus IL budget for the C2M channel. Therefore, it should not be removed.
This comment does not provide any information that was not included in previous comments.

*Cl* **176D** *SC* **176D.7.2** *P* **749** *L* **34** # 609

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

All impedance values should be 92.5 ohms

*SuggestedRemedy*

Change COM Impedance to 92.5 ohms

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **176D** *SC* **176D.7.2** *P* **749** *L* **51** # 140

Hidaka, Yasuo — Credo Semiconductor, Inc.

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket)*

tau^(h) value of 5.97x10^(-3) in Table 176D-6 seems a typo of 5.79x10^(-3). It is 5.79x10^(-3) in Table 179-16 and lim_3dj_01a_2409, slide 2.

*SuggestedRemedy*

Change 5.97x10^(-3) to 5.79x10^(-3).

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **176D** *SC* **176D.7.2** *P* **750** *L* **23** # 239

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *ctrical) Reference impedance*

Adjust COM voltage to 46.25 ohms measurement reference.

*SuggestedRemedy*

Change
A_vtō 0.415
A_fetō 0.415
A_netō 0.611

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #237.

---

*Cl* **176D** *SC* **176D.8.1** *P* **751** *L* **50** # 358

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucket)*

Differential and common-mode signals are not defined in 93.8.1.3, just the figure is used for level definition.

*SuggestedRemedy*

Replace with, Differential and common-mode signal levels definition is given by 93.8.1.3.

*Response* *Response Status* **U**

REJECT.
Contrary to the statement in the comment, the differential and common-mode signals are explicitly defined in the first paragraph of 93.8.1.3:
"The differential output voltage v_di is defined to be SLi<p> minus SLi<n>. The common-mode output voltage v_cmi is defined to be one half of the sum of SLi<p> and SLi<n>".

---

*Cl* **176D** *SC* **176D.8.1** *P* **752** *L* **13** # 359

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) AC CM*

The VCM(LF, FB) is measured at probability of 1E-5, in DJ it is tighten to P=1E-7

*SuggestedRemedy*

Common mode is bigger issue at 200G compared to 100G, with tighten probibility may result in failures. Change P to 1E-5 two places

*Response* *Response Status* **C**

REJECT.
The definition of peak-to-peak with a probability of 1e-7 was adopted by comment #82 against D1.2, see < https://www.ieee802.org/3/dj/comments/D1p2/8023dj_D1p2_comments_final_clause.pdf#page=21>, following presentations <https://www.ieee802.org/3/dj/public/24_11/ran_3dj_05a_2411.pdf> and <https://www.ieee802.org/3/dj/public/24_09/ran_3dj_02a_2409.pdf>.
As noted in these contribution, common-mode noise can cause correlated errors in receivers and degrade the post-FEC performance. Therefore, the peak should be specified at a probability much lower than the BER allocation assuming uncorrelated errors.
The suggested remedy is based on an assumption that this specification may result in failures. However, no data has been provided to show that such high CM noise occurs in transmitters and that receivers can cope with it.

*Cl* **176D** *SC* **176D.8.2** *P* **752** *L* **29** # 142

Hidaka, Yasuo — Credo Semiconductor, Inc.

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket)*

ERL definition in 93A.5 needs a parameter M that is not defined in Table 176D-8, because M is not used in COM definition in Annex 178A.

*SuggestedRemedy*

Add M to Annex 178A in the same way as Annex 93A and to all related tables that refer Annex 178A.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Annex 178A does not refer to 93A.5, so it does not need a value for M.
M should be provided by a clause that invokes 93A.5, along with all other parameters. In previous clauses M was part of the COM parameter tables (with value 32), but in this project it is not. Therefore, it needs to be added, preferably as an ERL parameter.

Add a row for "Number of samples per unit interval", M, with value 32, in the following tables:
Clause 178: Table 178-7, Table 178-8, Table 178-14
Clause 179: Table 179-9, Table 179-14
Annex 176C: Table 176C-3, Table 176C-9
Annex 176D: Table 176D-8
Annex 179B: Table 179B-1
[CC 178, 179, 176C, 176D, 179B]

*Cl* **176D** *SC* **176D.8.2** *P* **752** *L* **29** # 361

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) Tfx*

Line 30 says that "Tfx equal to twice the test fixture delay", statement is not clear.

*SuggestedRemedy*

Tfx for measurement of Host Input/Output is twice the HCB delay.
Tfx for measurement of Module Input/Output is twice the MCB delay.
Suggest to move Tfx into the table and make the above as footnotes in the table.
We shouldn't state in IEEE standard "Tfx is provided by the test fixture provider", what about if fixture suplier doesn't!

*Response* *Response Status* **U**

REJECT.
The test fixture delay is defined in detail in the second paragraph of 176D.8.2 for both host and module measurements. Based on these definitions, the statement should be clear. The suggested remedy does not match the second paragraph and would not improve clarity.
The statement that Tfx is provided by the test fixture provider" was added by the response to comment #199 against D1.1, see < https://www.ieee802.org/3/dj/comments/D1p1/8023dj_D1p1_comments_final_clause.pdf#page=77>. It should be understood as a requirement. The suggested remedy does not provide an alternative phrasing for this statement.

*Cl* **176D** *SC* **176D.8.2** *P* **752** *L* **44** # 608

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The C2M specification should use 92.5 ohm impedance for TP1a ERL

*SuggestedRemedy*

add line in Table 176D-8 to specify 92.5 ohm impedance

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **176D** *SC* **176D.8.2** *P* **752** *L* **50** # 360

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) ERL*

Not clear why Nbx is zero

*SuggestedRemedy*

Suggest to make Nbx=14 which number of fixed FFE taps

*Response* *Response Status* **U**

REJECT.
The host ERL definition is consistent with that of the CR host, as defined in 179.9.4.7. Comment #371 addressed the value of Nbx for CR hosts, but there was no consensus to make a change.

The module ERL definition is consistent with that of the CR cable assembly, as defined in 179.11.3. Nbx for CR cable assembly is also 0 and there was no comment suggesting a change.

There is no consensus to make a change.

*Cl* **176D** *SC* **176D.8.6** *P* **753** *L* **36** # 541

Levin, Itamar — Altera corp.

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucket) presets*

There is no preset that has a different than 0 precursor c(1). Also - the initialize and preset 6 are exactly the same.

*SuggestedRemedy*

Consider a preset with c(1) <> 0. this may help with CDR locking on some channels. Also consider to remove preset 6 or add a comment in this clause explaining why it was added

*Response* *Response Status* **C**

REJECT.
Preset #6 was added by the response to comment #125 against D1.3, see <https://www.ieee802.org/3/dj/comments/D1p3/8023dj_D1p3_comments_final_clause.pdf#page=69>, and the related presentation <https://www.ieee802.org/3/dj/public/25_01/simms_3dj_01a_2501.pdf>. The motivation for adding "initialize" as a separate row is explained in slides 12-20 the related presentation <https://www.ieee802.org/3/dj/public/25_01/ran_3dj_01_2501.pdf>. For AUIs "initialize" is identical to preset 6, but for PMDs it is identical to preset #1. These presets can be requested using the ILT protocol, e.g. to return to the initial value, without having "initialize" as a separate request.

The defined presets follow earlier PAM4 specifications (clause 136, used for 50 and 100 Gb/s) that had zero postcursor c(1) for all presets.
Note that changes to c(1) can be requested using ILT (which has an initial PAM2 pattern that may be used for CDR locking).

The comment does not provide sufficient justification to support the suggested remedy. The proposed change does not contain sufficient detail to implement.

*Cl* **176D** *SC* **176D.8.6** *P* **753** *L* **51** # 463

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Electrical) Tx equalizer*

There is no reference to the number TAPs the C2M TxFIR supplies (no reference to 179.4.1). In 179 there are separate sub-clauses for the FIR and ILT but it's combined in the Annexes. Can we align the C2M and C2C description to refer to 179 with exceptions for the reduced ranges and start up conditions.

*SuggestedRemedy*

Replace the text of 176D.8.6 with the following:

The transmit equalizer is identical to that specified in 179.4.1 and utilizes the inter-sublayer link training (ILT) function for Type E1 interface as defined in 179.8.9 with the following exceptions:
* Table 179D-9 is used instead of Table 179-8 for coefficient initialization values
* Host output step size and coefficient limits are specified in Table 179D-2
* Module output step size coefficient limits are specified in Table 179D-3

Replace the text of 176C.5.3.1 with the following:

The transmit equalizer is identical to that specified in 179.4.1 and utilizes the inter-sublayer link training (ILT) function for Type E1 interface as defined in 179.8.9 with the following exceptions:
* Table 179D-9 is used instead of Table 179-8 for coefficient initialization values
* Output step size and coefficient limits are specified in Table 179C-2

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The suggested wording would provide a more complete specification and improve readability.
Note that another comment, #666, suggests using the same initialize setting for PMDs and AUIs. If #666 is accepted, the exceptions will not be necessary and a single table can be used.

Implement the suggested remedy with editorial license, and with consideration of the response to comment #666.
[Editor's note: CC: 176C, 176D]
[Editor's note: changed page from 735 to 753]

*Cl* **176D** *SC* **176D.8.7** *P* **754** *L* **20** # 355

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) SNDR*

The dSNDR procedure for host is not clear as some some of the paragraph are for determination of reference SNDR but the last paragraph is for actual measurement of DUT SNDR.

*SuggestedRemedy*

Here are sugestions:
- Please separate the measurement of reference channel SNDR from measurement of DUT SNDR
- After definition of reference SNDR "calculate reference SNDR"
- In the 2nd part clarly identify this procedure is for measurement of DUT SNDR add to sentense "...of 6 ps is used for measurement of DUT SNDR"
- Then last step is dSNDR=DUT SNDR - Ref SNDR

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #481.

*Cl* **176D** *SC* **176D.8.7** *P* **754** *L* **34** # 356

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) SNDR*

The dSNDR procedure for module is not clear as some some of the paragraph are for determination of reference SNDR but the last paragraph is for actual measurement of DUT SNDR.

*SuggestedRemedy*

Here are sugestions:
- Please separate the measurement of reference channel SNDR from measurement of DUT SNDR
- After definition of reference SNDR "calculate reference SNDR"
- In the 2nd part clarly identify this procedure is for measurement of DUT SNDR
- Then last step is dSNDR=DUT SNDR - Ref SNDR

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #481.

*Cl* **176D** *SC* **176D.8.7** *P* **754** *L* **34** # 357

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) SNDR*

The dSNDR procedure for DUT measurement is missing

*SuggestedRemedy*

The module inputs at TP1 on each lane are driven by asynchronous signals created by PRBS31Q or
PCS data, with transmit equalization (see 176D.8.6) set to preset 1, and calibrated at the generator
output with target maximum steady-state voltage as specified in Table 176D-3 and transition time of
6 ps is used for measurement of DUT SNDR.

*Response* *Response Status* **U**

REJECT.
The addition of asynchronous signals at the host input in host SNDR measurement was added in response to comment #423 against D1.3, see <https://www.ieee802.org/3/dj/comments/D1p3/8023dj_D1p3_comments_final_clause.pdf#page=39>. The comment noted that the situation is different for module SNDR, since the output signal is stronger and the input interferer signals are weaker, and thus did not suggest adding the same requirement in this case. In consideration of that comment, the additional signals were added only to the host output SNDR measurement.

In this comment, the suggested remedy is to add the same signals for module SNDR measurement.

The comment but does not provide sufficient justification to support the suggested remedy.

*Cl* **176D** *SC* **176D.8.7** *P* **754** *L* **36** # 542

Levin, Itamar — Altera corp.

*Comment Type* **T** *Comment Status* **A** *(Electrical) SNDR*

no reference / example test-fixture like in the previous annex 163B, that meets the requirements for TP0

*SuggestedRemedy*

can we add an example rest-fixture annex for 200G similar to 163B with the COM values to serve as a reference for dVf, dSNR, etc'?

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The suggested remedy addresses dSNDR and dvf.
The response to comment #481 replaces dSNDR with SNDR, so an example of a reference is not required. dvf is not a specification in Annex 176D.

Resolve using the response to comment #481.

*Cl* **176D** *SC* **176D.8.11** *P* **755** *L* **12** # 411

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **R** *(Common) Block error ratio*

The determination of a receiver can tolerate a given voltage as its amplitude tolerance, is based on the receiver satisfies the error allocation requirements in 176D.2 when operating in Data mode.
In 176D.2, the error allocation is to meet the block error ratio of 1.45e-11 measured using the method described in 174A.8, where one can examine the histogram and compare it to a mask or calculate the block error ratio based on the histogram.

The histogram consists of 17 bins, with bin 0 to bin 15 should be measured or projected with value, to calculated bin 16p.

The expected measurement time of getting direct measurement result for each of the test_block_error_bin_i is impractical in both DVT and volume testing. An estimated of 10 days to observe 1 event in bin 15 in the cases of the upper limit Hmax. For practical products, performance are expected to be better than Hmax, making it even longer to observe.

My previous contribution with 100G/L data and Michael He's 200G/L data have shown that statistical projection can be very subjective approach, sometimes even impossible. This eliminates the block error histogram and the block error ratio (which is calculated using the histogram) being objective metric for link performance, especially when it comes to quantitative comparison. Whether or not a DUT passes the requirement can be dependent on an engineer's experience and judgement.

Judgement of amplitude tolerance of the module input and host input based on block error ratio is not ecnomical feasible.

*SuggestedRemedy*

Consider the approach of using BER, and use block error method as recommendation / informative test to complement verification of the system.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **176D** *SC* **176D.8.11** *P* **755** *L* **21** # 410

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **A** *:lectrical) Amplitude tolerance*

beginning of this section, the amplitude tolerance is said to be define as the maximum steady state voltage. In this note, it says the steady-state voltage is defined with preset 1. In the same time, the receiver is not required to tolerate preset 1 unless it specifically requests it.

It is very confusing which voltage is used and how it is defined.

*SuggestedRemedy*

Please clarify.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slide 30 in <https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01b_2507.pdf>.

Implement the changes as shown on slide 30 with editorial license.

---

*Cl* **176D** *SC* **176D.8.12.4** *P* **758** *L* **35** # 533

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) precoding*

The C2M receeiver should be able to determine whether pre-coding is used.

*SuggestedRemedy*

Change "PRBS31Q pattern" to "PRBS31Q pattern with the precoder enabled or disabled as the receiver would select using the ILT protocol"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #534.

---

*Cl* **177** *SC* **177.1** *P* **327** *L* **11** # 241

Gorshe, Steve — Microchip Technology

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The term "SIL" appears in this figure. It is defined in some figures as meaning "Signal Indication Logic" but not in this figure and others.

*SuggestedRemedy*

Since SIL is used in mutliple figures without consistent definition, I recommend adding SIL to the abbreviation list in clause 1.5

*Response* *Response Status* **C**

ACCEPT.
[Editor's note: CC: 1, 177]

---

*Cl* **177** *SC* **177.1.1.3** *P* **326** *L* **6** # 583

Nowell, Mark — Cisco

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Unlike Clause 184.1.3 which summarizes the functions of that clauses inner FEC, Clause 177.1.3 doesn't include the basic detail that it is a BCH(128,120) encoding/decoding.

For readability and consistency these two subclauses should provide similar information to the reader.

*SuggestedRemedy*

In clause 177.1.3, include the description that that the inner FEC encoding for Clause 177 is BCH(128,120)

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **177** *SC* **177.1.3** *P* **326** *L* **7** # 82

Bruckman, Leon — Nvidia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The convolutial interleaver is "a convolutional interleaver"

*SuggestedRemedy*

Change: "using the convolutional interleaver" to: "using a convolutional interleaver"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **177** *SC* **177.2** *P* **328** *L* **14** # 182

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

It would be better to not list the specific PMDs here and create a potential need to regularly update this text if new PHYs are added that use this inner FEC.

*SuggestedRemedy*

Replace "The number of parallel streams, n, is 1 for 200GBASE-DR1-2, 2 for 400GBASE-DR2-2, 4 for 800GBASE-DR4-2, 800GBASE-FR4, and 800GBASE-LR4, and 8 for 1.6TBASE-DR8-2."
with
"The number of parallel streams, n, is 1 for 200GBASE-R PHYs, 2 for 400GBASE-R PHYs, 4 for 800GBASE-R PHYs, and 8 for 1.6TBASE-R PHYs."

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **177** *SC* **177.2** *P* **328** *L* **21** # 83

Bruckman, Leon — Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Different lenguage used in adjacent paragraphs. In the first paragraph: ", the tx_symbol parameters are undefined." and in the next paragraph: "the corresponding rx_symbol parameters on all lanes are unspecified.

*SuggestedRemedy*

Use similar lenguage in both paragraphs.
Make same change in the two last paragraphs of 177.3

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Use the same language as rx side.

---

*Cl* **177** *SC* **177.3** *P* **328** *L* **45** # 183

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

Clause 182 is not the only PMD that is used with this inner FEC, so the service interface below the Inner FEC is not limited to the PMD service interface in 182.3. It could also be the interface in 183.3. Rather than enumerating all the clauses (which would create a potential need to regularly update the clause), a more generic statement can be used.

*SuggestedRemedy*

Change "the PMD service interface defined in 182.3" to "the PMD service interface for the PHY".

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **177** *SC* **177.4.2** *P* **331** *L* **29** # 184

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Awkward grammer in "The data from deskwed PMA lane is fed."

*SuggestedRemedy*

Change to "Data from the deskwed PMA lane is fed."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change:
"The data from deskewed PMA lane is fed."
to:
"Data from the deskewed PMA lane is fed."

---

*Cl* **177** *SC* **177.4.2** *P* **331** *L* **30** # 84

Bruckman, Leon — Nvidia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Missing word

*SuggestedRemedy*

Change: "The data from deskewed PMA lane" to: "The data from a deskewed PMA lane"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #184.

---

*Cl* **177** *SC* **177.4.5** *P* **333** *L* **16** # 697

Dawe, Piers — Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

is most naturally defined

*SuggestedRemedy*

Clean up

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Remove "most naturally".

*Cl* **177** *SC* **177.4.5** *P* **333** *L* **18** # 698

Dawe, Piers
Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

alpha

*SuggestedRemedy*

Define

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add definition for alpha as "alpha is a primitive element in Galois Field GF(2^7)."

*Cl* **177** *SC* **177.4.5** *P* **333** *L* **20** # 699

Dawe, Piers
Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Logic)*

x

*SuggestedRemedy*

Define

*Response* *Response Status* **U**

REJECT.
X, when used as the variable in a polynomial, is not defined in other clauses. This is common knowledge to implementers.

*Cl* **177** *SC* **177.4.5** *P* **333** *L* **24** # 700

Dawe, Piers
Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

T

*SuggestedRemedy*

Define

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add definition for T : " the superscript "T" denotes a matrix transpose operator"

*Cl* **177** *SC* **177.4.5** *P* **333** *L* **25** # 701

Dawe, Piers
Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Logic) (bucket2p)*

MSB

*SuggestedRemedy*

Define

*Response* *Response Status* **U**

REJECT.

MSB is defined in 1.5 and is used across the document. Although Galois field arithmetic has no mathematical MSB or LSB, they must be defined to ensure a correct implementation. For example, the order of the bits (MSB first or LSB first) impacts the syndrome calculation when implemeted as a shift register.

*Cl* **177** *SC* **177.4.5** *P* **333** *L* **30** # 702

Dawe, Piers
Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) matrix math*

big dot

*SuggestedRemedy*

Define

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.

Add definition for bit dot : "big dot" denotes matrix dot product. Make sure all "big dot"s are the same size.

Implement with editorial license.

*Cl* **177** *SC* **177.4.5** *P* **333** *L* **50** # 703

Dawe, Piers
Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) matrix math*

big dot

*SuggestedRemedy*

Define

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #702.

*Cl* **177** *SC* **177.4.5** *P* **334** *L* **1** # 704

Dawe, Piers
Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) matrix math*

^-1

*SuggestedRemedy*

Define

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.

Add definition for "^-1" as: "the superscript "-1" denotes a matrix inversion operator."

Each element is 1x8 with 8 elements that results in a square matrix. So an inverse operation is appropiate.

Implement with editorial license.

*Cl* **177** *SC* **177.4.5** *P* **334** *L* **4** # 705

Dawe, Piers
Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

generator matrix vs. Generation matrix - confusingly similar names

*SuggestedRemedy*

Rename one

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Rename to "generator matrix".

*Cl* **177** *SC* **177.4.7** *P* **334** *L* **37** # 185

Huber, Thomas
Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

Figure 177-7 is a bit confusing. The 1024-bit pad is the equivalent number of bits as "8x Inner FEC codewords", but of course is not that, it's padding bits as described by the text and subclauses under the figure. More generatlly, the use of "8x" in the figure is not appropriate, as there is no multiplication going on. In the text under the horizontal brace (8704 Inner FEC codewords), the intent is that there are 1088 blocks of 8 Inner FEC codewords (a total of 8704 codewords), but this could easily be misinterpreted by a careless reader as 8704 blocks of 8 Inner FEC codewords It would also be helpful to explicitly indicate 1088 blocks, as that would more clearly relate back to the text about the 1088/1089 ratio.

*SuggestedRemedy*

In the pad blocks, replace "8x Inner FEC codewords" with "1024 bits". In the other blocks, change "8x" to "8". In the text under the brace, add another line that says "(1088 blocks of 8 inner FEC codewords)".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **177** *SC* **177.4.7.3** *P* **336** *L* **4** # 85

Bruckman, Leon
Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

The bit pair interleaving function for the pad field is not described.

*SuggestedRemedy*

Add section decribing the bit-pair interleaving fucntion shown in figure 177-8. Something in the lines of: "After Inner FEC encoding, the eight pad flows of Inner FEC codewords shall be multiplexed together as decribed in 177.4.6".
Also refer to comment against the figures in Clause 177 vs the ones in Annex 177A regarding the pad insertion function liocation.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add subclause 177.4.7.4, describing the bit-pair interleaving as "The 8 pad codewords are multiplexed together as described in 177.4.6"

*Cl* **177** *SC* **177.4.8.2** *P* **336** *L* **15** # 186

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **R** *(Logic) (bucket)*

If the precoder is configured either based on ILT or is "set as required by the implementation", what is the purpose of having the set of "precoder_{tx|rx}_{in|out}_enable_i" variables to enable and disable it for each lane/direction? It doesn't sound like the user has any need to control these settings.

*SuggestedRemedy*

Either remove the variables entirely, or treat them as status variables that report the configuration if there is some value in the user knowing what the configuration is Or, if the intent in the case that ILT is not being used is that the user needs to figure out whether to enable the precoder, make that more clear.

*Response* *Response Status* **C**

REJECT.

When training is disabled, the user needs to configure the precoder on both sides to the same value, depending on the implementation. The language used here is consistent with similar language in clause 120 and other clauses, and is intentionally vague to allow for a variety of implementation choices.

[Editor's note: CC: 176, 177]

*Cl* **177** *SC* **177.5.1** *P* **336** *L* **36** # 187

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The last sentence is a comma splice.

*SuggestedRemedy*

Change to read: "The hard-decision PAM4 decoding function.. in Figure 177.2. The soft-decision PAM4 decoding."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **177** *SC* **177.5.2** *P* **337** *L* **9** # 86

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

The pad field is not used to frame the data stream in the state diagram shown in Figure 177-10.

*SuggestedRemedy*

Change: "The eight codewords inserted as pad (see 177.4.7) are used to frame the data stream and are then removed before the received data is processed further."
To: "The eight codewords inserted as pad (see 177.4.7) are then identified and removed before the received data is processed further."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **177** *SC* **177.5.2** *P* **337** *L* **19** # 281

Ren, Hao — Huawei

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

The definition of the candidate location and the synchronization location is not clear.

The candidate location is the inner FEC codeword boundary of a valid set of codewords. The candidate location is regarded as the synchronization location when the candidate location is confirmed valid for a second window of 128b-bit blocks.

*SuggestedRemedy*

Change:
The synchronization process searches for a valid set of codewords in a window of 128-bit blocks, confirms the candidate location is valid for a second window of 128b-bit blocks and then monitors that the synchronization location continues to be valid during operation.
to:
[A]: The synchronization process searches for a valid set of codewords in a window of 128-bit blocks. The boundary of these codewords is marked as candidate location, which is confirmed as the synchronization location if it is valid for a second window of 128b-bit blocks. The synchronization process contiuously validates the synchronization location during operation.
[B]: The synchronization process searches for a valid set of codewords in a window of 128-bit blocks, marking the boundary of these codewords as candidate location, confirms the candidate location as sychronization location by validating for a second window of 128b-bit blocks, and then monitors that the synchronization location continues to be valid during operation.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Breaking the sentence can improve clarity. Use language as follows:
"The synchronization process searches for a valid set of codewords in a window of 128-bit blocks, marking the boundary of these codewords as a candidate location. A candidate location is confirmed as the synchronization location if it is valid for a second window of 128b-bit blocks. The synchronization process continuously validates the synchronization location during operation."

*Cl* **177** *SC* **177.5.2** *P* **337** *L* **20** # 188

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

"128b-bit blocks" has a stray b

*SuggestedRemedy*

Change to "128-bit blocls"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **177** *SC* **177.5.5** *P* **338** *L* **31** # 568

Nicholl, Shawn — AMD

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Current text: "The decoder is expected to correct all codewords with one bit error. It may also be able to correct ..."

The current sentence, although containing no language that indicates a mandatory requirement, might be interpretted by readers as a requirement.

It is preferred to clarify the language as improved soft-decision decoder performance (gain) may be obtained by an implementation that is not bound by a rule to correct all codewords with one bit error

*SuggestedRemedy*

Referring to 802.3-2022 Sub-Clause "1.1.6 Word usage", perhaps the word "should" provides sufficient clarity.

Proposed text: "The decoder should correct all codewords with one bit error. It may also be able to correct ..."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **177** *SC* **177.5.5** *P* **339** *L* **5** # 282

Ren, Hao — Huawei

*Comment Type* **TR** *Comment Status* **R** *(Logic) FEC bin counters*

The number of Inner_FEC_codeword_error_bin_k counters can be decreased.
k = 0 should be ignored, because this counter value can be calculated from other counters.
Also in 802.3ck, k=0 is not set for RS-FEC error bin counter as in 161.6.17.

*SuggestedRemedy*

Change:
A set of four 32-bit counters where counter k counts once for each codeword received with exactly k bits corrected (flipped) when fas_lock is true (k = 0 to 3).
to:
A set of three 32-bit counters where counter k counts once for each codeword received with exactly k bits corrected (flipped) when fas_lock is true (k = 1 to 3).

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #561.

*Cl* **177** *SC* **177.5.5** *P* **339** *L* **6** # 569

Nicholl, Shawn AMD

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket2)*

Current text: "... when fas_lock is true (k = 0 to 3). For example, if an Inner FEC codeword has exactly two bits corrected, then Inner_FEC_codeword_error_bin_2 is incremented. Error bin 3 increments when three or more bits are corrected in an Inner FEC codeword."

The text in Sub-Clause "177.5.5 Inner FEC decode" is inconsistent with "Table 45-212l -- Inner FEC codeword error bin register definitions". The MDIO register contains bin_0 through bin_4.

*SuggestedRemedy*

Proposed text: "... when fas_lock is true (k = 0 to 4). For example, if an Inner FEC codeword has exactly two bits corrected, then Inner_FEC_codeword_error_bin_2 is incremented. Error bin 4 increments when four or more bits are corrected in an Inner FEC codeword."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The text in 177.5.5 is correct as written.

For Clause 177 Inner FEC, bin 3 counts codewords with 3 or more bits corrected and bin 4 is not used. For Clause184 Inner FEC, bin 3 counts codewords with 3 bits corrected (only), and bin 4 counts codewords with 4 or more bits corrected. The register set in 45.2.1.262 is used for both types of Inner FEC. The register description in 45.2.1.262 should be corrected to reflect this difference.

Replace the third paragraph of 45.2.1.262:
"The bin 0 register (1.2424, 1.2425) keeps a count of codewords with no bit errors, the bin 1 register (1.2426, 1.2427) keeps a count of codewords with 1 bit error corrected, the bin 2 register (1.2428, 1.2429) keeps a count of codewords with 2 bits corrected, the bin 3 (1.2430, 1.2431) register keeps a count of codewords with 3 bits corrected, and the bin 4 (1.2432, 1.2433) register keeps a count of codewords with 4 or more bits corrected."

With:
"The bin 0 register (1.2424, 1.2425) keeps a count of codewords with no bit errors, the bin 1 register (1.2426, 1.2427) keeps a count of codewords with 1 bit error corrected, and the bin 2 register (1.2428, 1.2429) keeps a count of codewords with 2 bits corrected.

For the inner FEC defined in Clause 184, the bin 3 (1.2430, 1.2431) register keeps a count of codewords with 3 bits corrected, and the bin 4 register (1.2432, 1.2433) register keeps a count of codewords with 4 or more bits corrected.

The inner FEC defined in Clause 177 does not use the bin 4 register, for Clause 177 the bin 3 register keeps a count of codewords with 3 or more bits corrected."

Implement with editorial license.

*Cl* **177** *SC* **177.5.5** *P* **339** *L* **11** # 87

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

There is no mention regarding when are the 8 parity bits removed

*SuggestedRemedy*

Add to the end of the section: "Parity bits are then removed from each Inner FEC codeword"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **177** *SC* **177.5.8** *P* **339** *L* **26** # 88

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic)*

The convolutional interleaver function is not trivial. Needs a more detailed description

*SuggestedRemedy*

Add a figure that describes the convolutional deinterleaver (refer to 184.5.8)

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

A figure would be helpful.

Add the figure shown in slide #44 of
https://www.ieee802.org/3/dj/public/25_07/nicholl_3dj_01_2507.pdf
to illustrate the convolutional deinterleaving process.

Add supporting text as necessary.

Implement with editorial license.

*Cl* **177** *SC* **177.6.1.1** *P* **339** *L* **44** # 89

Bruckman, Leon Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Missing "the"

*SuggestedRemedy*

Change: "is processed by Inner FEC sublayer" to: "is processed by the Inner FEC sublayer"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **177** *SC* **177.6.1.4** *P* **340** *L* **10** # 189

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) Test patterns*

Isn't this subclause just a natural consequence of subclause 177.6.1.2? I.e., if there is a PRBS 31 generator at the input to the PAM4 encoder, it stands to reason that there can be a PRBS31Q pattern at the output of the PAM4 encoder; that is not a unique test pattern, it's the natural result of enabling the PRBS31 generator.

*SuggestedRemedy*

Delete this subclause. Or if there is some value in noting that this pattern exists, rather than saying the inner FEC shall include it, just state that enabling the PRBS31 generator (see 177.6.1.2) produces a PRBS31Q pattern at the output of the PAM4 encoder.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The PRBS31Q pattern is naturally available by requiring a PRBS31 pattern generator.

Change the text of 177.6.1.4 to reflect this (similar to text in 176.7.4.2)

From:

"The Inner FEC shall include a PRBS31Q test pattern, provided by a PRBS31 generator (see 177.6.1.2) and the PAM4 encoder (see 177.4.8), on each transmit output lane towards the PMD service interface. The PAM4 encoder provides precoding (if enabled) and Gray mapping."

To:

"The PRBS31Q test pattern generation is provided by the PRBS31 generator (see 177.6.1.2), followed by Gray mapping, and precoding (if enabled) in the PAM4 encoder (see 177.4.8)."

Implement with editorial license.

*Cl* **177** *SC* **177.6.2.3** *P* **340** *L* **41** # 90

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Logic) (bucket)*

This checker is not shown in Figure 177-2.

*SuggestedRemedy*

Add the PRBS31 encoded by Inner FEC test pattern checker location in Figure 177-2.

*Response* *Response Status* **C**

REJECT.
By the definition of 177.6.2.3, this checker is not part of 177. It is in the PMA above the Inner FEC.

*Cl* **177** *SC* **177.10** *P* **346** *L* **47** # 571

Nicholl, Shawn — AMD

*Comment Type* **E** *Comment Status* **R** *(Logic) (bucket)*

In the "Status variable" column of the "Inner_FEC_codeword_error_bin_k (Inner FEC lane 0)" row of "Table 177-8 -- Inner FEC status variables and MDIO mapping", it is not obvious what is meant by 'k'.

Same issue is observed for rows "Inner_FEC_codeword_error_bin_k (Inner FEC lane 1)" through "Inner_FEC_codeword_error_bin_k (Inner FEC lane 7)".

*SuggestedRemedy*

Propose that in the "Status variable" column of the "Inner_FEC_codeword_error_bin_k (Inner FEC lane 0)" row of "Table 177-8-Inner FEC status variables and MDIO mapping" add text "(k = 0 to 4)".

Propose that in each of rows "Inner_FEC_codeword_error_bin_k (Inner FEC lane 1)" through "Inner_FEC_codeword_error_bin_k (Inner FEC lane 7)" also add the text "(k = 0 to 4)".

*Response* *Response Status* **C**

REJECT.
In Table 177-8 there is a reference to the defintion of the status variable "Inner_FEC_codeword_error_bin_k" (to subclause 177.5.5), and this definition defines the range for k.

*Cl* **177** *SC* **177.10** *P* **346** *L* **47** # 570

Nicholl, Shawn AMD

*Comment Type* **TR** *Comment Status* **A** *(Logic) FEC bin counters*

Some values are missing in the "MDIO register/bin number" column of the "Inner_FEC_codeword_error_bin_k (Inner FEC lane 0)" row of "Table 177-8-Inner FEC status variables and MDIO mapping".

Same issue is observed for rows "Inner_FEC_codeword_error_bin_k (Inner FEC lane 1)" through "Inner_FEC_codeword_error_bin_k (Inner FEC lane 7)".

*SuggestedRemedy*

In the "MDIO register/bin number" column of the "Inner_FEC_codeword_error_bin_k (Inner FEC lane 0)" row of "Table 177-8-Inner FEC status variables and MDIO mapping" add 1.2332 and 1.2333.

In each of rows "Inner_FEC_codeword_error_bin_k (Inner FEC lane 1)" through "Inner_FEC_codeword_error_bin_k (Inner FEC lane 7)" also add the MDIO registers that correspond to bin_4.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The max bin for Clause 184 Inner FEC is 4, and the max bin for Clause 177 Inner FEC is 3. The two sets of bin counters share the same MDIO register sets. The text in clause 177 is correct as written.

Clarifications to the use of the MDIO registers in Clause 45 for the Inner FEC error counters which support both clause 177 and 184 are being made through comment #569.

*Cl* **177A** *SC* **177A** *P* **765** *L* **1** # 453

He, Xiang Huawei

*Comment Type* **TR** *Comment Status* **A** *(Logic) Test vector*

The test vectors have not been updated since scrambler was added to the padding bits. Annex 177A should be updated to reflect the change.

*SuggestedRemedy*

A presentation with zipped files will be provided.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed the presentation at:
https://www.ieee802.org/3/dj/public/25_07/he_x_3dj_01_2507.pdf

The CRG reviewed slides #45-47 of the editorial presentation at:
https://www.ieee802.org/3/dj/public/25_07/nicholl_3dj_01_2507.pdf

The test vectors provided by 802.3dj D2.0 in Annex 177A are out of date since they do not include the scrambling of the Inner FEC pad bits.

Update Annex 177A to use the new set of test vectors updated to correspond to the response of comment #110.

Update the test vectors based on the current contribution located at:
https://www.ieee802.org/3/dj/public/25_07/he_x_3dj_02_2507.rar with an additional intermediate test point. TP1, TP2, TP3 do not change. TP4 and TP5 are removed. TP6 becomes TP5 and a new TP4 is to be added.

Update 177.4.7.2 to describe the scrambling order as shown in Option A on slide 4 of he_x_3dj_01_2507.

Implement with editorial license.

*Cl* **177A** *SC* **177A** *P* **765** *L* **21** # 294

Brown, Matt Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(Logic) Test vector*

The referenced test vectors do not include scrambling of pad bits as specified in 177.4.7.2 as the requirement scrambling was added in a later draft.

*SuggestedRemedy*

Provide a new test vector set which includes scrambling of the pad bits.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #453.

*Cl* **177A** *SC* **177A** *P* **765** *L* **46** # 110

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) Test vector*

Figure 177A-1 shows the pad insertion in a different position than Figure 177-2

*SuggestedRemedy*

Make the figures consistent.
Either move the pad insertion in Figure 177-2 to be before the Inner FEC encoder, or move it in Figure 177A-1 to be after the 8:1 PAM4 interleaver block

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slides #45-47 of the editorial presentation at:
https://www.ieee802.org/3/dj/public/25_07/nicholl_3dj_01_2507.pdf

Keep Figure 177-2 as it is.

In Annex 177A, replace Figure 177A-1 as shown on slide #47 of nicholl_3dj_01_2507.
Relabel test points (TP) as vector points (VP) as appropiate.

Implement with editorial license.

*Cl* **178** *SC* **178.1** *P* **357** *L* **1** # 91

Bruckman, Leon Nvidia

*Comment Type* **ER** *Comment Status* **R** *(Electrical) (bucket)*

Table 178-4 footnotes are in the next page

*SuggestedRemedy*

Make sure the footnotes of Table 178-4 are in the same page with their correspondent table.

*Response* *Response Status* **C**

REJECT.
The placement of tables and footnotes may change in future drafts due to various edits.
The publication editor will address such changes for the final version.

*Cl* **178** *SC* **178.2** *P* **357** *L* **5** # 638

Li, Mike Altera (An Intel compnany)

*Comment Type* **T** *Comment Status* **R** *:lectrical) (bucket) BERadded*

Refer to figure 174A-5,
1.) BERadded is the BER contribution outside of the measured sublayer link.
2.) Measured sublayer link is PCS-to-PCS including PMD and FEC. Both TX-FEC and RX-FEC must be included in the PHY-based measurement. To use FEC decoder, the incoming signal must be encoded (compared with the incoming signal does not need to be encoded to use PMA-based block error measurement).
3.) May the measured link have xMII extender outside this sublayer link (its BER budget is not 8e-6 according to CL-174A.4).
4.) with Table 174A-2, table 174A-3, xMII extender (if used) is not part of CER < 1.45e-11 spec.
5.) Considering all of these, the BERsdded value for CL-178.2 should not be simple 8e-6. Instead, it should be 8e-6 * Number_of_C2C_SubLayerLink outside of the measured sublayer link between the two ends MACs.

*SuggestedRemedy*

change the BERsdded value from 8e-6 to 8e-6 * Number_of_C2C_SubLayerLink outside of the measured sublayer link between the two ends MACs.

*Response* *Response Status* **C**

REJECT.

Resolve using the response to comment #639.

*Cl* **178** *SC* **178.7** *P* **359** *L* **23** # 300

Brown, Matt Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket)*

There are no "FEC lanes". This is likely a carry-over from 802.3ck for 100GBASE-KR1 which indeed does have FEC lanes.

*SuggestedRemedy*

Change "PCS or FEC" to "PCS".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178** *SC* **178.8.1** *P* **360** *L* **15** # 640

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *(Electrical) link diagram*

The test points in the figure are not the test points at which the OMD is spoecified. The PMD is specified at TP0v, which is not shown in the figure. The first sentence starting with "The test points" implies that these are the only test points.

*SuggestedRemedy*

Change the title of the section from "Specified Test Points" to "Referenced Test Points". Delete the word "The" at the beginning of the first sentence. Add a sentence after the first sentence that reads: "The PMD is specified at test points TP0v and TP5v (see 178.9.2.1 and 178.9.3.1)."

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #92.

*Cl* **178** *SC* **178.8.1** *P* **360** *L* **23** # 303

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(Electrical) link diagram*

The PMD ends and the medium begins at the MDI. According to 178.11 the MDI is at TP0 and TP5, not at TP0d and TP5d. Further, in most cases "channel" spans from TP0 to TP5; though there are some cases that reference the TP0d to TP5d channel, e.g., "Maximum insertion loss from Tp0d to Tp5d, ILdd, at 53.125 GHz (recommended)" in Table 178-11.

*SuggestedRemedy*

In Figure 178-2, make the following changes:
Show the PMD ending and "channel" beginning at TP0 and TP5.
Add a label at TP0 and TP5 "MDI".
Apply similar changes to Figure 176C-2.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #92.

*Cl* **178** *SC* **178.8.1** *P* **360** *L* **24** # 92

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Electrical) link diagram*

The ILT function and SIGNAL_OK handling is missing. In the optical PMDs appears in the block diagram figures

*SuggestedRemedy*

In Figure 178-2 add the ILT function above the PMD transmit and receive functions. Show the SIGNAL_OK as an input to the ILT function at the left side and as an output to the ILT function in the right side (refer for example to Figure 180-2)
Apply also to Figure 179-2.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slides 24-26 in
<https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01b_2507.pdf>.

Implement the changes listed on slide #25 of ran_3dj_01b_2507, with editodial license.

*Cl* **178** *SC* **178.8.1** *P* **360** *L* **32** # 304

Brown, Matt — Alphawave Semi

*Comment Type* **ER** *Comment Status* **R** *(Electrical) link diagram*

The die is labelled "device", whereas the "device" is the combination of die and package.

*SuggestedRemedy*

Change label pointing to the die on the left side of the Figure 178-2 to "Die".

*Response* *Response Status* **C**

REJECT.
The term "device to package interface" is used in several places in the draft and in the base standard. Changing it to "die to package" would create inconsistency.

*Cl* **178** *SC* **178.8.1** *P* **360** *L* **33** # 302

Brown, Matt — Alphawave Semi

*Comment Type* **ER** *Comment Status* **A** *(Electrical) link diagram*

Figure 178-2. The interface at TP0 is helpfully labelled as "package-to-board interface". A similar label would be helpful at TP0d.

*SuggestedRemedy*

Add a label at TP0d "die-to-package interface".
Apply similar change to Figure 176C-2.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #92.

*Cl* **178** *SC* **178.8.1** *P* **360** *L* **38** # 301

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **R** *'lectrical) (bucketp) possesive*

Use of possesive grammar is inconsistent with similar phrases used through this draft and is unecessary here.

*SuggestedRemedy*

Change "transmitter's" to "transmitter"
Change "receiver's" to "receiver"
Implement similar in Figure 179-2, Table 179-10, Figure 176C-2, Table 176C-4, Table 176D-4, Table 176D-5,
On page 723 line 26 change "component's" to "component".
On page 756 line 1 change "transmitter's
measured parameters" to "measured transmitter parameters"

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **178** *SC* **178.8.9** *P* **361** *L* **13** # 416

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Common) ILT local_pattern*

In order to bring up a link that includes multiple ISLs, the functionality of ILT as specified by Annex 178B (specifically Figure 178B-7 and Figure 178B-8) is required across ISLs.

In PMDs that have a training protocol but it's disabled, the "quiet" and "local pattern" modes are the method of communicating the RTS to the peer. However, the local pattern is currently not defined.

Apples to the multiple ILT function subclauses of the PMD functional specifications in clauses 178 through 182 (which have an SM-PMA above the PMD)

*SuggestedRemedy*

Specify that PRBS31Q (which may be generated by the PMA, see 176.7.4.2) is the pattern used when mr_training_enable is false and tx_mode has the value local_pattern (see 178B.14.3.1).

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following related contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/ran_3dj_02_2507.pdf

Implement slide 10 of ran_3dj_02_2507 and ensure that similar requirements for the C2M and C2C AUI are explicit as well.

Implement with editorial license.

*Cl* **178** *SC* **178.8.9** *P* **361** *L* **25** # 305

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(Electrical) (bucket)*

Regarding "control the transmitter on each lane of the MDI". It's really controlling the PMD transmitter not the MDI and to be clear it is controlling the PMD transmitter only in response to requests from the link peer interface.

*SuggestedRemedy*

Change "control the transmitter output on each lane of the MDI" to "control the PMD transmitter output on each lane based on requests from the peer interface".
Implement similarly in 179.8.9, 176C.3, and 176D.3.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178** *SC* **178.8.9** *P* **361** *L* **26** # 190

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *rical) DATA/TRAINING mode*

While it is clear what "DATA mode" is intended to mean here in the context of ILT, that term has specific meaning for 1000BASE-T PHYs that differs from what is intended here (see 1.4.278) Annex 178B.5 indicates that in the context of ILT, "data mode" means the variable tx_mode has the value 'data', which is associated with being in the PATH_UP state per figure 178B-8. As such, it would be more clear if the text in 178.8.9 referred to the PATH_UP state.

*SuggestedRemedy*

Change "coordinate the transition to DATA mode." to "coordinate the transition to the PATH_UP state (see Figure 178B-8)."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #191.

*Cl* **178** *SC* **178.8.9** *P* **361** *L* **31** # 706

Dawe, Piers — Nvidia

*Comment Type* **E** *Comment Status* **R** *(Electrical) Tx equalizer*

supports the coefficient indexes k_list = {-3, -2 -1, 0, 1} Too much nerdy, too little English.

*SuggestedRemedy*

Use the traditional "functional model is a FFE with these taps" language. Several clauses.

*Response* *Response Status* **C**

REJECT.
178.8.9 is not about the functional model of the equalizer but about the allowed values of k as specified in Annex 178B.

There was no consensus to make the suggested chagnge.

*Cl* **178** *SC* **178.8.9** *P* **361** *L* **40** # 707

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *ical) (bucketp) characteristics*

characteristics

*SuggestedRemedy*

specifications

*Response* *Response Status* **U**

REJECT.
The language in the header is consistent with prior electrical PMD clauses and with other subclauses in this draft.
There is no consensus to implement the change.

*Cl* **178** *SC* **178.9.1** *P* **361** *L* **43** # 611

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

All impedance values should be 92.5 ohms

*SuggestedRemedy*

Change reference impedance to 92.5 ohms

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **178** *SC* **178.9.1** *P* **361** *L* **43** # 63

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The reference impedance for measurement should align with the test fixture reference.

*SuggestedRemedy*

Change line to:

The reference impedance for differential specifications is 92.5 ohms. The reference impedance for common-mode specifications is 23.125 ohms.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

There are multiple comments on this topic.
The CRG reviewed slides 7-12 of <https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01a_2507.pdf>.

Implement the recommended changes on slide 12 of ran_3dj_01a_2507 with editorial license.

*Cl* **178** *SC* **178.9.1.2** *P* **363** *L* **32** # 616

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The KR specification should use 92.5 ohm impedance for TP0v test fixture

*SuggestedRemedy*

add line in Table 178-7 to specify 92.5 ohm impedance

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **178** *SC* **178.9.2** *P* **361** *L* **47** # 708

Dawe, Piers
Nvidia

*Comment Type* **TR** *Comment Status* **R** *ical) (bucketp) characteristics*

characteristics

*SuggestedRemedy*

specifications

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #707.

*Cl* **178** *SC* **178.9.2** *P* **361** *L* **48** # 641

Swenson, Norman
Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *(Electrical) (bucket)*

The sentence states that specifications must be met at TP0v, but TP0v has not yet been defined.

*SuggestedRemedy*

Change the sentence to "The transmitter on each lane shall meet the specifications at TP0v (see 178.9.2.1) given ."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178** *SC* **178.9.2** *P* **361** *L* **53** # 709

Dawe, Piers
Nvidia

*Comment Type* **TR** *Comment Status* **R** *cketp) TX measurement filter*

fourth-order vs. 5th order BT4. And why 60 GHz?

*SuggestedRemedy*

Change to 5th order, 53.125 GHz

*Response* *Response Status* **U**

REJECT.
The comment lacks justification to support the suggested remedy.

*Cl* **178** *SC* **178.9.2** *P* **362** *L* **24** # 494

Dudek, Mike
Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) RLdc and RLcd*

There is no specification for common-mode to differential-mode output return loss for KR, which would allow 100% of the common mode return energy from the channel and the far end receiver to be reflected as interfering differential mode energy which would severely degrade performance.

*SuggestedRemedy*

Add this specification to Table 178-6 using the same values as in equation 178-4. (Note that there is no minimum loss for the channel so common-mode reflections from the far end receiver as well as from the channel can create the interference).

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed the contribution <https://www.ieee802.org/3/dj/public/25_07/dudek_3dj_01_2507.pdf>.

Add a specification for KR transmitter common-mode to differential return loss, using Equation 178-4 (Figure 178-5).

*Cl* **178** *SC* **178.9.2** *P* **362** *L* **36** # 495

Dudek, Mike
Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) TX SNR_ISI*

The signal-to-residual-intersymbol-interference ratio is an additional effective transmitter noise source which is not included in the COM analysis beyond what is created with the reference package.

*SuggestedRemedy*

Change the specification to a difference signal-to-residual-intersymbol-interference with a value of 0 dB where the reference is the value of signal-to-residual-intersymbol-interference for the package claimed. Make the same change for C2C, C2M and CR where the reference is the COM module appropriate to the specification. (Or better complete the calculations and put in the value that matches).

*Response* *Response Status* **U**

REJECT.
The comment does not indicate a problem that needs to be solved. There is a minimum SNR_ISI specification for the purpose mentioned in the comment.
The suggested remedy is a new idea (difference SNR_ISI) that deviates from existing specifications, e.g. clauses 162 and 163, and would result in a lot of changes in the draft. It has insufficient justification for such changes and insufficiant details to implement.

The limit value of SNR_ISI may be worth additional examination to align it with the reference package. A contribition with explanation of the problem, and with a detailed proposal for changes, is encouraged.

*Cl* **178** *SC* **178.9.2.1** *P* **362** *L* **49** # 644

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *(Electrical) (bucket)*

"An example test fixture is described in Annex 163B." Annex 163B does not describe an example test fixture. A description of an example test fixture would be a drawing of a physical test fixture, or perhaps a description of a possible implementation of an example fixture. Annex 163B gives example electrical characteristics for a test fixture for which reference values can be calculated. (I am not certain my interpretation is correct and would like clarification.)

*SuggestedRemedy*

Change to " Annex 163B gives example electrical characteristics of a test fixture for which reference values can be calculated."

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178** *SC* **178.9.2.1** *P* **362** *L* **49** # 643

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **R** *ıcketp) Tx measurement filter*

Annex 163A describes methods for measuring transmitter characteristics applicable to 802.3ck. Are these same methods applicable here? Annex 163A refers to use of Clause 93A. Is that still applicable here, or should Clause 178A be used instead?

*SuggestedRemedy*

Please clarify.

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

REJECT.

This comment was WITHDRAWN by the commenter.

---

*Cl* **178** *SC* **178.9.2.1** *P* **362** *L* **49** # 642

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *(Electrical) (bucket)*

"measurements of the transmitter are made at the output of a test fixture (TP0v) as shown in Figure 178-3 and described in Annex 163A" reads like the test fixture is described in Annex163A, which it is not.

*SuggestedRemedy*

Change to "the transmitter is measured using the methodology described in Annex 163A at the output of a test fixture (TP0v) as
shown in Figure 178-3."

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178** *SC* **178.9.2.1** *P* **363** *L* **6** # 306

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(Electrical) KR test fixture*

Figure 178-3. It is ambiguous where the test fixture begins. The intent is that the text fixture begins at TP0. Also, it would be good to properly describe the TP0d interface. This figure nor the text definitely define the start and end points of the test fixture.

*SuggestedRemedy*

In Figure 178-3 do the following:
Add test point TP0 at the "package-to-board interface".
Draw a dashed line at this TP0 interface.
Adjust the test fixture line/arrow to end at this TP0 interface.
Add a label at the TP0d interface "die-to-package interface".
In 178.9.2.1 add the following sentence...
"The transmitter test fixture is between TP0 and TP0v."
Make similar updates for the receiver test fixture in 178.9.3.1 and Figure 178-4.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slide 26 in
<https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01b_2507.pdf>.
Implement the changes as shown in the slide, except that the receiver test fixture is between TP5 and TP5v.

Implement with editorial license.

---

*Cl* **178** *SC* **178.9.2.1.2** *P* **363** *L* **24** # 595

Kocsis, Sam — Amphenol

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The ERL for a test fixture at TP0v is defined without a reference impedance. The implied reference impedance is inferred from 178.9.1, 100-ohm. The use of a 100-ohm reference impedance for ERL is not consistent throughout D2P0.

*SuggestedRemedy*

Add definition of a 92.5-ohm reference impedance for the ERL computation, consistent with Annex179B.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **178** *SC* **178.9.2.1.2** *P* **363** *L* **25** # 307

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **R** *(Electrical) (bucket) ERL*

It appears that to measure ERL properly the test fixture would have to be terminated at TP0 with an appropriate impedance or reflections from the device under test would have to be gated out.

*SuggestedRemedy*

Provide appropriate guidance for measuring the ERL at TP0v.

*Response* *Response Status* **C**

REJECT.
The description is consistent with the initial specification of test fixture ERL in 163.9.2.1.2. Either of the methods suggested in the comment, and possibly others, could be used by test engineers to verify the quality of the test fixture. The standard does not prescribe the test method.
The suggested remedy does not provide sufficient detail to implement.

---

*Cl* **178** *SC* **178.9.2.1.2** *P* **363** *L* **45** # 59

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

ERL impedance should be aligned to Rd and 179B.

*SuggestedRemedy*

Add line:
The reference differential impedance for the test fixture ERL computation shall be 92.5 ohms.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

---

*Cl* **178** *SC* **178.9.2.2** *P* **364** *L* **3** # 308

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket)*

As is done for other parameters, it would be helpful to follow "difference ERL" with variable name "dERL".

*SuggestedRemedy*

Change "difference ERL" to "difference ERL dERL" where dERL is italic.
Make a similar change in other subclause throughout that specify dERL.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178** *SC* **178.9.2.2** *P* **364** *L* **4** # 309

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket)*

Likely, Table 178-7 should be Table 178-8.

*SuggestedRemedy*

Change cross-reference from "Table 178-7" to "Table 178-8".

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178** *SC* **178.9.2.2** *P* **364** *L* **15** # 617

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The KR specification should use 92.5 ohm impedance for KR transmit ERL

*SuggestedRemedy*

add line in Table 178-8 to specify 92.5 ohm impedance

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

---

*Cl* **178** *SC* **178.9.2.3** *P* **364** *L* **28** # 367

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *lectrical) (bucketp) RL masks*

802.3ck common mode return loss frequency was up to 50 GHz

*SuggestedRemedy*

We should at least extend the RLcc to 67 GHz.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #363.

*Cl* **178** *SC* **178.9.2.4** *P* **364** *L* **34** # 710

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucketp) Tx N_v*

Nv = 400 ! That's ludicrously rare, 4^400 is 7e240. 100 is enough

*SuggestedRemedy*

Change Nv to 100 wherever it is 400 in this draft

*Response* *Response Status* **U**

REJECT.
The pulse response length is intended to measure the steady-state voltage, which may have a long settling time. Limiting the measurement length does not serve any purpose and may cause test fixture dependence.
The probability argument in the comment is irrelevant since in practice the transmit equalizer will likely not be in preset 1 anyway, and in that case v_f will never be encountered.
The comment lacks justification to support the suggested remedy.

---

*Cl* **178** *SC* **178.9.2.4** *P* **364** *L* **35** # 478

Healey, Adam — Broadcom, Inc.

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket)*

"The reference value [...] is calculated based on the receiver package class to which the device adheres." SInce this subclause is about transmitter difference steady-state voltage, it seems that the calculation should be based on the transmitter package class.

*SuggestedRemedy*

Change "receiver" to "transmitter".

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178** *SC* **178.9.2.6** *P* **364** *L* **53** # 48

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *lectrical) (bucketp) TX SCMR*

SNDR(meas) replaced V_peak^2 with P_signal. SCMR should be aligned with SNDR(meas) (eq 179-9)

*SuggestedRemedy*

SNDR(meas) replaced V_peak^2 with P_signal. SCMR should be aligned with SNDR(meas) (eq 179-9)
Replace equation 178-1 with
SCMR= 10*log10(P_signal / VCM_FB^2)
In P365 line 4
Replace:
V_peak is defined in 179.9.4.1.2
With
P_signal is defined in equation 179-8

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178** *SC* **178.9.2.7** *P* **365** *L* **12** # 351

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) SNDR*

The reference pacakge A and B SDNR are known specific value

*SuggestedRemedy*

I belive these are the value in https://www.ieee802.org/3/dj/public/24_11/healey_3dj_01_2411.pdf page 5 at least for package A, for service to community reference SNDR should be provided

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #481.

---

*Cl* **178** *SC* **178.9.3.2** *P* **366** *L* **23** # 310

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket)*

178.9.3.3 should be compliant over the range as well.

*SuggestedRemedy*

Change "178.9.3.4 and 178.9.3.5" to "178.9.3.3 through 178.9.3.5"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178** *SC* **178.9.3.3** *P* **366** *L* **29** # 537

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **R** *(Electrical) ITOL*

There isn't a minimum loss specified for the KR channel. Specifying this as the minimum channel loss from the KR interference tolerance test may not be appropriate. It is also not very clear what loss is being referred to.

*SuggestedRemedy*

Consider whether using the same minimum loss used for the interference tolerance test is appropriate. If so add to 178.10.2. "The recommended minimum channel insertion loss is 18dB. "
On page 727 line 9 replace "using a channel with the minimum insertion loss specified in 178.9.3.4" with "using an amplitude tolerance test channel" Add a sentence to the end of the paragraph. The loss of the amplitude tolerance test channel including the package loss of the compliant transmitter used in the test is equal to the Test 1 loss in table 178-10 .
If not then replace "using a channel with the minimum insertion loss specified in 178.9.3.4" with "using a minimal loss channel"

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #535.

[Editor's note: Changed Line from 9 to 29]

*Cl* **178** *SC* **178.9.3.3** *P* **366** *L* **32** # 311

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket)*

The more formal word "may" should be used instead of "is allowed to". Per style guide: "The word may is used to indicate a course of action permissible within the limits of the standard (may equals is permitted to)."

*SuggestedRemedy*

Change "is allowed to" to "may".
Implement also on page 727 line 13, page 755 line 16.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178** *SC* **178.9.3.4.1** *P* **366** *L* **48** # 711

Dawe, Piers — Nvidia

*Comment Type* **E** *Comment Status* **A** *(Electrical) (bucket)*

0.8V

*SuggestedRemedy*

insert space

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178** *SC* **178.9.3.4.1** *P* **366** *L* **50** # 312

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket) ITOL*

So crosstalk is noise, so in this sentence what is "noise", also crosstalk and noise are not distortions per se, but rather perturbations. Is noise referring to alien noise or intrinsic noise? Distortion implies a changing of the launched signal such as insertion loss, bandwidth, and non-linearity, which I don't think are intended here.

*SuggestedRemedy*

Change "The channel noise source emulates crosstalk,
noise, and any other non-equalizable signal distortions that may be introduced by a transmitter or channel."
To "The channel noise source emulates crosstalk, alien and intrinsic noise, and any other non-equalizable signal perturbations that may be introduced by a transmitter or channel."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change from
"The channel noise source emulates crosstalk, noise, and any other non-equalizable signal distortions that may be introduced by a transmitter or channel."
to
"The channel noise source represents non-equalizable impairments that may be introduced by a transmitter or channel."

*Cl* **178** *SC* **178.9.3.4.2** *P* **367** *L* **17** # 313

Brown, Matt — Alphawave Semi

*Comment Type* **ER** *Comment Status* **A** *(Electrical) (bucket)*

It is not clear which text below this table are exceptions vs addition material. Usually, we use a dashed list to annotate the exceptions.

*SuggestedRemedy*

Identify the relevant exceptions within a dashed list.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license, with consideration of the response to comment #314.

---

*Cl* **178** *SC* **178.9.3.4.2** *P* **367** *L* **21** # 314

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(Electrical) (bucket)*

This is not an ordered list so should be formatted as dashed list.

*SuggestedRemedy*

Reformat as dashed list.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178** *SC* **178.9.3.4.2** *P* **367** *L* **35** # 315

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(Electrical) (bucket)*

This is not an ordered list so should be formatted as dashed list. Further, it is not permitted to use the same list values (e.g., a), b), c)), for two separate lists within the same subclause.

*SuggestedRemedy*

Reformat as dashed list.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178** *SC* **178.9.3.4.3** *P* **368** *L* **21** # 316

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket)*

Per style guide this should be lettered list, not numbered list.

*SuggestedRemedy*

Reformat as lettered list.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178** *SC* **178.9.3.4.3** *P* **368** *L* **44** # 317

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(Electrical) (bucket)*

The noise is RMS so not defined by amplitude. Also, "higher noise" here is compound adjective so should be hyphenated.

*SuggestedRemedy*

Change "higher amplitude" to "higher voltage" or "higher noise" or similar.
If the current wording is desired, then add a hyphen "higher-amplitude".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the text from "higher amplitude values" to "higher noise values."

*Cl* **178** *SC* **178.9.3.5** *P* **369** *L* **4** # 496

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) JTOL*

Not stressing the jitter tolerance signal with noise in addition to the jitter under-stresses receivers.

*SuggestedRemedy*

Delete the exception "No broadband noise is added". Change the following exception from "The test channel COM, calculated per the method in 178.9.3.4.2, is at least 3 dB." to "The test channel COM with the jitter included, calculated per the method in 178.9.3.4.2, is 3 dB." Make the similar change for C2C on page 730.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The test method for receivers is consistent with the methodology use in CR/KR clauses 92, 93, 94, 110, 111, 136, 137, 162, and 163 and in AUI-C2C annexes 120D and 120F, in which jitter tolerance (JTOL) is separate from interference tolerance (ITOL).
The exclusion of additive noise from JTOL was a deliberate decision made during 802.3bj, in response to comment #140 against D1.3. See <https://www.ieee802.org/3/bj/comments/P8023bj-D1p3-Comments_Final_byCls.pdf#page=64> and the related presentation <https://www.ieee802.org/3/bj/public/jan13/dawe_3bj_01_0113.pdf>.
Note that AUI-C2M specifications in annexes 83E, 120E, and 120G, which do not have separate interference tolerance tests, do not include additive noise in the "stressed input" tests either, although the eye hight is calibrated.

The following straw poll was taken.
Straw poll #E-4 (directional)
I support using additive noise in JTOL to achieve COM=3 dB in case G.
Y: 29 N:12 A: 19

Implement the suggested remedy except that the calibration of COM in the second dashed item is performed only in case G and the additive noise level obtained is used in all other cases.

Imlpement with editorial license.

*Cl* **178** *SC* **178.9.3.5** *P* **369** *L* **7** # 318

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(Electrical) (bucket)*

This phrase is hard to parse: "and both JRMS and J4u03 are measured with the jitter frequency and amplitude set according to Case F from Table 179-12." I think it means that J_RMS and J4u_03 are measured after the sinusoidal jitter with frequency and amplitude for Table 179-12 is applied. Also, I think this can be broken into a pair of subbullets for clarity.

*SuggestedRemedy*

Change to:
-- For the COM parameter calibration described in 93C.2 item 7):
-- J4u is substituted by J4u03
-- JRMS and J4u03 are measured with applied sinusoidal jitter with frequency and amplitude set according to Case F from Table 179-12

*Response* *Response Status* **C**

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

*Cl* **178** *SC* **178.9.3.7** *P* **369** *L* **13** # 348

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *lectrical) (bucketp) RL masks*

In 802.3ck the limit for RLcd was 50 GHz, going up to 50 GHz is not adequte

*SuggestedRemedy*

Suggest to increase to 67 GHz

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #363.

*Cl* **178** *SC* **178.10** *P* **370** *L* **26** # 319

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(Electrical) KR Channel*

The bounds of the "channel" are never defined. And, in fact, the specifications are for two different channels: one is MDI to MDI (or TP0 to TP1) and the other is die to die (or TP0d to TP5d). The former is prevalent, and latter only for the 40 dB insertion loss limit in 178.10.2 and AC-coupling in 178.10.6.

*SuggestedRemedy*

In the opening paragraph in 178.10 and the following sentence or similar. "Unless otherwise indicated, the channel is bounded TP0 and TP5."
In Table 178-11 change "Maximum AC-coupling 3 dB corner frequency" to "Maximum AC-coupling 3 dB corner frequency between TP0d and TP5d"
In 178.10.1, Change "The Channel Operating Margin (COM)" to "The Channel Operating Margin (COM) for the channel between TP0 and TP5"
In 178.10.2, change "The recommended maximum channel insertion loss, ILDD," to "The recommended maximum insertion loss, ILdd, for the channel between TP0d and TP5d"
Apply similar changes in 176C.7 to clarify the boundaries of the channels for each parameter.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The change suggested in 178.10.1 is redundant because of the rule in 178.10.

Implement the rest of the suggested remedy with editorial license.

*Cl* **178** *SC* **178.10** *P* **370** *L* **34** # 618

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The KR specification should use 92.5 ohm impedance for KR channel impedance

*SuggestedRemedy*

add line in Table 178-11 to specify 92.5 ohm impedance

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **178** *SC* **178.10** *P* **370** *L* **44** # 49

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *(Electrical) Channel SCMR*

Channel intrapair skew has not been considered for interoperability. Although a channel skew would be included in s-parameters passed to COM, the effect of skew on interoperability has not been specified. Channel common mode includes skew and other imbalance interoperable effects.

*SuggestedRemedy*

add line to Table 178-11-Channel characteristics summary
Channel Signal to common mode ratio (SCMR_CH) min 20 dB
Add section based on slides 12 and 14
https://www.ieee802.org/3/dj/public/adhoc/electrical/23_1207/mellitz_3dj_elec_01_231207.pdf
replacing V_peak^2 with sigma_tn^2 from equation 179.15 with c(n)=1 (no TxFFE)
i.e. SCMR_CH= 10*log10( sigma_ts^2 / VCM_CH^2 )

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The response to comment #50 adds a new specification for SCMR_CH in clause 179.

Add a row to Table 178-11-Channel characteristics summary
Channel Signal to common mode ratio (SCMR_CH) min, with a value of 20 dB, with a reference to the new clause added by the response to comment #50.

*Cl* **178** *SC* **178.10.1** *P* **370** *L* **50** # 480

Healey, Adam — Broadcom, Inc.

*Comment Type* **T** *Comment Status* **A** *(Electrical) KR COM*

The introductory paragraph states that COM is calculated twice, ones with the Test 1 package transmission line length parameters and once with the Test 2 package transmission line length parameters. However, there are also Class A and Class B package models and this introductory paragraph does not mention this. It would be useful to include reminders/guidance on how Class A and Class B models are to be selected.

*SuggestedRemedy*

Add text stating that COM is calculated with the parameters for the transmitter and receiver package classes that the channel under test is intended to support. Add similar text in 176C.7.1.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The suggested remedy would add clarity to the draft.
Implement the suggested remedy with editorial license.

*Cl* **178** *SC* **178.10.1** *P* **371** *L* **1** # 479

Healey, Adam — Broadcom, Inc.

*Comment Type* **E** *Comment Status* **A** *ectrical) (bucket) COM MLSD*

"The maximum likelihood sequence detection (MLSD) defined in 178A.1.10 is to be used for the calculation of COM." Now that Table 178-12 includes a parameter that indicate whether or not maximum likelihood sequence detection is included, this statement has become redundant.

*SuggestedRemedy*

Remove this sentence. Also remove similar sentences in 179.11.7, 176C.7.1, and 176D.7.2.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178** *SC* **178.10.1** *P* **371** *L* **12** # 378

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **ER** *Comment Status* **R** *l) (bucketp) COM parameters*

All symbols such as Cd(1) or Ls(1) the "(1)" seems like is superscript

*SuggestedRemedy*

Please make it inline

*Response* *Response Status* **U**

REJECT.

The numbers in parentheses are intended to be superscript. This is the convention used in all clauses in which COM is used (178, 179, 176C, 176D) and matches the parameter definitions in 178A and 93A.

There is no consensus to make the suggested change.

---

*Cl* **178** *SC* **178.10.1** *P* **371** *L* **15** # 712

Dawe, Piers — Nvidia

*Comment Type* **ER** *Comment Status* **R** *l) (bucketp) COM parameters*

Indices that look like exponents, should be subscripts

*SuggestedRemedy*

Change C_d^(1) to C_d1 or Cd1, and so on

*Response* *Response Status* **U**

REJECT.

Resolve using the response to comment #378.

---

*Cl* **178** *SC* **178.10.1** *P* **371** *L* **25** # 713

Dawe, Piers — Nvidia

*Comment Type* **ER** *Comment Status* **R** *(Electrical) (bucketp) COM*

Confusion between z and Z

*SuggestedRemedy*

As Z for impedance is very strongly established, use something other than z for length, such as L

*Response* *Response Status* **U**

REJECT.

Lowercase z is the symbol that is used to represent package trace lengths for several generations (e.g. Clauses 93, 137, 163).
L is commonly used to denote inductance, so it may also be considered confusing.

The proposed change would cause inconsistency with previous clauses and may cause confusion.

There is no consensus to make the suggested change.

---

*Cl* **178** *SC* **178.10.1** *P* **372** *L* **1** # 255

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, quantization noise parameters should be added to Table 178-13.

*SuggestedRemedy*

Add two quantization noise parameters with suggested values to the table. Please refer to slide 15 of the accompanying document for the proposed change.
Also, see shakiba_3dj_elec_01_250626.pdf.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **178** *SC* **178.10.1** *P* **372** *L* **7** # 236

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *ctrical) Reference impedance*

Adjust COM voltage to 46.25 ohms measurement reference.

*SuggestedRemedy*

Change
A_vtō 0.415
A_fetō 0.415
A_netō 0.608

*Response* *Response Status* **C**

REJECT.

Resolve using the response to comment #237.

[Editor's note: Changed subclause from 178.19 to 178.10.1]

*Cl* **178** *SC* **178.10.1** *P* **372** *L* **33** # 379

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **ER** *Comment Status* **A** *rical) (bucket) table formatting*

Symbols fp1 and fp2 seem connected

*SuggestedRemedy*

May need to adjsut or incease spacing

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Adjust spacing with editorial license.

*Cl* **178** *SC* **178.10.1** *P* **372** *L* **43** # 254

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, an updated value for One-sided noise spectral density in Table 178-13 is needed.

*SuggestedRemedy*

Change One-sided noise spectral density parameter value in the table (line 43). Please refer to slide 15 of the accompanying document for the proposed change.
Also, see shakiba_3dj_elec_01_250626.pdf.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **178** *SC* **178.10.1** *P* **372** *L* **46** # 715

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucketp) Jitter*

Unrealistic jitter values

*SuggestedRemedy*

"RJ" should be increased and D-D jitter should be reduced

*Response* *Response Status* **U**

REJECT.

The suggested remedy provided in the comment lacks specific values to implement them.

*Cl* **178** *SC* **178.10.1** *P* **372** *L* **46** # 714

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucketp) Jitter*

With a new COM, we can break away from old mistakes from the 8B/10B days. OIF did this years ago.

*SuggestedRemedy*

Change "Random jitter" to "Gaussian jitter", and sigma_RJ to sigma_GJ

*Response* *Response Status* **U**

REJECT.
"Gaussian jitter" appears in only 3 places in 802.3 and is never defined. The first instance is in 48B.1.2 which is titled "Random Jitter".
The suggested remedy deviates from established 802.3 terminology and would cause confusion, since the parameter sigma_RJ is used in multiple previous clauses.

There is no consensus to make the suggested change.

*Cl* **178** *SC* **178.10.3** *P* **373** *L* **33** # 596

Kocsis, Sam — Amphenol

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The ERL for a channel atTP0 and TP5 is defined without a reference impedance. The implied reference impedance is inferred from 178.9.1, 100-ohm. The use of a 100-ohm reference impedance for ERL is not consistent throughout D2P0.

*SuggestedRemedy*

Add definition of a 92.5-ohm reference impedance for the ERL computation, consistent with Annex179B.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **178** *SC* **178.10.3** *P* **373** *L* **51** # 716

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucket) ERL*

Tukey window: it's not a flag (status bit) it's a switch (control bit)

*SuggestedRemedy*

Change Tukey window flag to Tukey window

*Response* *Response Status* **C**

REJECT.
The parameter tw in 93A.5 (as amended by 802.3ck-2022) is called "Tukey window flag".

*Cl* **178** *SC* **178.10.6** *P* **375** *L* **50** # 543

Levin, Itamar — Altera corp.

*Comment Type* **TR** *Comment Status* **A** *(Electrical) AC coupling*

100Khz 3dB cutoff frequency requires AC blocking capacitors of at least XXX nF. This poses two issues: 1. it is hard to find a high quality capacitor that would behave well across the entire channel frequency band (low parasitics), 2. for on package or on die placement of the decoupling cap - the parasitics involved with such a capacitor degrade serdes performance

This corner frequency trades off these factors for better baseline wander mitigation, however - the impact on baseline wander from a 2x or even 3x corner frequency would not be severe and may be a good sacrifice for the benefits of a smaller cap.

*SuggestedRemedy*

increase corner freq. to at least 250Khz.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The commenter provided an update indicating that "XXX nF" in the comment should be "30 nF".

Note that the second paragraph of 178.10.6 addresses "Systems with no AC-coupling within the channel", and this may be considered sufficient.
Also note that 178.10.6 specifies the channel as "between TP0d and TP5d", which includes packages but excludes the die on both sides. On-die only AC coupling falls under "Systems with no AC-coupling within the channel".

In 178.10.6, change corner frequency from 100 kHz to 250 kHz.
Apply similar changes in Clause 179, Annex 176C, and Annex 176D.
Implement related changes as necessary with editorial license.

*Cl* **178A** *SC* **178A** *P* **777** *L* **26** # 243

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Add quantization noise.

*SuggestedRemedy*

Add a new section "178A.1.7.6 Quantization noise". Please refer to slides 3-5 of the accompanying document for the proposed sub-section content and text.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slides 19-22 of
<https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01a_2507.pdf>.

Implement the suggested changes on slide 22 of ran_3dj_01a_2507 with editorial license.

*Cl* **178A** *SC* **178A** *P* **785** *L* **19** # 235

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

Re-normalization of s-parameter is not defined in the document

*SuggestedRemedy*

Add new section 178A.2
The conversion of S s-parameter with reference Z_0 to S' s-parameter with reference Z_1 is computed as follows:
S'= A^(-1) *(I-S*rho)^(-1)* (S-rho)*A
where:
rho= (Z_1-Z_0)/(Z_1+Z_0 )
??= (Z_1+Z_0)/sqrt(Z_1*Z_0 )
S is the original s-parameter matrix with Z_0 as the original diagonal impedance matrix where each diagonal entry is the impedance of that port.
S' is the new s-parameter matrix with Z_1 as the new diagonal impedance matrix where each diagonal entry is the impedance of that port

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slide 13 of
<https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01a_2507.pdf>.

Add equations and supporting text to 178A.1.4, as shown in slide 13 of ran_3dj_01a_2507, with editorial license. Add a reference for the equations if possible.

*Cl* **178A** *SC* **178A.1.3** *P* **768** *L* **20** # 610

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

All impedance values should be 92.5 ohms

*SuggestedRemedy*

Channel can be measured with 100 ohms but should be converted to 92.5 ohms

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #235.

---

*Cl* **178A** *SC* **178A.1.7** *P* **774** *L* **32** # 247

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, "sampler" should be replaced with "quantizer".

*SuggestedRemedy*

Change "sampler" to "quantizer". Please refer to slide 9 of the accompanying document for the proposed change.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

---

*Cl* **178A** *SC* **178A.1.7** *P* **774** *L* **50** # 244

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, Figure 178A-7 should show addition of the quantization noise after the sampler.

*SuggestedRemedy*

Add quantization noise to the figure. Please refer to slide 6 of the accompanying document for the proposed change.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

---

*Cl* **178A** *SC* **178A.1.7** *P* **775** *L* **2** # 245

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, Table 178A-9 should include quantization noise parameters.

*SuggestedRemedy*

Add two quantization noise parameters to the table. Please refer to slide 7 of the accompanying document for the proposed change.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

---

*Cl* **178A** *SC* **178A.1.7** *P* **775** *L* **15** # 248

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, "sampler" should be replaced with "quantizer".

*SuggestedRemedy*

Change "sampler" to "quantizer". Please refer to slide 9 of the accompanying document for the proposed change.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

---

*Cl* **178A** *SC* **178A.1.7** *P* **775** *L* **19** # 246

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, Equation (178A-14) should include quantization noise PSD.

*SuggestedRemedy*

Add quantization noise PSD to the equation and its description to the descriptions. Please refer to slide 8 of the accompanying document for the proposed change.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **178A** *SC* **178A.1.8.1** *P* **777** *L* **43** # 249

Shakiba, Hossein Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, "sampler" should be replaced with "quantizer".

*SuggestedRemedy*

Change "sampler" to "quantizer". Please refer to slide 9 of the accompanying document for the proposed change.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **178A** *SC* **178A.1.8.1** *P* **778** *L* **18** # 250

Shakiba, Hossein Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, quantization noise should be added before sampler output is applied to the feed-forward filter in Figure 178A-9.

*SuggestedRemedy*

Add quantization noise to the figure. Please refer to slide 10 of the accompanying document for the proposed change.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **178A** *SC* **178A.1.9.3** *P* **782** *L* **17** # 251

Shakiba, Hossein Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, more text should be added to describe the procedure for deriving the probability density function of the quantization noise.

*SuggestedRemedy*

Add the suggested text in slides 11-12 of the accompanying document starting from line 17.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **178A** *SC* **178A.1.9.3** *P* **782** *L* **21** # 252

Shakiba, Hossein Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, Equation (178A-36) should include quantization noise PSD.

*SuggestedRemedy*

Add quantization noise PSD to the equation. Please refer to slide 13 of the accompanying document for the proposed change.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **178A** *SC* **178A.1.10** *P* **783** *L* **19** # 253

Shakiba, Hossein Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, quantization noise should be added before sampler output is applied to the feed-forward filter in Figure 178A-10.

*SuggestedRemedy*

Add quantization noise to the figure. Please refer to slide 14 of the accompanying document for the proposed change.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **178A** *SC* **178A.1.10.1** *P* **784** *L* **36** # 262

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *(Electrical)*

Proper handling of negative MLSE delta_COM in the COM code was presented in COM ad hoc and approved (shakiba_3dj_COM_02_250408.pdf).
Pointed out by Adee during the discussions, I took the action to look at the implication of this on the draft. This comment is to add a statement to this section to instruct the reader how a possible negative delta_COM should be handled.

*SuggestedRemedy*

Add a new paragraph at the end of this section with the following content:
"Due to the addition of this additional receiver noise when calculating the advantage of the MLSD-based receiver, there may be occasional cases where the DFE-based receiver performs better. In these cases, the MLSD function should be disabled. This can be done by ignoring the last term in Equation (178A-38) and setting it to zero and setting COM to COM_DFE. This process should also be applied if for any other reason, such as approximations in math and calculations, similar cases are encountered."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
With editorial license, insert the following sentence before the last paragraph in 178A.1.10.
"If the value of COM calculated by Equation (178A-39) is less than COM_DFE, then the value of COM is set to be equal to COM_DFE."

*Cl* **178B** *SC* **178B** *P* **786** *L* **6** # 484

D'Ambrosia, John — Futurewei, U.S. Subsidiary of Huawei

*Comment Type* **TR** *Comment Status* **A** *(Common) ILT scope*

ISL is a major new capability, and needs to be clearer than currentlyspecified.
For example, the title indicates "Inter-sublayer link training for electrical and optical interfaces". However, it is the understanding of the commentor that this clause covers link training for the interfaces as well as the total path.
Additionally, as this is a new capability, it is not clear that there won't be differences for link training between AUIs and PMDs.

*SuggestedRemedy*

Separate Annex 178B into 3 Annexes - one for the total path, one for the AUIs, and one for PMDs. Clauses with tables pointing to Annex 178B would need to be updated to point to the correct clause

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #220.

*Cl* **178B** *SC* **178B** *P* **786** *L* **10** # 397

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **R** *mon) ILT coherent (bucket2p)*

ILT should be supported for coherent optical PMDs, at the minimum 800GBASE-LR1 spec. 800GBASE-LR1 and 800GBASE-LR4 modules can be used in the same switch/router, and potentially interchangable in pairs in deploying network equipment depending on the fiber link condition. By allowing ILT in 800GBASE-LR1, the host equipment does not need to differentiate the optical port, and use one routine of link up process. This brings benefits to opex and firmware development.

This comment also requires updates to sub clause 160.2.10 in page190.

*SuggestedRemedy*

Extend ILT capability to LR1, at the minimum by supporting transmission of RTS. RTS condition of the ISL path between two LR1 PMDs could be derived from the states of the LR1 inner FEC, where dsp frame locking and aligning are already performed. A contribution will be provided.

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #418.

*Cl* **178B** *SC* **178B** *P* **786** *L* **12** # 424

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **A** *(Common) ILT scope*

There should be a distinction between "ILT", which is a protocol on a single ISL, and the end-to-end (RS-to-RS) path bring-up procedure. The latter is an ability that is enabled by the former, but is system-level result, while ILT is a local mechanism.

Additional terminology may be helpful, e.g. "Physical layer startup procedure".

*SuggestedRemedy*

Add a definition of "Physical layer startup procedure" and update the text in multiple places to distinguish it from "ILT" used over a single ISL. Implement with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #220.

*Cl* **178B** *SC* **178B.2** *P* **786** *L* **18** # 220

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Common) ILT scope*

The overview of ILT is confusing. ILT has two aspects - there is per-ISL training, and there is the end-to-end path startup behavior. These need to be more clearly separated in the overview text. The "continuous exchange of fixed-length training frames" is not entirely accurate - that may be what happens during the training phase, but is certainly not what happens once the training is completed.

*SuggestedRemedy*

Rewrite the paragraph as follows:
ILT describes a set of processes that serve two purposes: facilitating timing recovery and optimizing performance on individual ISLs, and coordination of ISLs along a path to enable a smooth path start-up. The individual link training is performed via the exchange of fixed-length training frames between peer interfaces of an ISL that enable the transmitter to optimize the performance of the ISL. Path start-up is performed via the exchange of status indications across the set of ISLs that exist between the path endpoints.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the changes to 178B.2 and 178B.5 as proposed on slides 32 and 33 of the following contribution:
https://www.ieee802.org/3/dj/public/25_07/brown_3dj_03a_2507.pdf

Implement with editorial license.

*Cl* **178B** *SC* **178B.2** *P* **786** *L* **18** # 374

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) ILT scope*

3 major functions are included in the ILT: Electrical LT, Optical LT, and inter-sublayer link signal or RTS. Designating everting as ILT is rather confusing throughout the draft.

*SuggestedRemedy*

I suggest the following definition:
All electrical link training called "ELT"
All optical link training called "OLT"
Inter-sublayer signaling RTS called "ILT" or could be called "ILM" (inter-sublayer link messaging)

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #220.

*Cl* **178B** *SC* **178B.2** *P* **786** *L* **19** # 498

Dudek, Mike — Marvell

*Comment Type* **E** *Comment Status* **A** *(Common) ILT scope*

The english isn't good.

*SuggestedRemedy*

Change "in a ISL or multi-ISL paths" to "in a ISL path or multi-ISL paths"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #220.

*Cl* **178B** *SC* **178B.2** *P* **786** *L* **20** # 553

Maki, Jeffery — Juniper Networks

*Comment Type* **TR** *Comment Status* **R** *ommon) ILT scope (bucket2p)*

The description "ILT supports these functions through the continuous exchange of fixed-length training frames between peer interfaces in an ISL" indicates training frames are continuously exchanged. The presumed purpose to be contiuous would be for the AUI components to update their equalization coeficients yet there is no desription of returning to training such as with recovered clock while continuing to carry real traffic nor is there status indicators that updated training is occurring.

*SuggestedRemedy*

Add to "Table 178B-2-Control field structure for E1 interfaces" indicator that updated training is occurring using traffic and recovered clock.

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #418.

*Cl* **178B** *SC* **178B.3** *P* **786** *L* **25** # 124

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

You define terms in this subclause but named the subclause "Conventions". Why not be consistent with 802.3-2022 and rename it "Definitions"?

*SuggestedRemedy*

Rename subclause "Definitions".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.3** *P* **786** *L* **31** # 221

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

The definition of AUI component in Annex 178B uses the terms 'AUI upper component' and 'AUI bottom component', whlie related text in 45.2.1.269 uses 'upper AUI component' and 'lower AUI component'. The terms should be consistent between the two.

*SuggestedRemedy*

Upper and lower works better than upper and bottom. Change the definition in 178B.3 to use 'upper AUI component' and 'lower AUI component'.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.3** *P* **786** *L* **33** # 52

D'Ambrosia, John — Futurewei, U.S. Subsidiary of Huawei

*Comment Type* **E** *Comment Status* **A** *(Common) ILT scope*

Given the introduction of inter-sublayer link training to the Ethernet world, it would be helpful if the term inter-sublayer link (ISL) was displayed graphically for the reader.

*SuggestedRemedy*

Implement figure on Page 3 of https://www.ieee802.org/3/dj/public/adhoc/electrical/25_0605/dambrosia_3dj_elec_02_250605.pdf with editorial license

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The suggested remedy appears to point to the wrong contribution. The correct URL is: https://www.ieee802.org/3/dj/public/adhoc/electrical/25_0605/dambrosia_3dj_elec_01_250605.pdf

An updated figure is provided on slide 22 of the following editorial contribution: https://www.ieee802.org/3/dj/public/25_07/brown_3dj_03_2507.pdf

This figure illustrates the architecture concepts as defined in Draft 2.0. Other comments may change some of these features.

Add a figure where appropriate based on the figure in slide 22 of brown_3dj_03_2507.

Update the figure as required to suit the adopted responses of other comments.

Implement with editorial license.

*Cl* **178B** *SC* **178B.3** *P* **786** *L* **34** # 222

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) ILT scope*

The definition of ISL is somewhat awkward. The two PMDs are not really 'adjacent sublayers' in the same sense that a pair of PMAs within a PHY implementation are. Also, the definition should be consistent as to whether the sublayers are or are not part of the ISL. As written, it suggests that the ISL is either the AUI (not including the PMAs) or a pair of PMDs plus the medium.

*SuggestedRemedy*

Change the text to read:
The xAUI-n between a pair of adjacent PMA sublayers, or the MDI between a pair of PMD sublayers.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the defintion of ISL to:
"An ISL is either an xAUI-n (a pair of AUI components and the AUI channel between) or a pair of PMDs (in different PHYs) and the medium between."

Implement with editorial license.

*Cl* **178B** *SC* **178B.3** *P* **786** *L* **36** # 112

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) ILT scope*

The ISL should be defined as the link between two adjacent sublayers and excludes the sublayers themselves. ISLs can be between two adjacent sublayers in the same Physical layer implementation (e.g., connecting PMAs in a single PHY) or between adjacent sublayers in two autonomous systems (e.g., connecting the two PHY PMDs via a medium).

*SuggestedRemedy*

Replace "The ISL may be an xAUI-n between a pair of PMA sublayers within the same Physical Layer implementation or a pair of PMDs and the medium between"

with

"The ISL may be an xAUI-n between a pair of PMA sublayers within the same PHY. The ISL may be an MDI between a pair of PMD sublayers, each of which is instantiated in separate PHYs".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #222.

*Cl* **178B** *SC* **178B.3** *P* **786** *L* **38** # 115

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) ILT scope*

Add single and multi-ISL definiton here to help with 178B.5.

*SuggestedRemedy*

Add: "A single-ISL path comprises exactly two sublayers connected by a single ISL. A multi-ISL path comprises three or more sublayers connected in series by ISLs".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #220.

*Cl* **178B** *SC* **178B.3** *P* **786** *L* **41** # 113

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **A** *ımon) ILT definitions (bucket)*

The second sentence might be too short and risks causing confusion.

*SuggestedRemedy*

Replace "For a PMD this term is equivalent to link partner"

with

"In the case where the ISL is an MDI between two PMDs, this term is equivalent to link partner".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "For a PMD this term is equivalent to link partner."
To: "In the case where the ISL is between two PMDs, this term is equivalent to link partner"
Implement with editorial license.

*Cl* **178B** *SC* **178B.4** *P* **786** *L* **52** # 223

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **A** *ıon) ILT components (bucket)*

The second paragraph is confusing. The text begins with "Devices in a path may include one or two physically instantiated interfaces, specifically AUI or PMD components." However, an end-to-end path between two PCS could include as many as 5 ISLs: two AUIs in each Physical Layer implementation, plus the MDI between the PMDs.

*SuggestedRemedy*

If this paragraph was not present, the information in the rest of the clause is still clear. Delete the paragraph.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The first sentence is important, but it and the rest of the paragraph should be reworded to make it more understandable.

Replace the paragraph with the following:
"Devices in a path have one or two physically instantiated interfaces. A physically instantiated interface is either a PMD or an AUI component. An example of a device with one physically instantiated interface is a PMA adjacent to a PCS with a single AUI-C2M (Annex 176D) or AUI-C2C (Annex 176C) interface (the interface with the PCS or PHY XS is never physically instantiated). An example of a device with two physically instantiated interfaces is a retimer with an AUI-C2C (Annex 176C) interface on one side and an AUI-C2M (Annex 176D) on the other side."

Implement with editorial license.

*Cl* **178B** *SC* **178B.4** *P* **786** *L* **52** # 114

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

It is unclear if "former" and "latter" refer to "one or two instantiated interfaces" or to "PMD or AUI components" in the next statements. Suggest removing text to improve clarity.

*SuggestedRemedy*

Delete "[.] specifically PMD or AUI components" from sentence.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.4** *P* **786** *L* **52** # 458

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket) ILT*

The second paragraph of 178B.4 talks about "devices" that have one or two physically instatied interfaces. The use of "former" and "latter" is refering to one and two? Or PMD and AUI?.

What about devices with no physically instantiated interfaces, it still uses ILT on the medium.

*SuggestedRemedy*

Change the 2nd paragraph from:
Devices in a path may include one or two physically instantiated interfaces, specifically PMD or AUI components. An example of the former is a PMA adjacent to a PCS or to a PHY XS with a single AUI-C2M (Annex 176D) or AUI C2C (Annex 176C) interface (the interface with the PCS or PHY XS is never physically instantiated). An example of the latter is a retimer with an AUI C2C (Annex 176C) interface on one side and an AUI-C2M (Annex 176D) on the other side.

To:
Devices in a path may include zero, one or two physically instantiated interfaces between the MAC and the PMD. Figure 176B-1 depicts a device with zero physically instantiated interfaces. The left two stacks in Figure 176B-2 depict a device with a single xAUI interface, either a AUI-C2M (Annex 176D) or AUI-C2C (Annex 176C). The right 3 stacks in Figure 176B-2 depicts a device with two xAUI interfaces.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
ILT is only applicable to physically instantiated interfaces.
The use of "later" and "former" is confusing.
Resolve using the response to comment #114.

*Cl* **178B** *SC* **178B.4** *P* **787** *L* **5** # 224

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket) ILT*

While it's true that there are "one or more per-lane functions", this language is misleading. For an n lane interface there are exactly n per-lane functions.

*SuggestedRemedy*

Change "one or more per-lane functions" to "one per-lane function for each physical lane"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "and one or more per-lane functions"
To: "and one per-lane function for each lane associated with the interface"

*Cl* **178B** *SC* **178B.4** *P* **787** *L* **30** # 375

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) ILT function*

Figure 178B-1 is trying to convey two different messages and combining the two function as shown is confusing

*SuggestedRemedy*

Some suggested improvements
Call them figure 1A and 1B
Figrue 1A is for AUI so it needs two ILT functions in the box (left and right)
Figure 1B better to show as following:
-Receive function connected to Transmit Function left-right (output SLi)
-Receive function to Transmit Function right-left (input DLi)
-Duplicate per-lane ILT function one for Egress and one for Ingress

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

ILT is one function. Only in the case of a retimer we have two functions. An AUI may include a single ILT function if it is not part of a retimer.

The transmit and receive functions of ILT are closely related, separating them may cause more confusion than adding clarity.

However, some clarification in the figure is warranted.

In Figure 178B-1, add a box indicating the boundaries of an AUI component or PMD.

Label the vertical dashed line as the service interface.

*Cl* **178B** *SC* **178B.5** *P* **787** *L* **37** # 225

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *:ommon) ILT layout (bucket2)*

The organization of subclauses 178B.5 through 178B.13 is suboptimal. The path start-up protocol depends on the per-ILS training protocol, so it would be better to introduce that first, and to have all the various pieces of that in one subclause rather than spread across 8 subclauses. Further, 178B.5.1 seems to be about the individual ISL training rather than the path startup process. and 178B.5.2 and 178B.5.3 are examples of individual ISL training

*SuggestedRemedy*

Rearrange the material as follows [comments relateive to current clauses in square brackets and are not intended to be included in the text of the document]:
178B.5 ISL training [new heading]
178B.5.1 Interface behavior [curent 178B.5.1]
178B.5.1.1 Training retimers [current 178B.5.2]
178B.5.1.2 Training xMII Extenders [current 178B,5,3]
178B.5.2 Training frame structure [current 178B.6]
178B.5.3 Control field structure [curernt 178B.7]
178B.5.4 Status field structure [current 178B.8]
178B.5.5 Trainng frame lock [current 178B.9]
178B.5.6 Polarity detection and correction [current 178B.10]
178B.5.7 Equalization control [current 178B.11]
178B.5.8 Training pattren setting [current 178B.12]
178B.5.9 Handshake timing [current 178B.13]
178B.6 Path start-up protocol [current 178B.5, without the subclauses included above]
178B.7 State diagrams [current 178B.14]
178B.8 Management variables [current 178B.15]
178B.9 PICS [current 178B.16]

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Rearrange the subclauses as suggested with editorial license.

*Cl* **178B** *SC* **178B.5** *P* **787** *L* **37** # 290

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(Common) ILT scope*

The term inter-sublayer link training (or ILT) by name defines a protocol over an inter-sublayer link (or ISL). Each ISL is one of several possible physical links between a pair of MAC sublayers. It is possible only a subset of the ISLs supports ILT. Annex 178B also defines a path start-up protocol which uses the outcome of ILT on each of the physical links, where supported, to determine when the path between a pair of PCSs or between a pair of extender suppliers is ready, allowing for some ISLs that do not support ILT. However, the combination of these two layers of functionality are references only as ILT. This is confusing!

*SuggestedRemedy*

Within Annex 178B, clearly differentiate these two processes (inter-sublayer link training and path-start-up protocol) as being separate from each other, rather than ILT being a combination of these two. ILT would refer to the process with operates on a specific ISL and with PSP the process that links the states of all ISL on a path. Throughout the draft specify and references these two functions separately.
A contribution will be provide to explore this further.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #220.

*Cl* **178B** *SC* **178B.5** *P* **787** *L* **39** # 116

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) ILT scope*

Improve clarity.

*SuggestedRemedy*

Replace: "ILT enables independent ISL training in a multi-ISL path that includes AUI components and PMDs. It also supports operation over paths that include ISLs that do not implement ILT".

With

"ILT supports independent training of ISLs in a multi-ISL path. ILT also operates over paths that include ISLs that do not support ILT".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The referenced text should be improved. Comment #220 proposes to improvement the description and termilogy for the ILT functionality.

Resolve this comment based on the resolution to comment #220.

*Cl* **178B** *SC* **178B.5** *P* **787** *L* **43** # 226

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Common) ILT description*

The bullet list that attempts to explain how path start-up works is not succeeding. It is not clear if "ready to send" is related to the local_rts and remote_rts indications or if it is something different. It seems like it must be something different, since the third bullet says you can only send local_rts or remote_rts across an ISL that is ready to send. The last two bullets seem to introduce a notion of "device" that is undefined. The concept of an ISL includes a physical instantiation of an AUI or a medium, so the intended meaning of 'device' is reasonably clear (i.e., the endpoint of an ISL), but it would be better to avoid using 'devices' in the description and focus on ISLs and their endpoints.

*SuggestedRemedy*

The intended behavior is not really clear, so it's hard to provide a specific remedy. It think the intention is that local_rts originates at the A end PCS and traverses all sublayers and ISLs until it reaches the Z end PCS. Upon receiving local_rts, the Z end PCS signals remote_rts to the A end PCS. (and of course vice versa for Z-->A). So local_rts makes its way down the stack in one system, across the medium, and up the stack in the peer system. In order for local_rts (or remote_rts) to go across an ISL, that ISL must be in a 'ready to send' condition that has nothing to do with the 'local_rts' or 'remote_rts' variables, but instead depends on ILT (for ISLs that support ILT) or some other mechanism (for those that don't support ILT) to determine if the ISL is 'ready to send'. If that is correct, write text accordingly to explain this, and modify the terminology or provide better definitions so that it's clear that "ISL ready to send" is not the same thing as local_rts or remote_rts. If the intended behavior is something else, rewrite the text to be more clear about what is intended.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change: "local_rts indicates that an AUI component or PMD is ready to send and receive normal data and propagates from the PCS at one end of the path towards the PCS at the other end of the path."
To: "local_rts indicates that an AUI component or PMD is ready to send and receive normal data (it reached the ISL_READY state in Figure 178B-8) and propagates from the PCS at one end of the path towards the PCS at the other end of the path."

Change: "When a device both sends local_rts and receives remote_rts in both directions"
To: "When an AUI component or PMD both sends local_rts and receives remote_rts in both directions"

Change: "When all devices are in data mode, communication on the path is established."
To: "When all AUI components and PMDs in the path are in DATA mode, communication on the path is established."

Replace "device" throughout the Annex with "AUI component or PMD", where appropriate.

Implement with editorial license.

*Cl* **178B** *SC* **178B.5** *P* **788** *L* **3** # 465

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket) ILT*

The otherwise is not necessary as the heading says you use one or the other.

*SuggestedRemedy*

Remove the "otherwise".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.5.1** *P* **788** *L* **9** # 227

Huber, Thomas — Nokia

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

"Interface" is vague. I think this clause is about lanes in an ISL.

*SuggestedRemedy*

Replace "interface" with something more specific and clear. "ISL endpoint" and "ISL lane" could be used as appropriate throughout the clause.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Interface is never concisely defined in Annex 178B. A defining statement near the beginning would be helpful.
The definition of "Interface" should be in line with the new definition for "ISL" as provided in the resolution to closed comment #222.
Also, the term "AUI component" should be defined collectively as either a C2C component or C2M component defined in 176C and 176D, respectively. Other changes to the definition would be helpful. The response to closed comment #221 provides some related wording changes.

Change the definition of "AUI component" in 178B.3 to the following:
"AUI component
An AUI component is either a C2C component (e.g., see 176C.3) or a C2M component (e.g., see 176D.3). In a device with two AUI components the upper AUI component is the one facing toward the MAC sublayer and the lower AUI component is the one facing toward the medium."

Add a definition for "Interface" in 178B.3 as follows:
"Interface
Unless qualified otherwise, interface is either an AUI component or a PMD."

Implement with editorial license.

*Cl* **178B** *SC* **178B.5.1** *P* **788** *L* **13** # 117

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Improve clarity.

*SuggestedRemedy*

Replace "Local variables are sent to the peer interface via the training frames. Remote variables are received from the peer interface"

with

"Peer interfaces send local variables and receive remote variables via the training frames".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "Local variables are sent to the peer interface via the training frames. Remote variables are received from the peer interface."
To: "Local variables are sent to the peer interface and remote variables are received from the peer interface via the training frames."
Implement with editorial license.

*Cl* **178B** *SC* **178B.5.1** *P* **788** *L* **15** # 228

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **R** *(Common) ILT description*

This clause appears to be about the process for training each lane of an ISL, so it's not clear why local_rts or remote_rts belong here (since they are about the end-to-end path - although the state diagrams clause suggests that each ISL maybe has its own local_rts and remote_rts - but that would mean that local_rts and remote_rts are not signals that propagate from PCS to PCS). While the intended meaning of 'device' is clear, it would be better to describe the protocol in terms of ISLs and the endpoints of ISLs.

*SuggestedRemedy*

Clarify what condition it is that causes the propagation_timer to be started. presumably it's not related to local_rts and remote_rts (or if it is, the definitions of local_rts and remote_rts need to be modified to make it clear that they apply to each lane of each ISL, not just to PCS-to-PCS communication).

*Response* *Response Status* **C**

REJECT.

Condition to start the propagation_timer is well defined in the referenced Figure 178B-8 "Training control state diagram".

Note that in 178B.14.1 it states "Should there be a discrepancy between a state diagram and descriptive text, the state diagram prevails."

*Cl* **178B** *SC* **178B.5.1** *P* **788** *L* **16** # 118

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) ILT*

In this subclause, I assume we are describing the interface behavior of Inter-sublayer Links (ISLs) and not the behavior of the overall ILT path from PCS to PCS (or XS to XS). If this assumption is correct, use of the term "device" is confusing.

*SuggestedRemedy*

Replace the word "device" with "sublayer".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #226.

*Cl* **178B** *SC* **178B.5.1** *P* **788** *L* **21** # 587

Shrikhande, Kapil Marvell

*Comment Type* **T** *Comment Status* **A** *(Common) (bucket) ILT*

"rx_ready" is not defined before this term is used. rx_ready is used on lines 21 and 23. Presumably rx_ready is receiver ready, which is defined later in clause in 178B.8.1 ?

*SuggestedRemedy*

Define rx_ready and / or clarify that this variable is same as receiver ready defined in 178B.8.1

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "waiting for either rx_ready or remote_rts to change"
To: "waiting for either local_rts or remote_rts (see 178B.14.2.1) to change"

*Cl* **178B** *SC* **178B.5.1** *P* **788** *L* **21** # 466

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **R** *(Common) ILT timers*

Having an unspecified time limit for rx_ready assertion (from entry to TRAIN_LOCAL) makes for unpredicatable link up behaviors. A time limit from the point at which TRAIN_LOCAL is entered to entry to TRAIN_REMOTE will improve predictability of operation which will facilitate predicatble device behaviors.

*SuggestedRemedy*

Presentation for a solution to be provided.

*Response* *Response Status* **U**

REJECT.

The following contribution was reviewed by the task force:
https://www.ieee802.org/3/dj/public/25_07/slavick_3dj_02_2507.pdf

An alternate proposal (per comment #420) in the following contribution was also reviewed:
<URL>/ran_3dj_02a_2505

Comment #420 proposes an alternate way to implement a timer.

Straw poll indicates that more work is needed to build a consensus position for the proposal in either slavick_3dj_02_2507 or ran_3dj_02a_2505.

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

Straw poll TF-6 Pick one (directional)
Straw poll TF-7 Chicago (directional)
I support add ILT timers as follows:
A: per slavick_3dj_02_2507
B: per ran_3dj_02a_2505
C: No changes in this regard
D: NMI
TF-6 -- A: 24 B: 13 C: 3 D: 28
TF-7 -- A: 26 B: 21 C: 15 D: 30

*Cl* **178B** *SC* **178B.5.1** *P* **788** *L* **30** # 291

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **R** *(Common) ILT enable*

There seems to be some confusion around whether ISL is required or optional.Clause 178 through 183 there is rather definitive text specification that indeed ISL is mandatory to implement, but with the ability to enable and disable. Text in 178B.5.1 allows for a case where training is not available with clarification "(disabled or not defined for the interface type)", the latter portion meaning that there is no normative text in the clause or annex. However, it may be helpful to circumvent any confusing and add some clear text at the begin of Annex 178B stating that the requirement for ILT for each interface is defined by the Clause or Annex the specifies the interface and perhaps even adding table list interfaces for which it is mandatory.

*SuggestedRemedy*

Add the following sentence or similar to the first paragraph in 178B.4: "The mandatory or optional implementation of the ILT function is specified in the clause or annex that defines the interface."

*Response* *Response Status* **C**

REJECT.

There is no consensus to implement the suggested remedy.

*Cl* **178B** *SC* **178B.5.2** *P* **789** *L* **2** # 54

Jones, Chad — Cisco Systems, Inc.

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

Use of the word guarantee, in two places. This will likely be flagged during MEC. Staff review will likely recommend this replaced with "helps ensure".

*SuggestedRemedy*

change "guarantees" to "helps ensure" in two places on lines 2 and 3.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change:
"As shown in the RTS control state diagram (Figure 178B-7) local_rts is set to true only after the transmit clock is derived from the PCS clock. This guarantees that the transition between clock sources occurs while sending local_rts = false."

To:
"As shown in the RTS control state diagram (Figure 178B-7) local_rts is set to true only after the transmit clock is derived from the PCS clock, such that the transition between clock sources occurs while sending local_rts = false."

*Cl* **178B** *SC* **178B.5.3** *P* **789** *L* **24** # 376

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Common) ILT retimer*

Figure can improve for better representation

*SuggestedRemedy*

Suggest the folloiwng:
- CDR ouput add mux (Training/mission modes)
- Connect Training frame decode to training frame encode
- You can also create a new block called "Training State Machine" then connect training decode and encode to it.

*Response* *Response Status* **U**

REJECT.
Figure 178B-2 is a reference model meant specifically for illustrating the operation of a retimer, not a full functional diagram. Adding too much detail to this diagram will make it unreadable. This "state machine" would need to be connected to tx_mode and the USE_TX_CLOCK signals as well as the training frames.

The commenter is encouraged to provide a detailed proposal with illustration.

*Cl* **178B** *SC* **178B.5.3** *P* **789** *L* **44** # 421

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *(Common) ILT extender*

The text about training xMII extenders does not address the communication of the status variables isl_ready and remote_rts between interfaces (PMD to AUI and vice versa) when there is a PHY XS and PCS between them.
Ideally, this communication should be the same as the one defined in 178B.14.2.1 using adjacent_signal_ok, but the case of an extender is not covered by NOTE that describes what "adjacent" is.

Since this behavior is specific to PHYs attached to extenders, it should be specified in this subclause, preferably with a diagram.

*SuggestedRemedy*

Add a NOTE in 178B.5.3 stating that, for the purpose of adjacent_signal_ok, the adjacent interface of a PMD in a PHY attached to an xMII extender is the service interface of the PHY XS; and the adjacent interface of the AUI component above the PHY XS is the service interface of the PMD.
Add a figure to illustrate the communication of adjacent_signal_ok between the PMD and the AUI (across the PCS and PHY XS, and possibly other sublayers).

*Response* *Response Status* **U**

REJECT.

The CRG reviewed slides 24 to 28 in the following contribution:
https://www.ieee802.org/3/dj/public/25_07/brown_3dj_03a_2507.pdf

Straw poll TF-1 (below) shows strong consensus to define startup signaling that extends RS to RS.

However, the proposed solution does not provide sufficient detail to implement at this time. For instance, it is missing details for exchanging signals across the PCS service interface.

A detailed contribution on this subject is encouraged.

Straw poll #TF-1 (directional)
I support the direction of extending path start-up signaling (as proposed in D2.0 comment #421) from Reconciliation sublayer to Reconciliation sublayer.
Yes: 23
No: 1
Abstain: 20

*Cl* **178B** *SC* **178B.5.3** *P* **789** *L* **47** # 119

Mascitto, Marco — Nokia

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

Subclause 178B.3 defines Path as the series of all ISLs between the two PCSs (or XSs), so use of "PCS to PCS path" or "main path" may cause confusion (as it suggests something different). I was thinking about suggesting a rename of "Path" to "ILT Path" to emphasize the end-to-end scope. Not sure if that is any better.

*SuggestedRemedy*

Replace "PCS to PCS path" and "main path" with "path".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "AUI components within an xMII Extender may train before or in parallel with the PCS to PCS path, and training signaling will continue until the main path is ready. This is the same behavior as AUI components within a PHY."
To: "AUI components within an xMII Extender have the same behavior as AUI components within a PHY."
Implement with editorial license.

---

*Cl* **178B** *SC* **178B.6.2** *P* **791** *L* **7** # 450

He, Xiang — Huawei

*Comment Type* **TR** *Comment Status* **A** *(Common) ILT types*

The definition of E1 and O1 is unclear.
"Two formats are defined for the control and status fields, E1 and O1." So E1 and O1 are two "formats" for the control and status fields. (This is the origin of E1 and O1 in the document). After this point in 178B, they were used as "E1 interfaces" and "O1 interfaces" all over the places - like in 178B.7. There are also 5 references using "Type E1 interface" and "Type O1 interface" in PMD clauses, like in 183.5.12.
We should do a better definition for these terms in Clause 178B, and use clear references in other clauses.

*SuggestedRemedy*

First change: Clearly define two types of interfaces, "Type E1 interface" and "Type O1 interface", and stick to these terms all across 178B and the document.

Second change: Change the reference from "178B" to the subclause where they were defined, like "178B.6.2".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #634.

---

*Cl* **178B** *SC* **178B.6.2** *P* **791** *L* **7** # 229

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) ILT types*

While it is probably not likely that any reader of this annex would get confused, "E1" is of course the name of the European PDH frame structure, so it might be better to avoid using that name. Further, the last sentence "Each interface using ILT shall identify which format is relevant for it" reads too much like a requirement that would show up in a PICS, but that is clearly not what is intended here (the intent being that electrical PHYs use the E format and optical PHYs use the O format).

*SuggestedRemedy*

The formats E1 and O1 are really about electrical or optical 200G/lane signaling. Maybe it would be better to refer to them that way (i.e., replace "E1" with "electrical 200G/lane" and "O1" with "optical 200G/lane". With that change, the last sentence could be deleted. If the change is made, it should be applied throughout the annex, and potentially in other clauses in the document that may refer to the frame names..

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #634.

---

*Cl* **178B** *SC* **178B.6.2** *P* **791** *L* **7** # 634

Law, David — HPE

*Comment Type* **T** *Comment Status* **A** *(Common) ILT types*

Subclause 178B.6.2 'Control and status fields' says that 'Two formats are defined for the control and status fields, E1 and O1.'. Everywhere else in the draft, however, it seems that E1 and O1 are defined as types of interfaces. For example, subclause 178B.7 'Control field structure' says, 'The structure of the control field for E1 interfaces shall be as shown in Table 178B-2 and for O1 interfaces as shown in Table 178B-3.'.

*SuggestedRemedy*

Suggest that the text 'Two formats are defined for the control and status fields, E1 and O1.' is changed to read 'The type E1 interface and a type O1 interface use different formats for the control and status fields (see 178B.7).'.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

There is no consensus to change to interface types. However, some clean up would be helpful.

Update text throughout the draft to consistently refer to "E1 format" and "O1 format", where appropriate.

Implement with editorial license.

*Cl* **178B** *SC* **178B.7** *P***795** *L***4** # 230

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **R** *(Common) (bucket) ILT*

It would be better to combine tables 178B-2 and 178B-3 into a single table, with one column for the electrical interfaces and one for the optical interfaces. That would make it easier for the reader to see that the formats are the same, except that on optical links some of the fields are not used. The same applies to tables 178B-4 and 178B-5 in clause 178B.8

*SuggestedRemedy*

Change the table title to 'Control field structure for 200G/lane interfaces'
Change the heading of the 3rd column to "Electrical interfaces". Add a fourth column titled "Optical interfaces, and populate it with the information that is in Table 178B-3.
Delete Table 178B-3
Make corresponding changes in clause 178B.8 for tables 178B-4 and 178B-5.

*Response* *Response Status* **C**

REJECT.
The tables as written clearly show what is required for either the optical or electrical interface. There is potential that the function of some reserved bits may be assigned different functions and might be combined in different ways so a combined table would get messy. Currently only two types, E1 and O1, are defined, but others might be defined making the table more crowded and perhaps more diversive.

*Cl* **178B** *SC* **178B.7** *P***796** *L***5** # 377

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Optical) ILT frames*

https://www.ieee802.org/3/dj/public/24_05/ghiasi_3dj_01a_2405.pdf looked at number of options for OLT such as Presets, FFE adjustment, OMA control, chirp, inner-outer eye adjustments, but at the time the Task Force decdied to just enable the basic OLT with pre-coder control. A vendor selected Preset can provide set of Presets optimized for example shorter/longer reacehs, lower OMA more linear or higher OMA less linear, higher peaking or less peaking

*SuggestedRemedy*

The enhancement to OLT issomehting that Task Force should consider specially that MMF will require enabling Presets. Just like E1 O1 should have 6 Presets, with default Preset 1 only meeting TDECQ, Presets 2-6 may have +1 dB TDECQ penalty.
Clasue 183 800GBASE-LR4 and possibly 800GBASE-FR4 are good candiate to have several presets to better mitigate dispersion penalties
See ghiasi_3dj_01_2507

*Response* *Response Status* **U**

REJECT.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/ghiasi_3dj_01a_2507.pdf

There is no consensus to make the proposed changes.

*Cl* **178B** *SC* **178B.7.1** *P***796** *L***26** # 485

Kimber, Mark — Semtech

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket) ILT*

Potentially confusing as this only applies to E1 cases but refers to configurations specified in the AUI and PMD clauses. There is a comment in the O1 table stating it should be ignored on receipt. It would be better to also state in this text that it refers only to E1.

*SuggestedRemedy*

Change
The initial condition request bits are used to select one of the up to six predefined transmitter equalizer configurations (presets) specified in the AUI annexes or PMD clauses.
To
Only applies for E1 intefaces. The initial condition request bits are used to select one of the up to six predefined transmitter equalizer configurations (presets) specified in the AUI annexes or PMD clauses.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.7.5** *P* **796** *L* **50** # 486

Kimber, Mark — Semtech

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket) ILT*

Potentially confusing as this only applies to E1 cases. There is a comment in the O1 table stating it should be ignored on receipt. It would be better to also state in this text that it refers only to E1.

*SuggestedRemedy*

Change
The coefficient select bits are used to identify the coefficient that is the target of a coefficient request.
To
Only applies for E1 interfaces. The coefficient select bits are used to identify the coefficient that is the target of a coefficient request....

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **178B** *SC* **178B.7.6** *P* **797** *L* **1** # 487

Kimber, Mark — Semtech

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket) ILT*

*SuggestedRemedy*

Change
The coefficient request bits are used to change the value of the coefficient specified by the coefficient select
bits.
To
Only applies to E1 interfaces. The coefficient request bits are used to change the value of the coefficient specified by the coefficient select
bits.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

---

*Cl* **178B** *SC* **178B.8** *P* **797** *L* **20** # 111

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Common) ILT frames*

The ILT bit is not used anyway in Annex 178B.

*SuggestedRemedy*

Change bit 14 in the status field in Tables 178B-4 and 178B-5 to "Reserved"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Based on straw poll there is support to make the proposed change.

Implement the suggested remedy.
Also, delete the ILT bit definition in 178B.8.2.

Implement with editorial license.

Straw poll #TF-2 (directional)
I support changing the ILT bit (bit 14 in E1 and O1 status frame) to reserved.
Yes: 12
No: 7
Abstain: 17

---

*Cl* **178B** *SC* **178B.8.5** *P* **799** *L* **1** # 120

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Consistently use "1" for boolean true and "0" for boolean false.

*SuggestedRemedy*

Replace "[.] and is not set to one" with "and is not set to 1".

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **178B** *SC* **178B.10** *P* **799** *L* **44** # 467

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket) ILT*

The fact that polarity_invert persists after training completes should be the last part of this sub-clause.

*SuggestedRemedy*

Move the 2nd paragraph in 178B.10 to be after the NOTE.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.10** *P* **799** *L* **50** # 121

Mascitto, Marco — Nokia

*Comment Type* **T** *Comment Status* **A** *(Common) ILT enable*

If this note is making reference to an ISL that can be administratively disabled by system management, this should not be allowed. See my comment regarding page 804, line 18.

*SuggestedRemedy*

Do not allow management control of ILT for ISLs required to support it.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #126.

*Cl* **178B** *SC* **178B.11.2** *P* **800** *L* **47** # 461

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Common) (bucket) ILT*

No pointer to the CHECK_REQ function is provided.

*SuggestedRemedy*

Add the following sentence to the last paragraph of 178B.11.2: "The function CHECK_REQ is defined in 178B.14.3.1."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add the following sentence to the last paragraph of 178B.11.2: "The function CHECK_REQ is defined in 178B.14.3.2.".
Implement with editorial license.
[Editor's note: changed page from 783 to 800]

*Cl* **178B** *SC* **178B.11.4** *P* **802** *L* **25** # 325

Brown, Matt — Alphawave Semi

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

Use of possesive grammar is inconsistent with similar phrases used through this draft and is unecessary here.

*SuggestedRemedy*

Change "transmitter's" to "transmitter", three instances. Also, page 808 line 17, 4 instances. Also on page 804 line 44, change "interface's" to "other interface"

*Response* *Response Status* **C**

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

*Cl* **178B** *SC* **178B.13** *P* **802** *L* **47** # 122

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Consistently use "1" for boolean true and "0" for boolean false.

*SuggestedRemedy*

Replace "[.] transmitted training frames is set to one" with "transmitted training frames is set to 1".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.14.2.1** *P* **803** *L* **46** # 123

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) ILT adjecency*

This is not very clear. I would suggest adding the definition of "adjacent service interface" in subclause 178B.3.

*SuggestedRemedy*

I would suggest adding the definition of "adjacent service interface" to subclause 178B.3 and referencing a diagram, like the one on Slide 3 of "Making Sense out of ILT" (J. D'Ambrosia, M. Brown, 802.3dj Joint Ad hoc Mtg - 05 Jun 2025).

Adjacent service interface
The service interface adjoining a PMD or AUI component to a PMA.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Slide 20 of the following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/brown_3dj_03a_2507.pdf

Although a figure similar to the one provided on slide 20 would be helpful, a contribution with full details is required.

Implement the suggested wording changes on slide 20 of brown_3dj_03a_2507.

Implement with editorial license.

*Cl* **178B** *SC* **178B.14.2.1** *P* **803** *L* **47** # 448

Ran, Adee
Cisco Systems

*Comment Type* **T** *Comment Status* **A** *(Common) ILT adjecency*

The second case in the NOTE says: "For ILT in an AUI component above a PMA, the adjacent service interface is the interface below the AUI component". That is the PMA's service interface. It may be easier to understand if it is stated.
Also, a figure illustrating the two cases would be helpful.

*SuggestedRemedy*

Change "the adjacent service interface is the interface below the AUI component" to "the adjacent service interface is the PMA service interface (below the AUI component)".
Add a figure, with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #123.

*Cl* **178B** *SC* **178B.14.2.1** *P* **804** *L* **15** # 55

Jones, Chad
Cisco Systems, Inc.

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket2) ILT*

Use of the work avoid. This will likely be flagged during MEC. Staff review would likely recommend to replace with "help reduce".

*SuggestedRemedy*

change "avoid" to "help reduce".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change:
"To avoid live-lock situations, ILT should only be restarted if there is an indication of an unrecoverable fault."
To:
"Restarting ILT might result in a live-lock situations, thus ILT should only be restarted if there is an indication of an unrecoverable fault."

*Cl* **178B** *SC* **178B.14.2.1** *P* **804** *L* **15** # 125

Mascitto, Marco
Nokia

*Comment Type* **E** *Comment Status* **R** *(Common) (bucket) ILT*

Could be clearer.

*SuggestedRemedy*

Replace NOTE with the following text, "There is no specified time limit for ILT to complete. ILT should be restarted if there is an indication of an unrecoverable fault or a livelock situation. The definition of unrecoverable fault is beyond the scope of this annex".

*Response* *Response Status* **C**

REJECT.
Although the comment set the comment type to "E", the suggested remedy is a technical change.
Although the intent of the comment was an editorial change to the text within the note for clarification, the suggested remedy changes the meaning and intent of the note.

*Cl* **178B** *SC* **178B.14.2.1** *P* **804** *L* **18** # 231

Huber, Thomas
Nokia

*Comment Type* **T** *Comment Status* **A** *(Common) ILT enable*

It is not clear why the ability to enable/disable ILT (via the mr_training_enable variable) is provided. In what circumstance would it be necessary or desirable for ILT to be turned off for any interface that can support it? Providing this ability complicates the feature (there are multiple places where the value of a variable depends on whether mr_training_enable is true or false) and creates the possibility of misconfiguration between two systems, or between a host and a module, complicating the process of bringing up end-to-end paths.

*SuggestedRemedy*

Reconsider the ability to disable ILT via management configuration.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #126.

*Cl* **178B** *SC* **178B.14.2.1** *P* **804** *L* **18** # 126

Mascitto, Marco — Nokia

*Comment Type* **T** *Comment Status* **A** *(Common) ILT enable*

It is my understanding that ILT is mandatory for all ISLs that make use of one or more 200 Gb/s lanes. These links will come up (i.e., tx_mode = data) IFF ILT completes successfully. I cannot envision a use case where ILT would be administratively disabled by system management (but do see the need to mr_restart, of course). Having the ability to disable ILT on these ISLs opens the door to operator misconfiguration, confusion during deployments, and reduces the plug-n-play value of 802.3 interfaces. It gets even more complicated if we consider the case of the multi-ISL path.

*SuggestedRemedy*

Do not allow management control of ILT for ISLs required to support it.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add text stating the following:
ILT is enabled by default
ILT must be disabled at both ends or enabled at both ends.
Manual configuration needed.
Recommendation to not disable on optical links
Note that performance could be compromised and end to end start-up would not work.

Implement with editorial license.

*Cl* **178B** *SC* **178B.14.2.1** *P* **804** *L* **27** # 127

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Clarify "device".

*SuggestedRemedy*

Replace "Boolean variable that controls the resetting of the device" with "Boolean variable that controls the global resetting of the ILT per-interface state machines".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.14.2.1** *P* **804** *L* **32** # 459

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **A** *'Common) ILT state diagrams*

Training status can not be both a AUI component variable and a per-lane training variable. Local_rts is an equivalent status to it and is mapped to a MDIO register bit.

*SuggestedRemedy*

Move the definition of training_status to 178B14.3.1
Remove the enumeration of "READY" from its definition.
Delete training_status <= READY from Figyre 178B-7

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following related contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/bruckman_3dj_01_2507.pdf

Implement the proposed changes on slides 5 and 6 of bruckman_3dj_01_2507.

Implement with editorial license.

*Cl* **178B** *SC* **178B.14.2.4** *P* **805** *L* **1** # 633

Law, David — HPE

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Change the title of subclause 178B.14.2.4 'State diagram figures' to read 'State diagram figure' since there is only one state diagram figure in this subclause, Figure 178B-7 'RTS update state diagram'.

*SuggestedRemedy*

See comment.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.14.3** *P* **805** *L* **51** # 128

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Missing "state machines".

*SuggestedRemedy*

Replace "An AUI component or PMD implements one instance of each of the Training control and the Training frame lock, and their associated variables[.]" with "An AUI component or PMD implements one instance of each of the Training control and the Training frame lock state machines, and their associated variables[...].

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "one instance of each of the Training control and the Training frame lock, and their associated variables"
To: "one instance of each of the Training control and the Training frame lock state diagrams, and their associated variables"

*Cl* **178B** *SC* **178B.14.3** *P* **806** *L* **1** # 499

Dudek, Mike Marvell

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

The Path ready descriptions apply to both E1 and O1 interfaces. It would read better if these paragraphs were placed before the paragraph that describes the different behaviour.

*SuggestedRemedy*

Move the first paragraph to after the 3rd paragraph.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.14.3** *P* **806** *L* **1** # 129

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **R** *(Common) (bucketp) ILT*

Replace instances of "state diagram" with "state machine".

*SuggestedRemedy*

Replace "E1 interfaces also implement one instance of the Coefficient update state diagram and its associated variables and functions independently for each of the n physical lanes. For O1 interfaces, this diagram and its associated variables and functions are not used" with "E1 interfaces also implement one instance of the Coefficient update state machine and its associated variables and functions independently for each of the n physical lanes. For O1 interfaces, this state machine and its associated variables and functions are not used".

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **178B** *SC* **178B.14.3.1** *P* **807** *L* **36** # 632

Law, David HPE

*Comment Type* **T** *Comment Status* **A** *'Common) ILT state diagrams*

The variables remote_mc_mode and remote_tp_mode are defined in subclause 178B.14.3.1 'Variables' but are not used in any of the respective state diagrams, Figure 178B-8 'Training control state diagram', Figure 178B-9 'Training frame lock state diagram', or Figure 178B-10 'Coefficient update state diagram'.

*SuggestedRemedy*

Remove the definitions of remote_mc_mode and remote_tp_mode from subclause 178B.14.3.1 'Variables'.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

These variables (remote_mc_mode and remote_tp_mode) are already listed in the management variables subclause.

Move the definitions for these variables to the relevant subclause.

Implement with editorial license.

*Cl* **178B** *SC* **178B.14.3.1** *P* **807** *L* **44** # 500

Dudek, Mike — Marvell

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

"Correspondent" is strange. "Corresponding" is better, as used in the base document in multiple places e.g. 73.7.6 first paragraph

*SuggestedRemedy*

Change "correspondent" to "corresponding" here and on line 48.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.14.3.1** *P* **808** *L* **2** # 631

Law, David — HPE

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Typo.

*SuggestedRemedy*

Change '... variable that is set to TRUE when ...' to read '... variable that is set to true when ..'.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.14.3.1** *P* **808** *L* **25** # 415

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Common) ILT local_pattern*

In order to bring up a link that includes multiple ISLs, the functionality of ILT as specified by Figure 178B-7 and Figure 178B-8 is required across ISLs.

In PMDs that don't have a training protocol, and in PMDs that have it but training is disabled, the "quiet" and "local pattern" modes are the method of communicating the RTS to the peer.

However, the specification for the transmitted local pattern is incomplete - it only says "transmits a pattern from a valid pattern generator".

A local pattern for ILT should be specified in every PMD clause and AUI annex. This comment addresses the general requirements; additional comments are sumbitted for the PMD clauses (including 185 and 187 that currently do not have ILT as a requirement at all):

- For AUIs, the local pattern is PRBS31Q, which may be generated by the PMA to which the AUI component is attached and fed into the AUI component.
- For PMDs in clauses 178-182 (directly below an SM-PMA with no inner FEC), the local pattern is PRBS31Q, which may be generated by the SM-PMA and fed into the PMD service interface.
- For PMDs in clauses 183 and 185 (below a clause 177 or clause 184 Inner FEC, respectively), the local pattern is PRBS31 encoded by the Inner FEC, which may be generated by the Inner FEC and fed into the PMD service interface.
- For the PMD in clause 187, the local pattern is the output of the test pattern generator defined in 186.2.3.12.

*SuggestedRemedy*

Add text in the definition of tx_mode (178B.14.3.1) stating that the pattern used as local_pattern is specified in each clause or annex that uses the ILT function.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #416.

*Cl* **178B** *SC* **178B.14.3.3** *P* **809** *L* **14** # 420

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **R** *(Common) ILT timers*

A presented in https://www.ieee802.org/3/dj/public/25_05/ran_3dj_02a_2505.pdf, there is a potential benefit in having a timer to the ILT training control state diagram, to inform management when the adaptation exceeds the expected time.

*SuggestedRemedy*

Implement the changes to clause 175 per slide 11 of ran_3dj_02a_2505, with editorial license.

*Response* *Response Status* **C**

REJECT.

Resolve using the response to comment #466.

*Cl* **178B** *SC* **178B.14.3.4** *P* **809** *L* **4** # 460

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **R** *(Common) ILT timers*

The duration of the quiet_timer breaks the time alloted during AN to begin sending negotiated rate data stream per 73.4.3.

*SuggestedRemedy*

Presentation of options to be supplied.

*Response* *Response Status* **U**

REJECT.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/slavick_3dj_01_2507.pdf

There is some agreement that further clarification and perhaps updates to the specifications are needed. However, further details and consensus building is required.

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

*Cl* **178B** *SC* **178B.14.3.5** *P* **809** *L* **26** # 130

Mascitto, Marco — Nokia

*Comment Type* **E** *Comment Status* **A** *'Common) ILT state diagrams*

These state diagrams inherit the variables, functions, and timers previously defined in 178B.14.2. There should be a statement to that effect.

*SuggestedRemedy*

Replace the first sentence with, "The training control state diagram (Figure 178B-8) defines the operation of ILT for AUI components and
PMDs, and makes use of the per-interface state diagram definitions (178B.14.2) and per-lane state diagram definitions (178B.14.3)".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

*Cl* **178B** *SC* **178B.14.3.5** *P* **810** *L* **2** # 627

Law, David — HPE

*Comment Type* **T** *Comment Status* **A** *'Common) ILT state diagrams*

The variables mr_restart and reset are used in Figure 178B-8 'Training control state diagram', Figure 178B-9 'Training frame lock state diagram', and Figure 178B-10 'Coefficient update state diagram', but are not defined in the associated subclause 178B.14.3.1 'Variables'.

*SuggestedRemedy*

Add the following two entries in alphabetical order to subclause 178B.14.3.1:

mr_restart
See 178B.14.2.1.

Reset
See 178B.14.2.1.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #130.

*Cl* **178B** *SC* **178B.14.3.5** *P* **810** *L* **7** # 626

Law, David HPE

*Comment Type* **TR** *Comment Status* **A** *(Common) ILT state diagrams*

The variable training_status is used by the 'Training control state diagram' in subclause 178B.14.3.5 'State diagram figures' but is not defined in the associated subclause 178B.14.3.1 'Variables'.

In addition, it appears that the training_status is a per-interface variable based on the definition found in 178B.14.2.1 'Variables', yet it appears to be driven by both the per-interface 'RTS update state diagram' (Figure 178B-7) and the per-lane 'Training control state diagram' (Figure 178B-8). I'm not sure how this would operate.

As an example, if the Training control state diagram on one lane in an interface enters the FAIL state, it would set training_status for the interface to FAIL. If, however, the Training control state diagram on another lane in the same interface enters the PATH_UP state immediately afterwards, training_status for the interface would then be set to OK. This doesn't seem to be correct.

*SuggestedRemedy*

Provide a definition for the training_status variable used in Figure 178B-8 'Training control state diagram' in its associated subclause 178B.14.3.1 'Variables'. In addition, clarify the operation of training_status regarding it being driven by both the per-interface 'RTS update state diagram' (Figure 178B-7) and the per-lane 'Training control state diagram'.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #459.

*Cl* **178B** *SC* **178B.14.3.5** *P* **810** *L* **10** # 628

Law, David HPE

*Comment Type* **T** *Comment Status* **A** *(Common) ILT state diagrams*

The variables mr_training_enable, local_rts and remote_rts are used in Figure 178B-8 'Training control state diagram' but are not defined in the associated subclause 178B.14.3.1 'Variables'.

*SuggestedRemedy*

Add the following entry in alphabetical order to subclause 178B.14.3.1:

local_rts
See 178B.14.2.1.

mr_training_enable
See 178B.14.2.1.

remote_rts
See 178B.14.2.1.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #130.

*Cl* **178B** *SC* **178B.14.3.5** *P* **810** *L* **13** # 269

Wang, Xuebo Huawei

*Comment Type* **T** *Comment Status* **R** *(Common) ILT timers*

There is no time out for exiting the state SEND_TRAINING. If either local_tf_lock or remote_tf_lock is false for a long time, the whole state diagram will be trapped in the state SEND_TRAINING for long. A maximum time duration for this state should be set.

*SuggestedRemedy*

A contribution to address this will be provided.

*Response* *Response Status* **C**

REJECT.

The following contribution was reviewed by the task force:
https://www.ieee802.org/3/dj/public/25_07/wang_3dj_02_2507.pdf

The proposal is to adopt the changes on slide 3 of wang_3dj_02_2507.

There is no consensus to make the proposed changes.

*Cl* **178B** *SC* **178B.14.3.5** *P* **810** *L* **45** # 629

Law, David HPE

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Subclause 178B.14.1 'State diagram conventions' says that 'The notation used in the state diagrams follows the conventions of 21.5.'. Table 21-1 'State diagram operators' defines the [not equal sign] character as 'Not equals'.

*SuggestedRemedy*

Change the text 'max_recovery_events !=0' to read 'max_recovery_events [not equal sign] 0'.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.14.3.5** *P* **810** *L* **46** # 630

Law, David HPE

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Subclause 178B.14.1 'State diagram conventions' says that 'The notation used in the state diagrams follows the conventions of 21.5.'. Table 21-1 'State diagram operators' defines the use of the [greater than or equal sign] character as 'Greater than or equal to'.

*SuggestedRemedy*

Change the text 'recovery_event_count >= max_recovery_events' to read 'recovery_event_count [greater than or equal sign] max_recovery_events'.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.15** *P* **813** *L* **1** # 422

Ran, Adee Cisco Systems

*Comment Type* **T** *Comment Status* **R** *(withdrawn)*

"If the MDIO Interface is not implemented, an alternate mechanism to access management variables shall be provided"

Specifically for AUI-C2M, the most prevalent management interface is expected to be CMIS rather than MDIO. We expect CMIS to provide access to these management variables. CMIS should be referenced, at least informatively.

*SuggestedRemedy*

Append the following sentence: "For example, for modules using AUI-C2M, the Content Management Interoperability Services (CMIS) interface may be used as an alternate mechanism". Add a footnote with a reference to the CMIS specification (undated, since the current version does not address ILT yet).

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **178B** *SC* **178B.15** *P* **813** *L* **50** # 635

Law, David HPE

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Suggest that the text 'Bit reference is provided for lane 0, bits for lanes 1 to 3 ...' is split into two sentences.

*SuggestedRemedy*

Change 'Bit reference is provided for lane 0, bits for lanes 1 to 3 ...' to read 'Bit reference is provided for lane 0. Bits for lanes 1 to 3 ...'

*Response* *Response Status* **C**

ACCEPT.

*Cl* **178B** *SC* **178B.16.1** *P* **815** *L* **7** # 131

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Include complete title of annex. Forgot "optical".

*SuggestedRemedy*

Replace first sentence with, "The supplier of a protocol implementation that is claimed to conform to Annex 178B, Inter-sublayer link
training for electrical and optical interfaces, shall complete the following protocol implementation conformance statement (PICS) proforma".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy and also change the sublcause title to: "Protocol implementation conformance statement (PICS) proforma for Annex 178B, Inter-sublayer link training for electrical and optical interfaces"

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*Cl* **178B** *SC* **178B.16.2.2** *P* **815** *L* **36** # 132

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Include complete title of annex. Forgot "optical".

*SuggestedRemedy*

Replace with "IEEE Std 802.3dj-202x, Annex 178B, Inter-sublayer link training for electrical and optical interfaces".

*Response* *Response Status* **C**

ACCEPT.

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*Cl* **178B** *SC* **178B.16.3** *P* **816** *L* **18** # 133

Mascitto, Marco Nokia

*Comment Type* **E** *Comment Status* **A** *(Common) (bucket) ILT*

Syntax error.

*SuggestedRemedy*

Replace "O<1>" with "O.1" per C21. Apply change to IL7 through IL10, and IL12 through IL16.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **179** *SC* **179.1** *P* **383** *L* **22** # 717

Dawe, Piers Nvidia

*Comment Type* **E** *Comment Status* **A** *(Electrical) (bucketp)*

The electrical specifications are separate for each host class - awkward

*SuggestedRemedy*

There are electrical specifications for each host class

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The proposed wording change does not improve the technical clarity or accuracy of the text. However, it would be more accurate to state that the specifications are different rather than separate.
Change "separate" to "different".

---

*Cl* **179** *SC* **179.1** *P* **384** *L* **35** # 718

Dawe, Piers Nvidia

*Comment Type* **ER** *Comment Status* **R** *(Electrical) (bucketp)*

Tables 1 and 2, and 3 and 4, can be combined

*SuggestedRemedy*

Combine them into two, as Table 167-2, here and in other clauses

*Response* *Response Status* **U**

REJECT.
The associated clauses are significantly different between 200G/400G, 800G, and 1.6T, and therefore combination of the tables as suggested would make them less readable.

The tables are consistent with other PMD clauses in most previous PMD clauses.

There is no consensus to make the suggested change.

*Cl* **179** *SC* **179.2** *P* **387** *L* **46** # 639

Li, Mike — Altera (An Intel compnany)

*Comment Type* **T** *Comment Status* **R** *:lectrical) (bucket) BERadded*

Refer to figure 174A-5,
1.) BERadded is the BER contribution outside of the measured sublayer link.
2.) Measured sublayer link is PCS-to-PCS including PMD and FEC. Both TX-FEC and RX-FEC must be included in the PHY-based measurement. To use FEC decoder, the incoming signal must be encoded (compared with the incoming signal does not need to be encoded to use PMA-based block error measurement).
3.) May the measured link have xMII extender outside this sublayer link (its BER budget is not 8e-6 according to CL-174A.4).
4.) with Table 174A-2, table 174A-3, xMII extender (if used) is not part of CER < 1.45e-11 spec.
5.) Considering all of these, the BERsdded value for CL-179.2 should not be simple 8e-6. Instead, it should be 8e-6 * Number_of_C2C_SubLayerLink outside of the measured sublayer link between the two ends MACs.

*SuggestedRemedy*

change the BERsdded value from 8e-6 to 8e-6 * Number_of_C2C_SubLayerLink outside of the measured sublayer link between the two ends MACs.

*Response* *Response Status* **C**

REJECT.
A PHY receiver needs to interoperate with a link partner that may or may not include an AUI-C2C. The expected block error ratio accounts for possible additional errors in an AUI-C2C in the link partner. This is a general expectation from the PHY that is independent of the link partner in a specific link.

*Cl* **179** *SC* **179.5** *P* **388** *L* **41** # 645

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *(Electrical) (bucket)*

The term "pervasive management" does not have a plain and ordinary meaning, nor is it defined anywhere in the document.

*SuggestedRemedy*

Either drop the word "pervasive" or provide a definition of "pervasive management".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The phrasing used here is consistent with several previous clauses.
However, the word "pervasive" does not seem to be necessary, and the sentence can be simplified.
Change from
"the implementer may employ use of pervasive management or employ a dedicated electrical signal"
to
"the implementer may employ system management or use a dedicated electrical signal".

*Cl* **179** *SC* **179.8.1** *P* **390** *L* **26** # 646

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **A** *(Electrical) (bucketp)*

TP1 is described as the cable assembly input. I believe it is not the cable assembly input, but rather the input to the cable assembly test fixture that feeds the cable assembly input.

*SuggestedRemedy*

Change the description of TP1 to "The input of the cable assembly test fixture that feeds the cable assembly input."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the description of the test points in Table 179-6 as follows:

TP1: The input of a cable assembly test fixture (see 179B.3), corresponding to MDI signals SLi<p> and SLi<n>, used in cable assembly specifications.

Implement corresponding changes to the descriptions if TP2 through TP4.

Implement with editorial license.

*Cl* **179** *SC* **179.8.1** *P* **390** *L* **28** # 647

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **A** *(Electrical) (bucketp)*

TP2 is described as the host output. I believe it is not the host output, but rather the output of the TP2 or TP3 test fixture that is fed by thost output.

*SuggestedRemedy*

Change the description of TP2 to "The output of the TP2 or TP3 test fixture that is fed by the host output."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #646.

*Cl* **179** *SC* **179.8.1** *P* **390** *L* **30** # 648

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **A** *(Electrical) (bucketp)*

TP3 is described as the host input. I believe it is not the host input, but rather the input to the TP2 or TP3 test fixture that is feeds the host input.

*SuggestedRemedy*

Change the description of TP3 to "The input of the TP2 or TP3 test fixture that feeds the host input."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE. Resolve using the response to comment #646.

*Cl* **179** *SC* **179.8.1** *P* **390** *L* **32** # 649

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **A** *(Electrical) (bucketp)*

TP4 is described as the cable assembly output. I believe it is not the cable assembly output, but rather the output of the cable assembly test fixture that is fed by the cable assembly output.

*SuggestedRemedy*

Change the description of TP4 to "The output of the cable assembly test fixture that is fed by the cable assembly output."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #646.

*Cl* **179** *SC* **179.8.1** *P* **390** *L* **37** # 650

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *(Electrical) (bucket)*

"The channel between TP0d to TP5d" is grammatically incorrect. It should be "between TP0d and TP5d", or it should be "from TP0d to TP5d".

*SuggestedRemedy*

Change to "between TP0d and TP5d"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179** *SC* **179.8.2** *P* **391** *L* **31** # 191

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *mon) DATA/TRAINING mode*

While it is clear what "DATA mode" is intended to mean here in the context of ILT, that term has specific meaning for 1000BASE-T PHYs that differs from what is intended here (see 1.4.278) Annex 178B.5 indicates that in the context of ILT, "data mode" means the variable tx_mode has the value 'data', which is associated with being in the PATH_UP state per figure 178B-8. As such, it would be more clear if the text in 179.8.2 referred to the PATH_UP state.

*SuggestedRemedy*

Change "When operating in DATA mode, ." to "When operating in the PATH_UP state (see Figure 178B-8),."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The two modes of the PMD transmit function are explicitly defined in the first paragraph of 179.8.2: "The PMD transmit function has two operating modes: DATA and TRAINING. The operating mode is controlled by the ILT function (see 179.8.9)". These modes are referenced in multiple places in the draft (although they are not currently defined by all PMDs).

The suggested remedy refers to a state of the training state diagram, but there is a variable, tx_mode, that explicitly controls the "DATA mode" behavior. This variable can be referenced to improve clarity.
Also, DATA and TRAINING modes of the transmit function should be defined for all PMDs that include an ILT function, and all references to these modes should be linked to the transmit function.

In the first paragraph of 179.8.2, change "The operating mode is controlled by the ILT function (see 179.8.9)" to "The operating mode is controlled by the tx_mode variable of the ILT function (see 179.8.9): it is DATA when tx_mode=data, and TRAINING otherwise".
Add similar paragraphs in 180.5.2, 181.5.2, 182.5.2, and 183.5.2 (possibly also 185.5.2 and 187.5.2 if ILT is added to these clauses).
Add an explicit reference to the transmit function in all instances of "DATA mode" and "TRAINING mode" across the draft, where appropriate.

Slide 15 and 16 in the following contribution provide extra background and implementation examples:
https://www.ieee802.org/3/dj/public/25_07/brown_3dj_03_2507.pdf

Implement with editorial license.

*Cl* **179** *SC* **179.8.9** *P* **393** *L* **6** # 192

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *mon) DATA/TRAINING mode*

While it is clear what "DATA mode" is intended to mean here in the context of ILT, that term has specific meaning for 1000BASE-T PHYs that differs from what is intended here (see 1.4.278) Annex 178B.5 indicates that in the context of ILT, "data mode" means the variable tx_mode has the value 'data', which is associated with being in the PATH_UP state per figure 178B-8. As such, it would be more clear if the text in 179.8.9 referred to the PATH_UP state.

*SuggestedRemedy*

Change "coordinate the transition to DATA mode." to "coordinate the transition to the PATH_UP state (see Figure 178B-8)."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #191.

---

*Cl* **179** *SC* **179.8.9** *P* **393** *L* **13** # 464

Slavick, Jeff — Broadcom

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucket) presets*

Move Table 179-8 and here. It's relevent only to the ILT function.

*SuggestedRemedy*

Move Table 179-8 to the end of 179.8.9 and delete 179.9.4.1.3

*Response* *Response Status* **C**

REJECT.
The initial conditions (presets) table includes tolerances, and thus it is part of the electrical specifications. Its location is consistent with previous clauses.
The suggested change is not considered an improvement of the draft, and may be confusing to readers.
[Editor's note: Changed page from 379 to 393]

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*Cl* **179** *SC* **179.9** *P* **393** *L* **19** # 719

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *ical) (bucketp) characteristics*

PMD electrical characteristics

*SuggestedRemedy*

PMD electrical specifications

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #708.

---

*Cl* **179** *SC* **179.9.3** *P* **393** *L* **40** # 64

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The reference impedance for measurement should align with the test fixture reference.

*SuggestedRemedy*

Change line to:

The reference impedance for differential specifications is 92.5 ohms. The reference impedance for common-mode specifications is 23.125 ohms.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

---

*Cl* **179** *SC* **179.9.3** *P* **393** *L* **40** # 612

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

All impedance values should be 92.5 ohms

*SuggestedRemedy*

Change reference impedance to 92.5 ohms

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

---

*Cl* **179** *SC* **179.9.4** *P* **393** *L* **43** # 734

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *ical) (bucketp) characteristics*

Transmitter characteristics

*SuggestedRemedy*

Transmitter specifications

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #708.

*Cl* **179** *SC* **179.9.4** *P* **394** *L* **13** # 446

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Electrical) DC CM*

For CR host output, DC common-mode voltage is specified only as a maximum value (1 V). For all other interfaces, it is specified as a range (0.2 to 1 V). See Table 178-6, Table 176C-2, Table 176D-2, and Table 176D-4.

Having no minimum limit would allow extremely low CM voltage to be driven by the host, which could cause large in-rush current through the cable's AC coupling into the link partner's receiver. This should be avoided.

The specifications for CR hosts should be aligned with those of C2M hosts.

*SuggestedRemedy*

Change the DC common-mode voltage specification to a range, 0.2 to 1 V.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
A similar comment was made against D1.4 and resulted in the current maximum value, but there was no consensus to add a minimum value specification. See the response to comment #262 in <https://www.ieee802.org/3/dj/comments/D1p4/8023dj_D1p4_comments_final_clause.pdf#page=42>.
The current comment includes additional reasoning (in-rush current) that was not included in the previous comment.

The change would improve the consistency of the standard.

Implement the suggested remedy with editorial license.

*Cl* **179** *SC* **179.9.4** *P* **394** *L* **18** # 619

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **R** *(Electrical) ERL*

Improve ERL specification

*SuggestedRemedy*

Presentation to be provided

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **179** *SC* **179.9.4** *P* **394** *L* **22** # 668

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Electrical) TX max swing*

As noted in comment #263 against D1.4, limiting the transmitter steady-state voltage v_f to 0.5 volt would reduce the effective channel reach that devices can operate on. In previous generations the v_f limit was 0.6 V (1.2 Vpp), and in current 802.3ck compliant systems, values at the upper half of this range (output swings above 1 Vpp) are commonly used to extend the reach and operate over longer cables and/or improve error statistics.

The comment suggested changing the transmitter specifications (v_f and peak-to-peak) and the corresponding receiver amplitude tolerance, but without changing the corresponding COM parameter (A_ne). In https://www.ieee802.org/3/dj/public/25_03/ran_3dj_03_2503.pdf it was referred to as "Change C" (apply for CR) and "Change D" (also for KR) (slide 3).

There was a preference to apply change D, as recorded in straw polls #TF-7 and #TF-8 (see minutes_3dj_2503_approved, page 17).

The following options are suggested for CR and KR (no change in C2C and C2M):
1. Change Tx maximum v_f to 0.6 V as proposed. Apply in Tx and Rx specifications (no change in COM A_ne).
2. Change as in option 1 and addiitonally change A_ne accordingly (increase by 20%).
3. Add a footnote in the transmitter specifications tables (179.9.4 and 178.9.2) to allow "engineered links" to operate above the specified v_f; as a model, use the second paragraph of 178.10.6 (operating without AC-coupling in the channel).
4. Add an optional "high swing" mode. In a device that supports high swing mode, it is disabled by default. When it is enabled the transmitter v_f range is 0.5 to 0.6. Enabling this mode is under the responsibilty of the system integrator.

*SuggestedRemedy*

Implement any of the four options listed in the comment. As a starting point, option A is suggested.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The following straw poll was taken
Straw poll #E-5 (directional)
I support making a change based on comment #668 and suggested remedy.
Y: 22 N: 19 A: 5

In 179.9.4.1.2, add a paragraph as follows
Systems with transmitters having steady-state voltage higher than the maximum specified are considered engineered links. It is the system integrator’s responsibility to verify that the transmitter, receiver, and channel are compatible.

*Cl* **179** *SC* **179.9.4** *P* **394** *L* **25** # 735

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Electrical) CR host classes*

Bad names HL HN HH because H and L are ambiguous: loss or performance or length? Which loss?

*SuggestedRemedy*

Change to A B C, with A for best

*Response* *Response Status* **U**

REJECT.
The current names were included in the baseline proposal for passive copper cables, <https://www.ieee802.org/3/dj/public/23_11/tracy_3dj_01a_2311.pdf>. The proposal, excluding nomenclature, was adopted by motion #11 in the November 2023 meeting, see <https://www.ieee802.org/3/dj/public/23_11/minutes_3cwdfdj_2311_approved.pdf#page=26>.
The host class names from the baseline proposal were subsequently adopted by the response to comment #191 against D1.1. See <https://www.ieee802.org/3/dj/comments/D1p1/8023dj_D1p1_comments_final_clause.pdf#page=82>. They appear in multiple places in the draft and in several presentations.
Changing the naming scheme at this point would be disruptive.
The existing names are indicative of insertion loss (Low, Nominal, High).

There is no consensus to make the proposed changes.

*Cl* **179** *SC* **179.9.4** *P* **394** *L* **37** # 736

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Electrical) SNDR*

Difference signal-to-noise-and-distortion ratio, dSNDR is too arcane and not justified for CR where the compliance board is properly defined and adjustment for its deviation is allowed

*SuggestedRemedy*

Change to SNDR, or delete and use EECQ

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #481.

*Cl* **179** *SC* **179.9.4** *P* **394** *L* **46** # 370

Ghiasi, Ali Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) CR host classes*

Reference to host classes missing

*SuggestedRemedy*

Please reference table 179A-1

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The existence of three host classes is stated in the overview subclause, 179.1, including the fact that they have different electrical specifications.
Table 179A-1 (mentioned in the suggested remedy) is not a definition of host classes - it only includes recommendations for insertion losses, and is informative. It is not a helpful reference.

In 179.1, add a reference to Annex 179A after the host classes are first mentioned.

Implement with editorial license.

*Cl* **179** *SC* **179.9.4.1.1** *P* **395** *L* **47** # 651

Swenson, Norman Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *(Electrical) (bucket)*

"For each configuration of the transmit equalizer" is not well defined, as no list of required configurations has been mentioned.

*SuggestedRemedy*

Clarify

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The calculation specified in 179.9.4.1.1 is for a specific configuration of the transmit equalizer, so "for each" is not adequate.
Delete the words "For each configuration of the transmit equalizer" from the second paragraph of of 179.9.4.1.1, and append the words "for a specific configuration of the transmit equalizer setting" to the first paragraph.
Implement with editorial license.

*Cl* **179** *SC* **179.9.4.1.1** *P* **396** *L* **1** # 652

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *(Electrical) (bucket)*

"Compute the linear fit pulse response" using what setting for the equalizer? This is not clear.

*SuggestedRemedy*

Clarify

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #651.

*Cl* **179** *SC* **179.9.4.1.3** *P* **397** *L* **22** # 666

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Electrical) presets*

As noted in comment #263 against D1.4, the different initialize value for CR vs. AUI-C2M creates an unnecessary burden for implementations. Firmware will need to have different modes, and training/adaptation algorithms will need to account for the different starting point. This will likely create confusion and interoperabilty issues that overshadow any potential benefit.

In https://www.ieee802.org/3/dj/public/25_03/ran_3dj_03_2503.pdf it was proposed to use preset 6 as the "initialize" setting for CR. This was referred to as "Change A" (slide 3).

There was consensus to apply this change, as recorded in straw polls #TF-7 and #TF-8 (see minutes_3dj_2503_approved, page 17).

Note that KR was not mentioned in "Change A" but it is assumed that the initialize value would be the same in KR and CR. Thus the intent is that this change would apply to KR as well.

*SuggestedRemedy*

Implement change A as shown on slide 3 in ran_3dj_03_2503, with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Straw polls #TF-7 and #TF-8 in the March 2025 meeting (see <https://www.ieee802.org/3/dj/public/25_03/minutes_3dj_2503_approved.pdf#page=17> and the related presentation <https://www.ieee802.org/3/dj/public/25_03/ran_3dj_03_2503.pdf#page=3>) indicated strong support of the direction suggested in this comment: in "choose one", options A-D (which include the suggested remedy) had a total of 40, while option E (no change) had 19. Note that the specification for KR PMDs (178.8.9) refers to the same table (Table 179-8) so the suggested change will affect clause 178 as well.

Change the "initialize" row in Table 179-8 to be identical to preset 6 instead of preset 1 (as in Table 176D-9).
Update references to these tables as necessary (e.g., remove exceptions)
Implement with editorial license.

*Cl* **179** *SC* **179.9.4.2** *P* **398** *L* **30** # 526

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **R** *(Electrical) RLM*

The method used to determine transmitter linearity (reference to 120D.3.1.2) uses the measured waveform. It is unlikely to work with all the different initial conditions, or with high loss hosts, due to the amount of ISI that is likely to be present.

*SuggestedRemedy*

Add after 120D.3.1.2 "except that the fitted waveform as defined in 120D.3.1.3 is used in place of the measured waveform"

*Response* *Response Status* **C**

REJECT.
The linear fit procedure in 120D.3.1.3 uses the values ES1 and ES2, which are defined in 120D.3.1.2 and calculated from the mean signal levels of the measured waveform, so eventually the measured waveform must be used.
A fitted waveform that does not account for non-ideal ES1 and ES2 would result in RLM=1. Therefore, the suggested remedy is inappropriate to address the possible problem noted in the comment.

Further work on this topic is encouraged.

*Cl* **179** *SC* **179.9.4.5** *P* **399** *L* **1** # 737

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Electrical) SNDR*

Difference signal-to-noise-and-distortion ratio, dSNDR too arcane and not justified for CR where the compliance board is properly defined and adjustment for its deviation is allowed

*SuggestedRemedy*

Change to SNDR, or delete and use EECQ

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #481.

*Cl* **179** *SC* **179.9.4.5.1** *P* **400** *L* **4** # 740

Dawe, Piers — Nvidia

*Comment Type* **T** *Comment Status* **R** *(Electrical) (bucket) SNDR*

Downsampling for P_Signal in SNDR seems fussy and unecessary

*SuggestedRemedy*

Remove it

*Response* *Response Status* **C**

REJECT.
The comment does not provide sufficient justification to support the suggested remedy.
The suggested remedy does not provide sufficient detail to implement.

*Cl* **179** *SC* **179.9.4.5.3** *P* **400** *L* **30** # 481

Healey, Adam — Broadcom, Inc.

*Comment Type* **T** *Comment Status* **A** *(Electrical) SNDR*

It has been demonstrated that the reference SNDR is a weak function of the test fixture s-parameters. This suggests that the SNDR test can be greatly simplified by specifying a fixed set of reference values that are a function of the preset. The reference values should be derived from the equivalent SNDR produced by the COM transmitter model under similar conditions.

*SuggestedRemedy*

Replace the dSNDR procedure with a comparison of the measured SNDR to a limit that is a function of the preset. Set the limits to the SNDR^(ref) values on slide 5 of <https://www.ieee802.org/3/dj/public/24_11/healey_3dj_01_2411.pdf> for presets 1 to 5. Set the limit to 31 dB for preset 6. Add a note that the limits are consistent with parameter values in the corresponding COM table. If desired, the subclause defining reference SNDR can be retained as documentation of the procedure used to define the limits.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
There are several comments related to SNDR/dSNDR.

The CRG reviewed slides 14-17 of <https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01a_2507.pdf>.

Implement the changes on slides 17 of ran_3dj_01a_2507 with editorial license.

*Cl* **179** *SC* **179.9.4.6** *P* **401** *L* **28** # 741

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucketp) Jitter*

Dud jitter method. Turning off aggressor lanes is desperate

*SuggestedRemedy*

Don't attempt to isolate jitter

*Response* *Response Status* **U**

REJECT.

The suggested remedy does not provide sufficient detail to implement.

*Cl* **179** *SC* **179.9.4.6** *P* **401** *L* **36** # 527

Dudek, Mike — Marvell

*Comment Type* **E** *Comment Status* **A** *(Electrical) (bucket) jitter*

Poor wording. Obviously the transmitter output of the lane under test shouldn't be disabled but it would be better to be more precise.

*SuggestedRemedy*

Change "transmitter output is" to transmitter outputs of the lanes not under test are"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179** *SC* **179.9.4.6.1** *P* **402** *L* **1** # 738

Dawe, Piers — Nvidia

*Comment Type* **ER** *Comment Status* **R** *(Electrical) (bucketp) jitter*

The standard should be written in English. The three-pronged magnet is pretentious, unfamiliar and unnecessary.

*SuggestedRemedy*

Change to: For each transition I in the set A:

*Response* *Response Status* **U**

REJECT.
The comment refers to the mathematical symbol ?.
This symbol appears 77 times in IEEE Std 802.3-2022, with instances spanning clause 21 to clause 144. Readers are assumed to be familiar with it. In case of doubt, It is defined in Table 21-1 as "Indicates membership".

There is no consensus to make the change.

*Cl* **179** *SC* **179.9.4.6.2** *P* **402** *L* **18** # 739

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucketp) jitter*

J4u03 can't be measured for CR because of the losses in the host

*SuggestedRemedy*

Delete, combine with other impairments into EECQ

*Response* *Response Status* **U**

REJECT.

The suggested remedy does not provide sufficient detail to implement.

*Cl* **179** *SC* **179.9.4.6.3** *P* **402** *L* **43** # 742

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucketp) jitter*

EOJ03 should be included in SNDR or EECQ. It's not clear that we need a separate spec for it

*SuggestedRemedy*

Ensure that SNDR or EECQ include it (by telling the scope that the pattern is twice as long as it is), and delete

*Response* *Response Status* **U**

REJECT.
Even-odd jitter is a specification parameter for multiple generations of electrical transmitter specifications.
The comment does not indicate a problem that needs to be solved.
The comment does not provide sufficient justification to support the suggested remedy.
The suggested remedy does not provide sufficient detail to implement.

*Cl* **179** *SC* **179.9.4.7** *P* **403** *L* **2** # 597

Kocsis, Sam — Amphenol

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The ERL of a transmitter at TP2 is defined without a reference impedance. The implied reference impedance is inferred from 179.9.3, 100-ohm. The use of a 100-ohm reference impedance for ERL is not consistent throughout D2P0.

*SuggestedRemedy*

Add definition of a 92.5-ohm reference impedance for the ERL computation, consistent with Annex179B.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **179** *SC* **179.9.4.7** *P* **403** *L* **5** # 743

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Electrical) (bucketp) ERL*

mating interface discontinuity - ambiguous and not defined.

*SuggestedRemedy*

Clarify what this means

*Response* *Response Status* **U**

REJECT.
The existing text exists since D1.2 and originates from the response to comment #199 against D1.1. This response was a result of discussion in the CRG with consensus on the wording "excluding the mating interface discontinuity". See <https://www.ieee802.org/3/dj/comments/D1p1/8023dj_D1p1_comments_final_clause.pdf#page=77>.

There may be room for improvement of the wording, but the suggested remedy does not provide sufficient detail to implement. Additional work on this topic is encouraged.

*Cl* **179** *SC* **179.9.4.7** *P* **403** *L* **13** # 620

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The CR specification should use 92.5 ohm impedance for transmitter and Receiver ERL

*SuggestedRemedy*

add line in Table 179-9 to specify 92.5 ohm impedance

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **179** *SC* **179.9.4.7** *P* **403** *L* **19** # 371

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) ERL (bucket2p)*

Not clear why Nbx is zero

*SuggestedRemedy*

Suggest to make Nbx=15 which number of fixed FFE taps

*Response* *Response Status* **U**

REJECT.
The existing N_bx value 0 is consistent with the CR PMD in 802.3ck (Clause 162).

The comment does not provide sufficient justification to support the suggested remedy.

There was no consensus to make a change.

*Cl* **179** *SC* **179.9.4.7** *P* **403** *L* **23** # 60

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

ERL impedance should be aligned to Rd and 179B.

*SuggestedRemedy*

Add line:
The reference differential impedance for the test fixture ERL computation shall be 92.5 ohms.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **179** *SC* **179.9.4.8** *P* **403** *L* **35** # 363

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *lectrical) (bucketp) RL masks*

802.3ck common mode return loss frequency was up to 50 GHz

*SuggestedRemedy*

We should at least extend the RLcc to 67 GHz.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG has reviewed the presentation <https://www.ieee802.org/3/dj/public/25_07/ghiasi_3dj_05b_2507.pdf>.

Note that the resolution of comments 492, 493, and 494 made changes and additions to several frequency masks.
Implement the changes shown on slides 3-4 of ghiasi_3dj_05b_2507, and the corresponding equations.
For RLcd in clause 179, extend the equations adopted by comment #492 up to 67 GHz (using the same value as in 60 GHz).
Implement with editorial license.

*Cl* **179** *SC* **179.9.4.9** *P* **404** *L* **35** # 364

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *lectrical) (bucketp) RL masks*

802.3ck common mode to differential return loss frequency was up to 50 GHz

*SuggestedRemedy*

We should at least extend the RLdc to 67 GHz.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #363.

*Cl* **179** *SC* **179.9.5.2** *P* **406** *L* **10** # 667

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Electrical) ATOL*

As noted in comment #263 against D1.4, the amplitude tolerance required by a receiver (at its input, TP3) is not a swing identical to the output of the transmitter. This is due to both channel attenuation and initial Tx equalization (which is addressed by another comment). This is despite the fact that the tolerance is defined using the output of the transmitter (but this value is at TP2).

The comment suggested adding an informative NOTE to highlight this non-trivial fact for readers. SImilar comments exist in Amplitude tolerance subclauses of AUIs, both C2C and C2M.

In https://www.ieee802.org/3/dj/public/25_03/ran_3dj_03_2503.pdf it was referred to as "Change B" (slide 3).

There was consensus to apply this change, as recorded in straw polls #TF-7 and #TF-8 (see minutes_3dj_2503_approved, page 17).

SImilar notes should be use for all instances of amplitude tolerance.

*SuggestedRemedy*

Implement change B as shown on slide 3 in ran_3dj_03_2503, with editorial license.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slides 31-32 in <https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01b_2507.pdf>.

Implement the changes as shown on slide 32 in ran_3dj_01b_2507 with consideration of the resolution of other related comments.
Implement with editorial license.

*Cl* **179** *SC* **179.9.5.3** *P* **406** *L* **26** # 623

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The CR specification should use 92.5 ohm impedance for interference tolerance parameters

*SuggestedRemedy*

add line in Table 179-11 to specify 92.5 ohm impedance

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **179** *SC* **179.9.5.3** *P* **406** *L* **26** # 534

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) precoding*

It should be explicit that the test pattern for Interference tolerance for CR can be precoded.

*SuggestedRemedy*

Add a footnote to PRBS31Q in table 179-11. Footnote to say "With precoding enabled or disabled as the receiver would select using the start-up protocol described in 179.8.9."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Precoding and PRBS31Q generation and checking are functions of the PMA. The definition of PRBS31Q in 176.7.4.2 includes optional precoding, so it is not required to add it here explicitly.
However, precoding should be available for the receiver under test, just like transmit equalizer control. It is currently not stated in the test procedure.

In 179.9.5.3.5, change from
"the device under test (DUT) configures the pattern generator transmit equalizer to the coefficient settings it would select using the start-up protocol described in 179.8.9"
to
"the device under test (DUT) configures the pattern generator transmit equalizer coefficients and precoding to the settings it would select using the training protocol described in 179.8.9"
Make similar changes in 178.9.3.4.3, 176C.6.4.5.3, and 176D.8.12.4.
Implelent with editorial license.
[CC 178, 179, 176C, 176D]

*Cl* **179** *SC* **179.9.5.3** *P* **406** *L* **39** # 744

Dawe, Piers — Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Electrical) (bucket) ITOL*

See 179.2 for definition of block error ratio - not. 179.9.5.3.5 says "Block error ratio is defined in 174A.8."

*SuggestedRemedy*

Change "See 179.2 for definition of block error ratio." to "See 179.2 and 174A.8."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179** *SC* **179.9.5.3.3** *P* **407** *L* **11** # 501

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket) ITOL*

The host channel as defined in 179A.4 includes the package and connector. Listing the host channel and package separately could lead to double counting. Partial host channel model is what this is called in Table 179-16.

*SuggestedRemedy*

Change "using the receiver host channel, package, and device termination models" to "using the receiver partial host channel, package, and device termination models. Also in C2M on page 757 line 34.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
In item a of 179.9.5.3.3, change from
"using the receiver host channel, package, and device termination models"
to
"using the receiver partial host channel, package, and device termination models".
In item a of 176D.8.12.2, change from
"using the host channel, device package, and device termination models"
to
"using the partial host channel, package, and device termination models".

*Cl* **179** *SC* **179.9.5.3.4** *P* **408** *L* **16** # 745

Dawe, Piers Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Electrical) ITOL*

"peak-to-peak differential when measured on an alternating zero-three sequence": this isn't how peak-to-peak voltage is defined these days, and does not appear in 178.9.3.4.1, 176C.6.4.5.1

*SuggestedRemedy*

Delete "when measured on an alternating zero-three sequence", refer to 176D.8.1.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The pattern generator amplitude will depend on equalization setting and may be lower than 0.8 V if the initial setting is not preset 1. This is indeed an insufficient way to specify pattern generator settings.
Similar issues exist in 178.9.3.4.1 and 176C.6.4.5.1. The text in 176D.8.12.3 is better but still incomplete.

Rewrite the first paragraph of 179.9.5.3.4 in terms of the following requirements:
1. Steady-state voltage v_f set to the minimum specified for a transmitter in Table 179-7
2. Meeting the coefficient range limits defined in 179.9.4.1.5 (which include "The sum of the absolute values shall be less than or equal to 1")
Add an informative NOTE that these requirement imply that the differential peak-to-peak output (voltage as defined in 176D.8.1) at the pattern generator output does not exceed 0.8 V.

In both 178.9.3.4.1 and 176C.6.4.5.1, change the text to refer to v_f instead of peak-to-peak voltage, not exceeding the minimum specified for a transmitter (Table 178-6 or Table 176C-2), and add similar informative NOTEs.

In 176D.8.12.3, add a requirement that the pattern generator meets the coefficient range limits defined in 179.9.4.1.5.

Implement with editorial license.

*Cl* **179** *SC* **179.9.5.4.2** *P* **410** *L* **3** # 497

Dudek, Mike Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) JTOL*

Not stressing the jitter tolerance signal with noise in addition to the jitter under-stresses receivers.

*SuggestedRemedy*

Change "The jitter tolerance test procedure is similar to that of 179.9.5.3, with the exception that no noise is injected (i.e., step g in 179.9.5.3.3 is not performed). Instead, jitter with the specified frequency and amplitude is applied to the pattern generator and the jitter amplitude is adjusted to obtain the peak-to-peak jitter specified for that frequency in Table 179-12 at the Tx test reference (see Figure 110-3a). The test channel COM, calculated per 179.9.5.3.3 with the jitter-stressed transmitter output, shall not be lower than the value in Table 179-11."
to
"The jitter tolerance test procedure is similar to that of 179.9.5.3, with the exception that jitter with the specified frequency and amplitude is applied to the pattern generator and the jitter amplitude is adjusted to obtain the peak-to-peak jitter specified for that frequency in Table 179-12 at the Tx test reference (see Figure 110-3a). The test channel COM, calculated per 179.9.5.3.3 with the jitter-stressed transmitter output and the broadband noise added, shall be equal to the value in Table 179-11."

Make the equivalent change for C2M in section 176D.8.13.2 on page 759

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #496.

*Cl* **179** *SC* **179.9.5.5** *P* **410** *L* **29** # 598

Kocsis, Sam Amphenol

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The ERL of a receiver at TP3 is defined without a reference impedance. The implied reference impedance is inferred from 179.9.3, 100-ohm. The use of a 100-ohm reference impedance for ERL is not consistent throughout D2P0.

*SuggestedRemedy*

Add definition of a 92.5-ohm reference impedance for the ERL computation, consistent with Annex179B.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **179** *SC* **179.9.5.6** *P* **410** *L* **44** # 368

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) RLdc and RLcd*

The more critical return loss is common mode to differential, but for some reason in clause 179 instead RLcd is defined

*SuggestedRemedy*

Change RLcd to RLdc (common mode to differential)

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #365.

*Cl* **179** *SC* **179.9.5.6** *P* **410** *L* **47** # 369

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *lectrical) (bucketp) RL masks*

802.3ck common mode to differential return loss frequency was up to 50 GHz

*SuggestedRemedy*

We should at least extend the RLdc to 67 GHz.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **179** *SC* **179.10.1** *P* **415** *L* **45** # 380

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **ER** *Comment Status* **R** *l) (bucketp) COM parameters*

All symbols such as Cd(1) or Ls(1) the "(1)" seems like is superscript

*SuggestedRemedy*

Please make it inline

*Response* *Response Status* **U**

REJECT.

Resolve using the response to comment #378.

*Cl* **179** *SC* **179.11** *P* **412** *L* **23** # 621

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The CR specification should use 92.5 ohm impedance for cable assembly

*SuggestedRemedy*

add line in Table 179-13 to specify 92.5 ohm impedance

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **179** *SC* **179.11** *P* **412** *L* **29** # 138

Noujeim, Leesa — Google

*Comment Type* **TR** *Comment Status* **R** *(Electrical) CA ILdd*

Ilddmin is unreasonably high.

*SuggestedRemedy*

Change 16dB to 13dB

*Response* *Response Status* **C**

REJECT.
The current value was adopted by the response to comment #521 against D1.1. See <https://www.ieee802.org/3/dj/comments/D1p1/8023dj_D1p1_comments_final_clause.pdf#page=89>.
There were no contributions that showed availability, need, or data of cable assemblies with loss lower than 16 dB.
Note that cable assembly measurements include two MCBs and their counterparts in the cable.

The comment does not provide sufficient justification to support the suggested remedy.
See also comment #529.

*Cl* **179** *SC* **179.11** *P* **412** *L* **38** # 50

Mellitz, Richard Samtec

*Comment Type* **TR** *Comment Status* **A** *(Electrical) Channel SCMR*

Channel intrapair skew has not been considered for interoperability. Although a channel skew would be included in s-parameters passed to COM, the effect of skew on interoperability has not been specified. Channel common mode includes skew and other imbalance interoperable effects.

*SuggestedRemedy*

add line to Table 179-13-Cable assembly characteristics summary
Channel Signal to common mode ratio (SCMR_CH) min 20 dB
Add section based on slides 12 and 14
https://www.ieee802.org/3/dj/public/adhoc/electrical/23_1207/mellitz_3dj_elec_01_231207.pdf
replacing V_peak^2 with sigma_tn^2 from equation 179.15 with c(n)=1 (no TxFFE)
i.e. SCMR_CH= 10*log10( sigma_ts^2 / VCM_CH^2 )

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The following straw poll was taken
Straw poll #E-3 (directional)
I support the direction of adding a specification for the intergrated effect of mode conversion in cable assemblies such as SCMR_Ch (as proposed in mellitz_3dj_adhoc_02_250626).
Y: 15 N: 2 NMI: 4 A: 6

Add a new subclause fot CSMR_CH based on slides 7-8 of <https://www.ieee802.org/3/dj/public/adhoc/optics/0625_OPTX/mellitz_3dj_adhoc_02_250626.pdf>.

Add a row to Table 179-13-Cable assembly characteristics summary:
Channel Signal to common mode ratio (SCMR_CH) min, with a value of 20 dB and a reference to the new subclause.

Implement with editorial license.

*Cl* **179** *SC* **179.11.1** *P* **412** *L* **47** # 65

Mellitz, Richard Samtec

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The reference impedance for measurement should align with the test fixture reference.

*SuggestedRemedy*

Change line to:

The reference impedance for differential specifications is 92.5 ohms. The reference impedance for common-mode specifications is 23.125 ohms.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **179** *SC* **179.11.1** *P* **412** *L* **47** # 613

Palkert, Thomas Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

All impedance values should be 92.5 ohms

*SuggestedRemedy*

Change reference impedance to 92.5 ohms

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **179** *SC* **179.11.2** *P* **412** *L* **29** # 529

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **R** *(Electrical) CA ILdd*

For CA-A the maximum loss is 19dB with a minimum loss of 16dB allowing only a 3dB range for guardbanding for measurement accuracy and manufacturing tolerance.

*SuggestedRemedy*

Consider changing the cable minimum loss (for all cable types) to 15dB with a consequent reduction in the Test 1 test channel insertion losses and Cable assembly insertion losses in Table 179-11 from 15.5 Min and 16.5 max to 14.5 min and 15.5 max. Also modifying Table 179A-3 replacing 16 with 15 for ILddCA,min and 13 with 12 for ILddch,min. and Figure 179A-3 (including the footnotes from 13dB to 12dB for the minimum channel loss from TP0d to TP5d and 15 instead of of 16 in the first equation footnote and 3.1 instead of 4.1 in the second equation footnote.

*Response* *Response Status* **C**

REJECT.
There is no evidence that a cable assembly with the proposed minimum insertion loss can be built.

See also the response to comment #138.

*Cl* **179** *SC* **179.11.3** *P* **412** *L* **11** # 61

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

ERL impedance should be aligned to Rd and 179B.

*SuggestedRemedy*

Add line:
The reference differential impedance for the test fixture ERL computation shall be 92.5 ohms.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **179** *SC* **179.11.3** *P* **413** *L* **6** # 599

Kocsis, Sam — Amphenol

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The ERL of a cable assembly at TP1 and TP4 is defined without a reference impedance. The implied reference impedance is inferred from 179.11.1, 100-ohm. The use of a 100-ohm reference impedance for ERL is not consistent throughout D2P0.

*SuggestedRemedy*

Add definition of a 92.5-ohm reference impedance for the ERL computation, consistent with Annex179B.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **179** *SC* **179.11.3** *P* **413** *L* **6** # 653

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

93A.5 does not specify how to terminate the far end of the cable when measuring ERL.

*SuggestedRemedy*

Specify a source impedance and a termination impedance for the ERL measurement.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following related contribution was reviewed by CRG:
https://www.ieee802.org/3/dj/public/25_07/swenson_3dj_01_2507.pdf

The definition of ERL in 93A.5 (802.3-2022) states that "PTDR(t) may be acquired directly from an appropriately filtered time domain reflectometer (TDR), or derived mathematically from measured differential scattering parameters S(f) <...>"

The reference differential impedance for cable assembly specifications is defined in 179.11.1 as 100 Ohm. This fully defines the S-parameters measurement.

Other comments suggest that the reference impedance for ERL be changed to 92.5 Ohm differential.

Add a clarification of the termination impedance, differentiating from reference impedance, where appropriate.

*Cl* **179** *SC* **179.11.3** *P* **413** *L* **8** # 139

Noujeim, Leesa — Google

*Comment Type* **T** *Comment Status* **A** *(Electrical) ERL*

ERL calculation shouldn't de-embed to just before mating interface; this language was inherited from adjustment of HCB, but doesn't apply to CATF in the same way. CA ERL should include the connector and launch but this would be removed with the definition of Tfx currently in the draft

*SuggestedRemedy*

Reword to remove reference to the mating interface discontinuity; Tfx should include the RF test connector only.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slide 40-42 in <https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01b_2507.pdf>.

Implement the changes shown on slide 42 of ran_3dj_01b_2507 with editorial license.

*Cl* **179** *SC* **179.11.3** *P* **413** *L* **19** # 622

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The CR specification should use 92.5 ohm impedance for cable assembly ERL

*SuggestedRemedy*

add line in Table 179-14 to specify 92.5 ohm impedance

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **179** *SC* **179.11.7** *P* **415** *L* **11** # 720

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Electrical) CR host classes*

Add 4th host class:

*SuggestedRemedy*

| | | | |
|---|---|---|---|
| CA-A | HL | HL, HN, HH or HH2 | 4 |
| | HN | HL, HN, or HH | 3 |
| | HH | HL or HN | 2 |
| | HH2 | HL | 1 |

*Response* *Response Status* **U**

REJECT.
There is no definition of HH2.

The comment does not indicate a problem that needs to be solved.
The comment does not provide sufficient justification to support the suggested remedy.
The proposed change does not contain sufficient detail to implement.

*Cl* **179** *SC* **179.11.7.1** *P* **416** *L* **27** # 237

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *ctrical) Reference impedance*

Adjust COM voltage to 46.25 ohms measurement reference.

*SuggestedRemedy*

Change
$A_{v\bar{t}\bar{o}}$ 0.415
$A_{fe\bar{t}\bar{o}}$ 0.415
$A_{ne\bar{t}\bar{o}}$ 0.609

*Response* *Response Status* **C**

REJECT.

There are several comments related to the reference impedance. The editorial team will prepare a proposal for resolving all these comments.

This comment seems to assume that the measurement of v_f is done on a load of 46.25 Ohm single-ended and therefore to obtain the specified limits from the reference transmitter the values need to change. However, there is no proposal to specify measurement on a 46.25 Ohm load.

See also the response to comment #63.

*Cl* **179** *SC* **179.11.7.1** *P* **417** *L* **8** # 373

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) CR host classes*

Table 179-17 provide partial channel for different host classes, it would be helpful to also include the losses for the 3 partial channels

*SuggestedRemedy*

Host Partial HL Class loss = 1.72 dB
Host partial NL Class loss = 9.4 dB
Host partial HH Class loss = 14.35 dB
If one adds the MCB loss of 3.2 dB to the above value then that would give host channel see below and similar to Table 179A-1
Host HL Class loss = 4.9 dB
Host NL Class loss = 9.4 dB
Host HH Class loss = 14.35 dB
The above losses are the not max or min losses, some explanation why value in table 179-17 are chossen would be helpfull.
For the HH case if we go with Zp=140 mm will result in loss of 18.3 dB when MCB is included which inline to max loss in table 179A-1.

*Response* *Response Status* **U**

REJECT.

Slide 37 in the following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01b_2507.pdf

The comment suggests adding the ILdd values corresponding to the partial host channel of each host class. That could be done by adding another row in Table 179-17.
However, the ILdd value is just a result of the existing information in the table, and is not a specification by itself. Thus, this row would only be informative. Moreover, it would not represent the whole host channel and thus would not be helpful for implementers (and might cause confusion).
The NOTE below the table includes references to the informative annexes where the recommended host channel ILdd values are listed.

Some further information might be helpful. However, detailed proposal is required.

*Cl* **179** *SC* **179.11.7.1** *P* **417** *L* **8** # 372

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) CR host classes*

The only place that host classes are defined is in Table 179A-1

*SuggestedRemedy*

Need reference to table 179A-1 or Host classes should be added to the glossary

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #370.

*Cl* **179** *SC* **179.11.7.1** *P* **417** *L* **21** # 257

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, quantization noise parameters should be added to Table 179-18.

*SuggestedRemedy*

Add two quantization noise parameters with suggested values to the table. Please refer to slide 16 of the accompanying document for the proposed change.
Also, see shakiba_3dj_elec_01_250626.pdf.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **179** *SC* **179.11.7.1** *P* **418** *L* **18** # 256

Shakiba, Hossein — Huawei Technologies Canada

*Comment Type* **TR** *Comment Status* **A** *rical) COM quantization noise*

Following first comment, an updated value for One-sided noise spectral density in Table 179-18 is needed.

*SuggestedRemedy*

Change One-sided noise spectral density parameter value in the table (page 418, line 18).
Please refer to slide 16 of the accompanying document for the proposed change.
Also, see shakiba_3dj_elec_01_250626.pdf.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #243.

*Cl* **179A** *SC* **179A.4** *P* **818** *L* **37** # 656

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **A** *trical) (bucketp) LInk Diagram*

I believe the host channel loss is to include the mated host/cable connector. But the text says "host connector", which is ambiguous.

*SuggestedRemedy*

Change "host connector" to "mated host/cable connector".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Figure 179A-1 includes mated connectors within the host channel, and has a NOTE that states "mated" explicitly.

For consistency with the figure, change "host connector" to "mated host connector".

---

*Cl* **179A** *SC* **179A.4** *P* **818** *L* **40** # 502

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(Electrical) Host connector*

It is not helpful saying that the assumed mated connector insertion loss is 2.45dB. Host vendors can trade connector losses for cable/pcb/package losses.

*SuggestedRemedy*

Delete the last sentence. "The recommended maximum differential insertion loss (TP0d-to-TP2) or (TP3-to-TP5d) are consistent with the host channels and an assumed mated connector insertion loss of 2.45 dB." If this is not done then change "are" to "is" as loss is singular.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The host channel includes the connector.
The TP0d-TP2 channel includes the host channel and the HCB. The recommendation is consistent with the reference HCB.

Replace the last sentence with "The recommended maximum differential insertion loss (TP0d-to-TP2) or (TP3-to-TP5d) is consistent with the host channels and the reference TP2 or TP3 test fixture specified in 179B.2.1."

---

*Cl* **179A** *SC* **179A.4** *P* **818** *L* **53** # 657

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **A** *ctrical) (bucket) Link Diagram*

The Range(dB) for Host-High (HH) should be 4.45 to 18.95.

*SuggestedRemedy*

Change 18.5 to 18.95

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The existing number is a typo.
Implement the suggested remedy.

---

*Cl* **179A** *SC* **179A.5** *P* **819** *L* **8** # 509

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket)*

Figure 179A-3 does not show the maximum insertion loss of the cable assembly assembly and maximum insertion loss of the cable. There is no illustration of this as there are multiple combinations possible and the maximum values of all the items listed is not simultaneously allowed.

*SuggestedRemedy*

Change "and is illustrated in Figure 179A-3" to "and is illustrated for the HN to HN channel in Figure 179A-2"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The first reference to Figure 179A-3 in the second paragraph of 179A.5 is incorrect, since the text describes the maximum insertion loss, but the figure shows the minimum loss budget, which is described later in the paragraph (the second reference is correct).
Delete the first instance of "and illustrated in Figure 179A-3" and insert the following sentence instead: "An example of the channel loss allocation for the HN-to-HN link configuration is illustrated in Figure 179A-2".
Delete the final sentence "The HN-to-HN link configuration is illustrated in Figure 179A-2."
Implement with editorial license.

*Cl* **179A** *SC* **179A.5** *P* **819** *L* **38** # 594

Kocsis, Sam — Amphenol

*Comment Type* **TR** *Comment Status* **R** *(Electrical) CR test fixture*

The MTF illustration in Figure 179A-1 allocates an informative reference of the MCB that is hard to validate.

*SuggestedRemedy*

Move the allocation marker to cover TP1-MCB Via, and align the allocation with the equations in 179B.3

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #289.

*Cl* **179A** *SC* **179A.5** *P* **820** *L* **39** # 289

Heck, Howard — TE Connectivity

*Comment Type* **TR** *Comment Status* **R** *(Electrical) CR test fixture*

MCB loss specified in the lower left of Figure 179A-1 is not directly measurable as it is currently specified. Indirect measurement methods do not provide the necessary accuracy. The version of the figure in D1.4 was measureable and reverting back to it will resolve the problem. Equation 179B-2 requires modification to make it accurately represent the MCB insertion loss measured with the 2Xthru method

*SuggestedRemedy*

Change Figure 179A-1 back to the version that was in D1.4 in which the MCB loss was specified as 2.7dB to the MCB via. Change Equation 179B-2 to IL_catref = -0.0067*f^1.5+0.0309*f-0.2523*sqrt(f)+0.0868. Change the Ildd_catf curve in Figure179B-1 to match the updated equation. A supporting contribution is planned for presentation at the June 26 electrical ad hoc meeting.

*Response* *Response Status* **U**

REJECT.
A presentation related to the comment was reviewed in the P802.3dj ad hoc meeting: <https://www.ieee802.org/3/dj/public/adhoc/optics/0625_OPTX/ellison_3dj_adhoc_01_250626.pdf>
The presentation noted that the MCB cannot be verified directly against the current specifications (which include the connector) and that this can also lead to mated pairs with non-compliant HCBs.
The proposed change is to move the demarcation line of the MCB loss in Figure 179A-1 to exclude the MCB via and the connector (implicitly leaving 3.25 dB for the MCB via and connector) and change Equation 179B-2 to represent only the MCB transmission line. The changes are shown on slide 5 of ellison_3dj_adhoc_01_250626 (items 1 and 2, and the figure).

The discussion indicated a concern that this proposal would leave the receptacle (part of the MCB) unspecified and unverifiable, and would contradict the text in 179B.3.1 referring to Equation 179B-2 as "The insertion loss of the cable assembly test fixture PCB, test point, connector and any associated vias".

Additionally, the proposal is based on an assumption that the connector+via is always the same (e.g. 3.25 dB at 53.125 GHz), but this may vary between form factors and receptacle designs.

The following straw poll was taken
Straw poll #E-2 (directional)
I support the direction of the proposal in ellison_3dj_adhoc_01_250626 slide 5.
Y: 10 N: 17 NMI: 12

there was no consensus for making the proposed changes. Further contributions in this area would be welcome.

*Cl* **179A** *SC* **179A.5** *P* **821** *L* **4** # 658

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **R** *:al) CR test fixture (bucket2p)*

What is the extra rectangle labeled Paddle/Wire Termination shown in Fig. 179A-2 that is not shown in the mated test fixtures in Fig 179A-1? It is not explained in the text.

*SuggestedRemedy*

Clarify

*Response* *Response Status* **U**

REJECT.
The rectangle and labels "Paddle/Wire Termination" serve as demarcation of the cable assembly and the host channel, in Figures 179A-1, 2, and 3. The "Paddle" and "Wire Termination" are structures associated with the cable assembly, and are not necessarily present in an HCB (or Mated Test Fixture). The labels are used to identify specific structures that are not documented elsewhere in the figure.

These figures provide illustration as appropriate within an informative Annex. Similar figures with the same features are included in in Annex 162A, added by IEEE Std 802.3ck.

The suggested remedy does not contain sufficient detail for the CRG to discuss a specific change. A detailed proposed change and consensus building are encouraged.

*Cl* **179A** *SC* **179A.7** *P* **822** *L* **13** # 510

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucket)*

Figure 179A-3 does not show that Device package models are included in the TP0d and TP5d channels and there are no such things as TP0d and TP5d channels which are test point.

*SuggestedRemedy*

Either delete the sentence "Device package models are included in the TP0d and TP5d channel (Figure 179A-3);" or replace it with "Device package models are included in the TP0d to TP5d channel (Figure 179-2)."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The fact that the TP0d-TP5d channel includes the packages does not need to be accompanied by a figure. These test points are referenced many times in Annex 179A. However, their definition is in 179.8.1 and is not explicitly referenced.

In 179A.7, change
"Device package models are included in the TP0d and TP5d channel (Figure 179A-3)"
to "Device package models are included in the TP0d-to-TP5d channel".
In 179A.1, change
"TP0d and TP5d test points are illustrated in the 200GBASE-CR1, 400GBASE-CR2, 800GBASE-CR4, and 1.6TBASE-CR8 link block diagram of Figure 179-2"
to "TP0d and TP5d are defined in 179.8.1 and illustrated in Figure 179-2".

*Cl* **179B** *SC* **179B** *P* **823** *L* **39** # 602

Kocsis, Sam — Amphenol

*Comment Type* **ER** *Comment Status* **A** *(Electrical) (bucket)*

Flip the order of polynomial from decreasing to increasing to align formatting with older clauses.

*SuggestedRemedy*

Impacted equations: 179B-1, -2, -3, -4, -5

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179B** *SC* **179B.1** *P* **823** *L* **19** # 43

Mellitz, Richard Samtec

*Comment Type* **TR** *Comment Status* **R** *(Electrical) MTF - ILdd*

Referring to the words "using the equation": The Insertion loss equation uses a complicated set of coefficient powers (eq 179B-3, 4, and 5) which do not appear to be tied to the physics of the test fixture design nor to compliance testing. Measurements of IL at a particular frequency had been demonstrated wander considerably. A fitted insertion loss wanders considerably less.

*SuggestedRemedy*

Replace line:
"The reference insertion loss of the mated test fixtures is 9.75 dB at 53.125 GHz using Equation (179B-5)'
With:
"The reference fitted insertion loss of the mated test fixtures is 9.75 dB at 53.125 GHz."
This resolution is tied to the comment suggesting the removal of sections 17B.2.1, 179B.3.1, 179B.4.1
In other sections and appendixes, the fit loss at Nyquist shall be used for budgeting test setups.

*Response* *Response Status* **C**

REJECT.
The comment implies that a fitting operation is applied to the refernece insertion loss, but the reference insertion loss is never measured, so no fit can be applied.

There is no consensus to make the suggested change.

*Cl* **179B** *SC* **179B.1** *P* **823** *L* **22** # 514

Dudek, Mike Marvell

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference impedance*

The reference impedances for measuring the test fixtures is not listed except for the ERL (where it is 92.5 Ohm differential)

*SuggestedRemedy*

Add the sentence (or a reference impedance subsection) stating "The reference impedance for differential specifications is 92.5 ohms and the reference impedance for common-mode specifications is 25 Ohms unless specified otherwise. Consider using 92.5 Ohm instead of 100 Ohm for the differential measurements

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #63.

*Cl* **179B** *SC* **179B.2** *P* **823** *L* **27** # 44

Mellitz, Richard Samtec

*Comment Type* **TR** *Comment Status* **R** *(Electrical) MTF - ILdd*

The Insertion loss equation uses a complicated set of coefficient powers (eq 179B-1) which do not appear to be tied to the physics of the test fixture design nor to compliance testing

*SuggestedRemedy*

Replace:
"The TP2 or TP3 test fixture (also known as Host Compliance Board) is required for measuring the transmitter and receiver specifications at TP2 and TP3. The TP2 and TP3 test points are illustrated in Figure 179-2."
with:
The TP2 or TP3 test fixture (also known as Host Compliance Board) is required for measuring the transmitter and receiver specifications at TP2 and TP3. The TP2 and TP3 test points have a normalize signal power between 0.46 and 0.52 V^2. The fit insertion loss is 3.8 dB.
The normalized signal power (P_signal) is calculated according to ### (slide 7 in mellitz_3dj_03_2505") with fb = 106.25 GHz, Tt = 6 ps, and fr = 0.55 × fb over the range fmin = 0.05 GHz to fmax = 67 GHz.
Remove section: 179B.2.1

*Response* *Response Status* **U**

REJECT.

Resolve using the response to comment #46.

*Cl* **179B** *SC* **179B.2** *P* **823** *L* **29** # 511

Dudek, Mike Marvell

*Comment Type* **T** *Comment Status* **A** *(Electrical) (bucketp)*

The TP2 and TP3 test points are not well illustrated in Figure 179-2 as it does not really show

*SuggestedRemedy*

Add "and figure 179A-1" after Figure 179-2

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Figure 179-2 does not show the test fixtures where TP2 and TP3 are defined (HCBs), so it is not a good reference.
Change the reference from Figure 179-2 to Figure 179A-1.

*Cl* **179B** *SC* **179B.2.1** *P* **823** *L* **34** # 600

Kocsis, Sam — Amphenol

*Comment Type* **TR** *Comment Status* **A** *(Electrical) CR test fixture*

Text says "TP2 or TP3 test fixture printed circuit board board (PCB) insertion loss values" implies only PCB material is used in the HCB fixture reference. This is not always the case

*SuggestedRemedy*

Remove "printed circuit board (PCB)". Test fixture can be implemented against the reference in many ways. There are (3) instances in this section that would be corrected.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #512.

*Cl* **179B** *SC* **179B.2.1** *P* **823** *L* **34** # 512

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) CR test fixture*

The point at which the loss is defined needs to be better defined not left ambiguous.

*SuggestedRemedy*

Insert the sentence "The printed circuit board insertion loss is defined as the loss between the reference plane of the RF test connector and the end of the gold fingers on the HCB" between the 1st and 2nd sentences. An alternative (less desirable in my opinion) sentence would be "The printed circuit board insertion loss is defined as the loss between the reference plane of the RF test connector and the nominal contact location on the gold finger".

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The term "gold fingers" in the suggested remedy is not defined or used in 802.3 or its normative references (to the best knowledge of the editors).

Both OSFP and QSFP-DD use the term "edge connector". OSFP uses the term "contact pads" (section 3.5: "The OSFP module contains a PCB with contact pads...") and QSFP-DD uses the term "pads" (section 4.1: "The <.> module edge connector consists of a single paddle card with 38 pads on the top and 38 pads on the bottom".
The nominal pad dimensions in QSFP-DD1600 are 1.07 mm x 0.45 mm (Figure 81). OSFP is likely similar (though the dimensions are not stated explicitly). The loss difference across the pad seems insignificant, but the nominal point is likely the center.

Also, The "shall" in the text is vague and does not represent any verifiable requirement. Some rewording is suggested.

In 179B.2.1, change from
"The TP2 or TP3 test fixture printed circuit board (PCB) insertion loss values determined using Equation (179B-1) shall be used as the TP2 or TP3 test fixture reference insertion loss."
to
"The TP2 or TP3 test fixture insertion loss is defined as the insertion loss between the reference plane of the RF test connector and the center of the edge connector pad. The reference insertion loss is defined by Equation (179B-1) and illustrated by Figure 179B-1".
Delete "The TP2 or TP3 test fixture PCB reference insertion loss is illustrated in Figure 179B-1."

Implement with editorial license.

*Cl* **179B** *SC* **179B.2.1** *P* **823** *L* **34** # 513

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **R** *(Electrical) CR test fixture*

The loss needs to be better defined to be less ambiguous.

*SuggestedRemedy*

Insert the sentence "The cable assembly tested fixture loss is equal to the loss of the mated test fixture minus the loss of the specific TP2 or TP3 test fixture printed circuit board loss used when measuring the mated text fixture loss." between the 1st and 2nd sentences.

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #289.
[Editor's note: Changed Page from 823 to 824]

*Cl* **179B** *SC* **179B.2.1** *P* **823** *L* **39** # 328

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(Electrical) (bucket)*

Variable subscripts should be normal font rather than italic font unless the subscript represents another variable, e.g. an index, f_i where i is and index variable.

*SuggestedRemedy*

Change variable subscripts to normal font where appropriate through Annex 179B.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179B** *SC* **179B.2.1** *P* **824** *L* **12** # 659

Swenson, Norman — Nokia, Point2

*Comment Type* **ER** *Comment Status* **A** *trical) (bucket) CR test fixture*

Curve label is inconsistent with the text.

*SuggestedRemedy*

Change ILdd_{catf} to ILdd_{catfref}

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179B** *SC* **179B.3** *P* **823** *L* **27** # 45

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *(Electrical) MTF - ILdd*

The Insertion loss equation uses a complicated set of coefficient powers (eq 179B-2) which do not appear to be tied to the physics of the test fixture design nor to compliance testing.

*SuggestedRemedy*

Replace:
The cable assembly test fixture (also known as Module Compliance Board) is required for measuring the cable assembly specifications in 179.11 at TP1 and TP4. The TP1 and TP4 test points are illustrated in Figure 179-2.
With:
The TP1 or TP4 test fixture (also known as Host Compliance Board) is required for measuring the transmitter and receiver specifications at TP2 and TP3. The TP2 and TP3 test points have a normalize signal power between 0.41 and 0.47 V^2. The fit loss is 5.95 dB.
The normalized signal power (P_signal) is calculated according to ### (slide 7 in mellitz_3dj_03_2505") with fb = 106.25 GHz, Tt = 6 ps, and fr = 0.55 × fb over the range fmin = 0.05 GHz to fmax = 67 GHz.
Remove section: 179B.3.1

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #46.

*Cl* **179B** *SC* **179B.3.1** *P* **824** *L* **32** # 660

Swenson, Norman — Nokia, Point2

*Comment Type* **TR** *Comment Status* **R** *(Electrical) CR test fixture*

It is unclear how "The effects of differences between the insertion loss of an actual test fixture and the reference insertion loss" are to be
determined, given that the specification in 179B.4 Is for the mated test fixture and not the Cable Assembly Test Fixture by itself.

*SuggestedRemedy*

Explain how the differences are to be determined.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **179B** *SC* **179B.3.1** *P* **824** *L* **33** # 601

Kocsis, Sam — Amphenol

*Comment Type* **TR** *Comment Status* **R** *(Electrical) CR test fixture*

Text says "cable assembly test fixture PCB, test point, ocnnector and any associated vias" has proven to be difficult to validate. Since the effects of the differences between an actual test fixture and the reference insertion loss are to be accounted for, the reference definition should be more tangible.

*SuggestedRemedy*

Replace "cable assembly test fixture PCB, test point, ocnnector and any associated vias" with "cable assembly test fixture, from the RF connector refrence plane to the MDI transition". Update Equation 179B-1 appropriately, and remove "PCB" from the other (2) instance in this section.

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #289.

*Cl* **179B** *SC* **179B.4** *P* **825** *L* **3** # 46

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **R** *(Electrical) MTF - ILdd*

The Insertion loss specification uses a complicated reference line (eq 179B-3, 4, and 5) which does not appear to be tied to the physics of the test fixture design nor to compliance testing measurements. The reason for the 1.5 power term is not defined. The equation was developed as an average of measurements (kocsis_3dj_adhoc_01_250206). The normalized signal power is expected to track performance better than the specified frequency masks and reference lines

*SuggestedRemedy*

Replace:
"The TP2 or TP3 test fixture and the cable assembly test fixture are specified in a mated state illustrated in Figure 92-18. The mated test fixtures specifications are given below."
With:
The TP2 or TP3 test fixture and the cable assembly test fixture has a normalized signal power (P_signal) of the Insertion loss shall be between 0.31 and 0.34 V^2. The normalized signal power (P_signal) is calculated according to ### (slide 7 in mellitz_3dj_03_2505") with fb = 106.25 GHz, Tt = 6 ps, and fr = 0.55 × fb over the range fmin = 0.05 GHz to fmax = 67 GHz.
Remove section: 179B.3.1 to line 1 on page 825.
Keep the following lines:
The FOM_ILD and is calculated according to 93A.4 with fb = 106.25 GHz, Tt = 6 ps, and fr = 0.55 × fb. The fitted insertion loss and insertion loss deviation are computed over the range fmin = 0.05 GHz to fmax = 67 GHz. FOM_ILD shall be less than or equal to 0.15 dB.

*Response* *Response Status* **U**

REJECT.
The limit lines were adopted by comment #139 against D1.4 (see <https://www.ieee802.org/3/dj/comments/D1p4/8023dj_D1p4_comments_final_id.pdf#page=33> and the related presentation <https://www.ieee802.org/3/dj/public/25_03/sekel_3dj_01_2503.pdf>).

The comment points out that detailed physics behind the mated test fixture equations is not provided. However, such information has not been provided with numerous other limit-mask equations in previous clauses. It is unclear what problem with testing compliance of test fixtures.

The suggested remedy offers an alternative method using a "signal power" metric, but it is not clear how it improves the testability or the quality of test fixtures.
The suggested remedy mentions the contribution <https://www.ieee802.org/3/dj/public/25_05/mellitz_3dj_03_2505.pdf>.

Note that test fixtures are specified with a region around the reference ILdd, in order to limit variability in measurements of hosts, modules, and cables. It is not clear that the suggested remedy achieves that purpose.

Further data and consensus building on this idea are encouraged.

There was no consensus to implement the suggested changes.

---

*Cl* **179B** *SC* **179B.4.1** *P* **825** *L* **11** # 136

Noujeim, Leesa — Google

*Comment Type* **TR** *Comment Status* **R** *(Electrical) MTF - ILdd*

Spread between Ildd_MTFmin and Ildd_MTFmax curves is too large

*SuggestedRemedy*

shift the min curve down and the max curve up, especially in 40-60GHz region

*Response* *Response Status* **C**

REJECT.
The suggested remedy does not provide sufficient detail to implement.
The comment does not provide justification for the proposed changes.

---

*Cl* **179B** *SC* **179B.4.1** *P* **826** *L* **1** # 604

Kocsis, Sam — Amphenol

*Comment Type* **TR** *Comment Status* **R** *(Electrical) FOM_ILD*

The rise time used in the FOM_ILD calculation is inconsisent with the rise time used on ICN calculations

*SuggestedRemedy*

Converge to a single rise time setting for mated test fixture calculations and adjust criteria pass/fail limits appropriately.

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

REJECT.

This comment was WITHDRAWN by the commenter.

---

*Cl* **179B** *SC* **179B.4.2** *P* **826** *L* **10** # 603

Kocsis, Sam — Amphenol

*Comment Type* **TR** *Comment Status* **A** *ference impedance (bucket2)*

There is no documented procedure for adjusting the reference reference impedance for an ERL computation, though one exists in the COM code.

*SuggestedRemedy*

Add details to this Annex to document the procedure and provide a reference for other places where an ERL computation requires a reference impedance other than 100-ohm.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #235.

---

*Cl* **179B** *SC* **179B.4.2** *P* **826** *L* **19** # 624

Palkert, Thomas — Samtec, Macom

*Comment Type* **TR** *Comment Status* **A** *ctrical) Reference Impedance*

The CR specification should use 92.5 ohm impedance for MTF ERL

*SuggestedRemedy*

add line in Table 179B-1 to specify 92.5 ohm impedance

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #63.

---

*Cl* **179B** *SC* **179B.4.2** *P* **826** *L* **34** # 515

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **R** *ctrical) Reference impedance*

It has been stated that making test fixtures that are 92.5 Ohm differential impedance throughout their length is not feasible and sections of the fixtures near the RF connectors need to be 100 Ohm which degrades this ERL measurement resulting in a need for a more relaxed specification. However it is important that the mating interface to the DUT is close to the 92.5 Ohm value.

*SuggestedRemedy*

Consider adding an additional Mated test fixture ERL specification with a tighter value but with the length of the reflection signal reduced and the Time gated propagation delay set to a non-zero value. It may be necessary to have different settings for the different directions of the measurement.

*Response* *Response Status* **C**

REJECT.
The suggested remedy does not contain sufficient detail so that the CRG can understand the specific change being suggested.

*Cl* **179B** *SC* **179B.4.3** *P* **826** *L* **44** # 516

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *(Electrical) MTF - ILdc*

There isn't a specification for the differential-mode to common mode insertion loss but theorectically it will be similar to the common mode to differential insertion loss. The specification in section 179B.4.3 is very weak and an MCB that only just passes this specification would cause a module to fail the 60mV full band AC common-mode specification in Table 176D-3 even if the moudle itself has no AC common mode output noise.

*SuggestedRemedy*

Change Equation 179B-6 (and figure 179B-3) to 30-(21/28)*f from 0.01 to 40GHz and 15 from 40GHz to 67GHz which is the scaled equation from clause 162B.4.3

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slide 49 in <https://www.ieee802.org/3/dj/public/25_07/ran_3dj_01b_2507.pdf>.

The suggested remedy includes an equation that is depicted by the rightmost red dashed line in the plot. However, there is consensus to use a modified mask depitced by the leftmost red dashed line, which has an inflection point at 35 GHz.

Change the equation as required to match the leftmost red dashed line, with editorial license.

*Cl* **179B** *SC* **179B.4.6** *P* **829** *L* **26** # 517

Dudek, Mike — Marvell

*Comment Type* **E** *Comment Status* **A** *(Electrical) (bucket)*

Incomplete sentence (no verb)

*SuggestedRemedy*

Change "voltage determined" to "voltage is determined"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179B** *SC* **179B.4.6** *P* **829** *L* **39** # 605

Kocsis, Sam — Amphenol

*Comment Type* **TR** *Comment Status* **R** *(Electrical) MTF - ICN*

The aggressor amplitudes in the ICN calculations are not consistent with the expected worst-case maximum transmitter amplitudes.

*SuggestedRemedy*

Adjust the amplitudes match the transmitter swing and scale the criteria pass/fail limits appropriately.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **179B** *SC* **179B.4.6** *P* **830** *L* **14** # 518

Dudek, Mike — Marvell

*Comment Type* **E** *Comment Status* **A** *(Electrical) (bucket)*

missing letter

*SuggestedRemedy*

change "th" to "the"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179B** *SC* **179B.4.6** *P* **830** *L* **14** # 544

Schreiner, Stephan — Rosenberger Hochfrequenztechnik GmbH & Co. KG

*Comment Type* **E** *Comment Status* **A** *(Electrical) (bucket)*

missing "e" at the end of "the"

*SuggestedRemedy*

change "th" to "the"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **179B** *SC* **179B.4.6** *P* **830** *L* **23** # 47

Mellitz, Richard — Samtec

*Comment Type* **TR** *Comment Status* **A** *(Electrical) MTF - ICN*

"Total integrated crosstalk noise voltage" and "MDFEXT integrated crosstalk noise voltage" is system use case dependent. Aft is not relevant. See "mellitz_3dj_03_2505"

*SuggestedRemedy*

Remove "Total integrated crosstalk noise voltage" lines (24)
Add section describing slide 7 on in "mellitz_3dj_03_2505" for SNR_MDFEXT.
Replace:
MDFEXT integrated crosstalk noise voltage (max)
with:
SNR_MDFEXT (min) of 40 dB
(slide 10 in mellitz_3dj_03_2505")

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.
The comment provides an alternative method to specify far-end crosstalk (MDFEXT) allowance for a mated test fixture, as in the referenced contribution <https://www.ieee802.org/3/dj/public/25_05/mellitz_3dj_03_2505.pdf>
The comment does not demonstrate the benefits of the proposed method compared to the existing method, and does not replace the existing method completely (ie. current method still applies to MDNEXT).

There is no consensus to adopt the proposed method at this time.
However, there is consensus to remove the total integrated crosstalk noise specification.

Delete the row "Total integrated crosstalk noise voltage" from Table 179B-4.

*Cl* **179C** *SC* **179C.1** *P* **833** *L* **25** # 437

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *al) MDI References (bucket2)*

There are currently no specifications, neither final or draft, of SFP224 and SFP-DD224 that can be referred to.

The amendment cannot be finalized with references to undefined specifications.

We should at least decide on a deadline for availability of these specifications. If they are not available by the deadline, they will need to be removed.

*SuggestedRemedy*

Add editor's note at the beginning of Annex 179C stating that SFP224 and SFP-DD224 specifications are not available yet, and that all references to these connector types will be removed if specifications are not available by the first SA ballot recirculation (i.e. they will not appear in D3.1).

These notes should replace the notes in 179C.2.1 and 179C.2.2.

Add similar notes in 179.11.7.2.2 and 179.12 where these connectors are mentioned too.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The comment identifies an issue regarding the completeness of the references to the MDI connector types defined in Annex 179C.
Resolve using the response to comment #483.

*Cl* **179C** *SC* **179C.1** *P* **834** *L* **4** # 519

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **R** *ectrical) MDI pin assignments*

For inter-operability the PMDs on both ends and the cable pins have to match.

*SuggestedRemedy*

Change "should be used" to "shall be used"

*Response* *Response Status* **C**

REJECT.
Discussion in the CRG revealed that the phrase "fully utilized" and the recommendation is ambiguous, including whether it applies to the cable assembly or to the host or both, whether it refers to breakout, etc.

There is no consensus to make a change at this time.
Further work on rephrasing the recommendation is encouraged.

*Cl* **179C** *SC* **179C.2.1** *P* **839** *L* **45** # 483

D'Ambrosia, John — Futurewei, U.S. Subsidiary of Huawei

*Comment Type* **TR** *Comment Status* **A** *(Common) MDI References*

Editor's Note states the following:
The reference for SFP224 does not currently include 200G per lane specifications but it's expected to include before publication of this standard.
It is not clear that the referenced SFP224 specification will include 200G per lane specifications.
The current state of development in SFF-1031 or SFP-DD is unclear.
The IEEE P802.3dj standard could not be approved in this state.
Similar comment for 179C.2.2, 179C.2.3

*SuggestedRemedy*

Two options are offered, as the state of development in noted organizations is unclear.
1. If development is underway in noted organizations, modiffy the note to indicate that if the specification is not received for consideration by the Task Force by Jan 2026, the note will be removed and the MDI will be noted in a non-specific manner.
2. Remove any references to the SFF specification and make the section generic.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The comment identifies an issue regarding the completeness of the references to the MDI connector types defined in Annex 179C.

For each of the references noted in the comment, add the following editor's note:
"When this draft was published this reference was not available. If this reference is not available for review by the P802.3dj Task Force prior to the January 2026 IEEE 802.3 interim meeting then the reference will be deleted and related MDI specifications will be deleted or appropriately modified (proposal required)."

Put this note in 179C.2.1, 179C.2.2, 179C.2.3, as well as for the related references in subclause 1.3.

Implement with editorial license.

*Cl* **179C** *SC* **179C.2.3** *P* **841** *L* **40** # 438

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **A** *al) MDI References (bucket2)*

The Editor's note is obsolete - the recent version of SFF-TA-1027 (1.0.6, https://members.snia.org/document/dl/36947) does include QSFP224.

*SuggestedRemedy*

Delete the note.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The update of the reference to SFF-TA-1027 is addressed by the response to Comment #434.
Assuming the reference is updated to a version that includes QSFP224, remove the editor's note.

*Cl* **180** *SC* **180.2** *P* **432** *L* **33** # 395

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **R** *(Common) Block error ratio*

The error ratio allocation provides reference to 174A.5, which defines the PHY to PHY link. The clause itself is focused on optical PMD. Table 174A-1 provide detailed error allocation of the components in the PHY link, and specifically addresses the optical PHYs as this clause. It provides the full picture of error allocation. We should reference it more clearly.

This comment applies to all IMDD opitcal PMDs. i.e. CL180~183,CL185.

*SuggestedRemedy*

change to "A complete PHY is expected to meet the frame loss ratio specifications in 174A.5, with each component in the PHY meeting the error ratio allocations specified in Table 174A-1. "

This comment applies to all applicable opitcal PMDs. i.e. CL180~183,CL185.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **180** *SC* **180.2** *P* **432** *L* **33** # 396

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **A** *(Common) Block error ratio*

The receiver sensitivity and stressed receiver sensitivity, as the two most important opitcal parameter are defined as the input OMA at which the receiver hits the threshold of an error ratio metric. They will be tested for each module to be shipped, which currently has a volume in the million ports/year level now. That means the time spent on testing the receiver sensitivity is a huge factor in cost, both in terms of CAPEX and OPEX of the module vendor, system vendor and the end user.

While block error ratio maybe theoretically perfect, it is almost impossible to implement practically or cost effectively, reasons as following:

The expected measurement time of getting direct measurement result for each of the test_block_error_bin_i is impractical in both DVT and volume testing. An estimated of 10 days to observe 1 event in bin 15 in the cases of the upper limit Hmax. For practical products, performance are expected to be better than Hmax, making it even longer to observe. And to have statistical confidence, one would even require to observe over 10 times of the event to make it representative, or the data set to "be sufficiently large to reliably verify".

My previous contribution with 100G/L data and Michael He's 200G/L data have shown that a time span of several mins would be required to get reasonable result. Comparing what is being used today ( a few seconds), that is ~10 times the length.

The data also showed that statistical projection can be very subjective approach, sometimes even impossible. This eliminates the block error histogram and the block error ratio (which is calculated using the histogram) being objective metric for link performance, especially when it comes to quantitative comparison. Whether or not a DUT passes the requirement can be dependent on an engineer's experience and judgement. This is not a economical feasible parameter to be used in mass volume production in modern industry, which typically employs automatic testing and validation.

This comment applies to all applicable opitcal PMDs. i.e. CL180~183,CL185.

*SuggestedRemedy*

Provide the information of BER threshold under random error assumption as previous generations of ethernet optical PMDs. Point out that for links that are prone to burst error, further evaluation of the PHY/link/PMD can be done based on the block error ratio method. Similar statement on leaving margin for not-so-random links has been use before. Leave it to the implementer and user of this standard to decide which method to use in their design, DVT and volume production stage,.

This comment applies to all applicable opitcal PMDs. i.e. CL180~183,CL185.

A contribution will be provided with detailed suggested remedy.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following related contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/mi_3dj_03a_2507.pdf

Resolve using the response the comment #593.

---

*Cl* **180** *SC* **180.5.12** *P* **437** *L* **28** # 193

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *mon) DATA/TRAINING mode*

While it is clear what "DATA mode" is intended to mean here in the context of ILT, that term has specific meaning for 1000BASE-T PHYs that differs from what is intended here (see 1.4.278) Annex 178B.5 indicates that in the context of ILT, "data mode" means the variable tx_mode has the value 'data', which is associated with being in the PATH_UP state per figure 178B-8. As such, it would be more clear if the text in 180.5.12 referred to the PATH_UP state.

*SuggestedRemedy*

Change "coordinate the transition to DATA mode." to "coordinate the transition to the PATH_UP state (see Figure 178B-8)."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #191.

---

*Cl* **180** *SC* **180.6** *P* **437** *L* **35** # 521

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **A** *(Optical) (bucket)*

The positioning and ordering of the lanes at the MDI is not specified in 180.9.

*SuggestedRemedy*

Change the reference from 180.9 to 180A.4

*Response* *Response Status* **C**

ACCEPT.

*Cl* **180** *SC* **180.7.1** *P* **438** *L* **33** # 16

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

The minimum TX launch power and OMA must be increased by 0.2dB to account for the changes in MPI+DGD penalty allocation in Table 180-9.

*SuggestedRemedy*

In Table 180-7, make the following changes:
1. Change Average launch power, each lane (min) from -3.3 dBm to -3.1 dBm.
2. Change Outer Optical Modulation Amplitude (OMAouter), each lane (min) from -0.3 dBm to -0.1 dBm, and from -1.2 + max(TECQ,TDECQ) to -1 + max(TECQ,TDECQ).
3. Change footnote (b) to read: "An average launch power of -3.1 dBm corresponds to an OMA of -0.1 dBm with an infinite extinction ratio."

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed the following presentation.
Https://www.ieee802.org/3/dj/public/25_07/johnson_3dj_01_2507.pdf

Implement slides 4 through 18 of johnson_01 with editorial license. Note on slide 17, Table 182-xx should be 183-xx and on slide 18, Table 182-yy should be 183-yy.

*Cl* **180** *SC* **180.7.1** *P* **438** *L* **40** # 592

He, Michael — TeraHop

*Comment Type* **T** *Comment Status* **A** *(Common) TDECQ*

Tx OMAouter (min) equals -1.2 + max(TECQ, TDECQ) for 0.9 dB < max(TECQ, TDECQ) < 3.4 dB. It means that Tx OMAouter shall increase to compensate TECQ/TDECQ induced penalty. However, the testing data show 1dB TECQ/TDECQ degradation will only cause <1dB Rx sensitivity penalty, which means the TECQ/TDECQ penalty is overestimated.

*SuggestedRemedy*

The TDECQ test methodology needs to be optimized to make it more closely to reflect the real TECQ/TDECQ induced penalty. The expected 1dB TECQ/TDECQ degradation vs it's induced penalty would be at least 0.75dB or above. Some new approaches, e.g. adding 1-tap DFE for the ref. equalizer, or narrowing histogram spacing of the eye diagram (referring to rodes_3dj_01_2411) may help. May submit one contribution with collected data to support feasibility.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #384.

*Cl* **180** *SC* **180.7.1** *P* **438** *L* **44** # 488

Kimber, Mark — Semtech

*Comment Type* **TR** *Comment Status* **R** *(Optical) Ceq*

Over equalizing transmitters can cause BER floor issues as shown in kimber_3dj_01a_2505. Keeping Ceq > 1 (0dB) helps to prevent Tx peaking.

*SuggestedRemedy*

Add additional specification line after TECQ specification.
Noise Enhancement Factor, Ceq (min) 1

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #491.

*Cl* **180** *SC* **180.7.1** *P* **438** *L* **51** # 425

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *(Common) Jitter*

Transmitter jitter specifications are required for optical PMDs. Clock jitter, especially at low frequencies, are not captured adequately by existing specifications, and should be limited by specifications to avoid correlated errors in receivers that would degrade link performance.

A presentation with more details is planned, but the suggested remedy contains a summary of the suggested changes.

*SuggestedRemedy*

In Table 180-7, add an "Output jitter" row with parameters, values, and units as in Table 176D-3 (module output specifications at TP4).

In Table 180-14, add an "Output jitter" row with pattern 4 or 6, and reference to 180.9.14 (new subclause).

Add a new subclause 180.9.14 for Output jitter. The content is to be taken from 176D.8.9, with additional exceptions:
- transmit equalizer is fixed
- when the PHY includes an xAUI-n, the clock source for the test pattern is derived from the clock recovered from the xAUI-n input signal.

Implement with editorial license.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **180** *SC* **180.7.1** *P* **439** *L* **28** # 17

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

Figure 180-3 must be updated to correspond to the 0.2 dB increase in OMAouter(min) in Table 180-7.

*SuggestedRemedy*

Update the OMAouter(min) curve in Figure 180-3 to correspond to the updated values -0.1 dBm and -1 + max(TECQ,TDECQ), with editorial license.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **180** *SC* **180.7.2** *P* **440** *L* **4** # 394

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **A** *(Common) Block error ratio*

In Table 180-8, footnote c for stressed receiver sensitivity. The requirement of measured for the block error ratio specified in 180.2 is impractical to implement. Reason is the same as the comment to 180.2.

This comment applies to all applicable optical PMD Clauses, i.e. CL180~183,CL185

*SuggestedRemedy*

instead of pointing to block error ratio. Point to the error allocation clause of 180.2.

Change footnote c in Table 180-6 to:
" Measured with conformance test signal at TP3 (see 181.0.13) for the error ratio allocation specified in 180.2. "

This comment applies to all applicable optical PMD Clauses, i.e. CL180~183,CL185.
Change the respective CL18x.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #593.

*Cl* **180** *SC* **180.7.2** *P* **440** *L* **17** # 18

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

The minimum RX receive power must be increased by 0.2dB to account for the changes in MPI+DGD penalty allocation in Table 180-9.

*SuggestedRemedy*

In Table 180-8, change Average receive power, each lane (min) from -6.3 dBm to -6.1 dBm.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **180** *SC* **180.7.2** *P* **440** *L* **33** # 391

Rodes, Roberto — Coherent

*Comment Type* **TR** *Comment Status* **R** *(Common) Block error ratio*

The receiver sensitivity specification currently relies on a complex block error ratio calculation. However, the methodology is unclear regarding the required test duration to meet the specification, and it lacks guidance on how to perform a 'statistical projection'. As receiver sensitivity is a primary specification for a PMD receiver, its test and verification procedures should be clear and practical to execute, while ensuring a reasonable level of confidence. Supporting presentation will be provided

*SuggestedRemedy*

replace note c by:"Measured using the conformance test signal at TP3 (refer to Section 180.8), with an error ratio allocation one decade lower than specified in 174A.12 for PMD-to-PMD." Apply also to clauses 181, 182 and 183

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **180** *SC* **180.7.2** *P* **440** *L* **33** # 593

He, Michael — TeraHop

*Comment Type* **T** *Comment Status* **A** *(Common) Block error ratio*

The footnote for receiver sensitivity show that it shall be measured with conformance test signal at TP3 (see 180.8) for the block error ratio specified in 180.2. However, accurately measuring with block error ratio method may need too long time. We need to find a proper way to shorten the testing time to make it acceptable either for compliance or for mass production.

*SuggestedRemedy*

Is it possible to just accumulate a limited codewords for FEC-bin and prediction via expropolating the FEC-bin curve. Will submit a contribution to discuss the feasibility.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/he_m_3dj_01c_2507.pdf

Also slide 41 of the following editorial contribution was reviewed:
https://www.ieee802.org/3/dj/public/25_07/brown_3dj_03c_2507.pdf

Implement the proposed changes on slide 41 of brown_3dj_03c_2507 with editorial license.

*Cl* **180** *SC* **180.7.3** *P* **441** *L* **42** # 15

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

The allocation for MPI and DGD penalties of 0.1 dB is too small. It should be increased to 0.1 dB for MPI and 0.2 dB for DGD per johnson_3dj_01-2505.

*SuggestedRemedy*

In Table 180-9, make the following changes:
1. Change Allocation for penalties (for max TDECQ) from 3.5 dB to 3.7 dB
2. Change Power budget (for max TDECQ) from 6.5 dB to 6.7 dB
3. Change footnote (b) to read: "...This channel insertion loss may be reduced by up to 0.5 dB depending on ."
4. Change footnote (c) to read: ".includes an allocation of 0.1 dB for MPI and 0.2 dB for DGD penalties. For cases with a channel insertion loss less than 3 dB, as shown in Table 180-12, the allocation for penalties should be "6.7 - channel insertion loss".

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **180** *SC* **180.7.3** *P* **441** *L* **46** # 342

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

MPI/DGP penalty of 0.1 dB would be too small for 200GBASE-DR1/400GBASE-DR2/800GBASE-DR4/1.6TBASE-DR8

*SuggestedRemedy*

The BS/CD MPI penalty were evaluated with ER of 5 dB which is too high for 200G Si MZM. Analysis need to be based on SER of 5.6E-4, with half the loss at mid-span, and ER=3.5, see https://www.ieee802.org/3/dj/public/25_05/ghiasi_3dj_01b_2505.pdf and https://www.ieee802.org/3/dj/public/25_05/johnson_3dj_01a_2505.pdf
Given that Table 180-12 with 8 discrete reflectance -55 dB and -45 dB and zero discrete reflectacen of -45 dB and -35 dB has 0.15 dB of MPI penalty with addtion of ~0.18 dB, or with ~ 0.3 dB total penalty.
Require following adjsutments:
Table 180-9 power budget increases from 6.5 dB to 6.7 dB
Table 180-7 average launch power increases from -3.3 dBm to -3.1 dBm, OMA(min) increases by +0.2 dB
Table 180-8 average receive power increases from -6.3 dBm to -6.1 dBm
See ghiasi_3dj_02_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **180** *SC* **180.7.3** *P* **442** *L* **6** # 19

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

Figure 180-5 must be updated to correspond to the 0.2 dB increase in TX OMAouter in Table 180-7.

*SuggestedRemedy*

Update the Transmitter OMAouter(min) curve in Figure 180-5 to correspond to the updated values in Table 180-7, with editorial license.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **180** *SC* **180.8.1** *P* **443** *L* **44** # 285

Maguire, Valerie — Copperopolis; aff'l w/ CME Consulting and Cisco

*Comment Type* **TR** *Comment Status* **A** *(Optical) fiber specs*

The cabled optical fiber attenuation characteristics in Table 180-11, Table 181-9, Table 182-11, and Table 183-10 and associated intro text need a careful look... The current revision of the TIA Optical Fiber Cabling and Components Standard is ANSI/TIA-568.3-E. The document specifies B-652.D or B-657 as acceptable fiber for Outside Plant cables and specifies the maximum cabled attenuation as 0.4 dB/km at 1310nm, 1383nm, and 1550nm. While it's true that ANSI/TIA-568.3-E specifies the maximum cabled attenuation as 0.5 dB/km at 1310nm and 1550nm, this is not aligned with B-652.D or B-657 (OS2) as mentioned in the intro paragraph to each table. A dash is missing between "TIA" and "568" in the ANSI/TIA-568.3-C reference. Unecessary commas between 'or' statements. I think what the draft is trying to do is accomodate legacy installed OSP cabling, but calling out 'newer, higher peforming cables with exceptions' as the specification is a confusing way to do this.

*SuggestedRemedy*

Option A, in Table 180-11, Table 181-9, Table 182-11, and Table 183-10 and their corrsponding intro text:
Replace "The optical fiber cable requirements are satisfied by cables containing ITU-T type G.652.D (low water peak, dispersion unshifted), or type G.657.A1, or type G.657.A2 (bend insensitive) fibers, or the requirements in Table 18x-yy where they differ." with "The optical fiber cable requirements are satisfied by cables meeting the characteristics in Table 18x-yy. The use of optical fiber cables containing ITU-T type G.652.D (low water peak, dispersion unshifted), type G.657.A1, or type G.657.A2 (bend insensitive) fibers is recommended."
Replace "ANSI/TIA 568-C.3" with "ANSI/TIA-568-C.3"

Option B, in Table 180-11, Table 181-9, Table 182-11, and Table 183-10 and their corrsponding intro text:
Replace "The optical fiber cable requirements are satisfied by cables containing ITU-T type G.652.D (low water peak, dispersion unshifted), or type G.657.A1, or type G.657.A2 (bend insensitive) fibers, or the requirements in Table 18x-yy where they differ." with "The optical fiber cable requirements are satisfied by cables meeting the characteristics in Table 18x-yy. Optical fiber cables containing ITU-T type G.652.D (low water peak, dispersion unshifted), type G.657.A1, or type G.657.A2 (bend insensitive) fibers are examples of cables that exceed these requirements."
Replace "ANSI/TIA 568-C.3" with "ANSI/TIA-568-C.3"

Option C, in Table 180-11, Table 181-9, Table 182-11, and Table 183-10 and their corrsponding intro text:
Replace "0.5" with "0.4"
Replace "...ITU-T type G.652.D (low water peak, dispersion unshifted), or type G.657.A1, or type G.657.A2 (bend insensitive) fibers, or the requirements in Table 18x-yy where they differ." with "...ITU-T type G.652.D (low water peak, dispersion unshifted), type G.657.A1, type G.657.A2 (bend insensitive), or other fibers meeting the requirements in Table 18x-yy."
Replace " ANSI/TIA 568-C.3" with "ANSI/TIA-568-E.3"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
In 180.8.1 replace
"The optical fiber cable requirements are satisfied by cables containing ITU-T type G.652.D (low water peak, dispersion unshifted), or type G.657.A1, or type G.657.A2 (bend insensitive) fibers, or the requirements in Table 180-11 where they differ."
with
"The optical fiber cable requirements are satisfied by cables meeting the characteristics in Table 180-11. The use of optical fiber cables containing ITU-T type G.652.D (low water peak, dispersion unshifted), type G.657.A1, or type G.657.A2 (bend insensitive) fibers is recommended."

Implement the same change in 181.8.1, 182.8.1 and 183.8.1.

In Tables 180-10, 181-9, 182-11 and 183-10 change footnote a from
"The 0.5 dB/km attenuation is provided for Outside Plant cable as defined in ANSI/TIA 568-C.3."
to
"The 0.5 dB/km attenuation is provided for Outside Plant cable as defined in TIA-568-C.3."

With editorial license.

*Cl* **180** *SC* **180.8.2** *P* **444** *L* **10** # 20

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

Update the maximum channel insertion loss Table 180-12 per the updated MPI penalties given in consensus presentation johnson_3dj_01_2505.

*SuggestedRemedy*

Replace the values of maximum channel insertion loss in Table 180-12 with the new values included in supporting editorial presentation, johnson_3dj_01_2507, slide 7.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **180** *SC* **180.8.3** *P* **444** *L* **47** # 194

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Optical) (bucket)*

DR MDIs use pairs of fibers

*SuggestedRemedy*

Change "...besides the option to connect to a single fiber MDI, ..." to ".besides the option to connect to a single fiber-pair MDI, ."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #134.

*Cl* **180** *SC* **180.8.3** *P* **444** *L* **47** # 134

Parsons, Earl — CommScope

*Comment Type* **T** *Comment Status* **A** *(Optical) (bucket)*

The phrase "option to connect to a single fiber MDI" is incorrect since there are two fibers in that MDI.

*SuggestedRemedy*

Change "For 200GBASE-DR1, besides the option to connect to a single fiber MDI, there are two additional specified MDI optical receptacles, a single-row 12-fiber interface and a single-row 16 fiber interface."

to

"For 200GBASE-DR1, besides the option to connect to an MDI with two fibers, there are two additional specified MDI optical receptacles, a single-row 12-fiber interface and a single-row 16 fiber interface."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **180** *SC* **180.9.1** *P* **445** *L* **31** # 530

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) precoding*

PRBS31Q with pre-coding should be listed as a possible test pattern. Also it would be better to reference the description of the 200G per lane PRBS31Q test pattern in 176.7.4.2 rather than the older reference in

*SuggestedRemedy*

Add PRBS31Q with precoding as an additional test pattern (8) in table 180-13. In table 180-14 add this pattern as an option wherever patter 3 is used. The reference for the test pattern definition should be 176.7.4.2. Change the test pattern generator generator for PRBS31Q from 120.5.11.2.2 to 176.7.4.2. Make equivalent changes to Clause 181.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment points out that the reference for the PRBS31Q (pattern 3 ) test pattern should be 176.7.4.2. The same applies to the square wave (176.7.4.6), PRBS13Q (176.7.4.3), and SSPRQ (176.7.4.5) patterns.

The comment also correctly points out that there is no direction to provide precoding to pattern 3 or pattern 5 (scrambled idle) when required by the receiver.

The comment proposes to address this by adding a new pattern: <PRBS31Q with precoding>. However, a new pattern <scrambled idle with precoding> would also be required, as well.

In operation, precoding is requested as enabled or disabled through the ILT process. Further, given that ILT is mandatory, a receiver might rely upon the ILT process (e.g., starting with a particular training frame pattern) to achieve the best performance. Regardless, a statement is needed in 180.9.12 and 180.9.13 about applying precoding when needed/requested by the receiver.

Change the references for the test patterns as noted above in Table 180-13 and Table 181-11.

Also, add a footnote to Pattern 3 and 5 pointing out that addition precoding may be added pointing to 176.7.1.2 as well as the receiver sensitivity and stressed receiver sensistivity subclauses.

In 180.9.12, 180.9.13, 181.9.12, and 181.9.13, add a statement that precoding, as provided by the PMA, is enabled if requested by the receiver. Also include a reference to 176.7.1.2 which defines precoding.

Add the following sentence in 180.9.12, 180.9.13, 181.9.12, and 181.9.13
"Precoding (see 176.7.1.2) shall be enabled if the receiver requests precoding during ILT."

Implement with editorial license.

*Cl* **180** *SC* **180.9.5** *P* **447** *L* **1** # 1

El-Chayeb, Ahmad — Keysight Technologies

*Comment Type* **TR** *Comment Status* **R** *(Common) TDECQ*

Current definition for TDECQ points to clause 121.8.5.1 where TDECQ is calculated at a pre-FEC target SER. This definition is not a very good indicator of link performance

*SuggestedRemedy*

Re-define TDECQ and extend it to CER (codeword error ratio) to have better correlation with link performance. CER TDECQ definition need to be technically and economically feasible. A subsequent presentation will be provided at a later ad-hoc meeting.

*Response* *Response Status* **U**

REJECT.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/chayeb_3dj_01b_2507.pdf

The proposal does not provide sufficient detail to implement.

However, based on the straw poll TF-8 there is strong interest for further work on this subject.

Straw poll TF-8 (directional)
I am interested in further refinement of the proposal for Codeword Error Rate TDECQ as described in chayeb_3dj_01c_2507.pdf as a replacement for TDECQ
Y: 51
N: 11
Abstain: 21

*Cl* **180** *SC* **180.9.5** *P* **447** *L* **21** # 381

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) TDECQ*

Current TDECQ reference equalizer is only 15 tap FFE where most implemetnation of DSPs are 20-30 taps FFE with DFE and optional MLSE. Many have raised that real receivers perform much better than reference equalizer which is a good thing, but this also leaves all the margin for RX DSP.

*SuggestedRemedy*

A reasonblae next step is to supplement the current TDECQ equalizer based on 15T FFE with 1T DFE. The Scope can already support 1TDFE.
The reference equalizer is a 15-tap feed-forward equalizer (FFE) and 1-tap decision-feedback equalizer (DFE), where T is the symbol
period, with equalizer coefficient constraints as shown in Table 180-15.
In table 180-15 add limits for DFE min=-0.4 max=0
see ghiasi_3dj_04_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #384.

*Cl* **180** *SC* **180.9.5** *P* **447** *L* **21** # 393

Rodes, Roberto — Coherent

*Comment Type* **T** *Comment Status* **A** *(Common) TDECQ*

The current reference receiver assumption used in TDECQ measurements prevents a large number of transmitters-despite demonstrating excellent real-world receiver performance-from passing the TDECQ test. The reference receiver is significantly less capable than actual implemented receivers. It is proposed to add a 1-tap DFE with a limited maximum value to better reflect practical receiver performance.Supporting presentation will be provided

*SuggestedRemedy*

replace with:" The reference equalizer is a 15-tap, T-spaced, feed-forward equalizer (FFE) combined with a 1-tap decision feedback equalizer (DFE), where T is the symbol period, with equalizer coefficient constraints as shown in Table 180-15...". In Table 180-15 add limit for 1-tap DFE with max value 0.3. Apply also to clauses 181, 182 and 183

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #384.

*Cl* **180** *SC* **180.9.5** *P* **447** *L* **24** # 721

Dawe, Piers — Nvidia

*Comment Type* **TR** *Comment Status* **R** *(Common) ser*

4.56 x 10^-4 and the related Q t value (see 121.8.5.3) is 3.428
-> Qt = 3.846, 1 dBe better "SNR" (but doesn't change xECQ by that much). (implied 9e-5 but that doesn't matter). do this less for SRS and URS. 10*log10(3.846/3.428) = 0.5

*SuggestedRemedy*

Change Qt to 3.846, 1 dBe better "SNR" (but doesn't change xECQ by that much). (implied 9e-5 but that doesn't matter). Don't change Qt for for SRS and URS. FYI 10*log10(3.846/3.428) = 0.5

*Response* *Response Status* **U**

REJECT.

There is some agreement that further work is needed.

There is no consensus to make the proposed changes.

*Cl* **180** *SC* **180.9.5** *P* **448** *L* **17** # 430

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Common) taps*

The reference equalizer currently allows a very large magnitude for the precursor (i = -1) and postcursor (i = 1) coefficients of the reference receiver. This assumes real receivers will be able to apply similar equalization.

Reference receiver coefficient data was provided in the following contributions:
- https://www.ieee802.org/3/dj/public/24_05/welch_3dj_01_2405.pdf - where most data points have pre/post coefficients within the range -0.3 to +0.1.
- https://www.ieee802.org/3/dj/public/24_09/welch_3dj_01_2409.pdf - where new data sets are included with pre/post cursors that reach approximatley -0.4.

The reference receiver limits were set with margin relative to all provided data sets, such that they are all acceptable, and allowing transmitters that require even stronger equalization. However, there was no evidence or indication in either presentation that these transmitters enable good receiver performance.

Contributed data in https://www.ieee802.org/3/dj/public/25_05/chayeb_3dj_01_2505.pdf shows that reference receiver coefficients that have large magnitudes, and especially large difference between pre/post coefficients (indicating phase distortion), create severe degradation in real receivers. It is known fact that DSP receiver implementations have limited equalization capability (especially for precursor) and that strong equalization degrades the performance (e.g. due to limited ADC range). It is not expected to be much better in future designs.

Requiring such strong equalization settings indicates poor transmitter waveform shaping and would likely create unexpectedly bad link performance. Even if real transmitters will not have such impairments, a signal with such bad waveform shaping might be used for stressed receiver testing; this should not be allowed.

See https://www.ieee802.org/3/dj/public/adhoc/electrical/25_0605/ran_3dj_elec_01b_250605.pdf , slides 12-18; the suggested remedy has been updated since that presentation.

*SuggestedRemedy*

In Table 180-15, change the Minimum value for i=-1 from -0.5 to -0.3, and for i=1 from .-0.6 to -0.3.
Change the Maximum value for i=1 from 0.2 to 0.1.

Alternatively, specify that the difference between coefficients -1 and +1 of the reference receiver does not exceed +/-0.3.

Apply the same changes in Table 181-13, Table 182-15, and Table 183-14.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #343.

*Cl* **180** *SC* **180.9.5** *P* **448** *L* **18** # 343

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) taps*

Contribution https://www.ieee802.org/3/dj/public/25_05/chayeb_3dj_01_2505.pdf showed that for some weired FFE setting still one may have compliant TDECQ but BER can degrade with this 100G DSP likley due to timing recovery

*SuggestedRemedy*

Contribution https://www.ieee802.org/3/dj/public/24_07/ghiasi_3dj_02a_2407.pdf with data from several suppliers was used to set the limits for TDECQ. Limiting the taps can result in many good modules and we are not sure given that we have link training if this type of problem still exist for weired transmitter FFE settigns. Any limit on TDECQ FFE taps must not result in failing good moduels, looking at the data in Chayeb the following tap adjsutments will have minimum impact on module yield and will address the case of weired transmitter FFE casuing receive BER floor:
Change C(1) from 0.2 to to 0.1 and add following restriction Max C(1)-C(-1) taps=0.4
Other improvements are is to use Block TDECQ and functional hardware receiver
see https://www.ieee802.org/3/dj/public/25_05/ghiasi_3dj_03a_2505.pdf
see ghiasi_3dj_03_2507

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/ghiasi_3dj_03c_2507.pdf

Add the following constraint in Table 180-15, Table 181-13, Table 182-15, and Table 183-14:
abs(c(1)-c(-1)) < 0.25 only if c(1) > 0

Implement with editorial license.

Straw Poll O-1 (pick one) and O-2 (chicago)
I support the following constraint:
A: abs(c(1)-c(-1)) < 0.3
B: abs(c(1)-c(-1)) < 0.25 only if c(1) > 0
C: -0.3 < c(1)-c(-1) < 0.15
D: no change
O-1: A: 6 B: 10 C: 6 D: 3
O-2: A: 8 B: 13 C: 10 D: 3

*Cl* **180** *SC* **180.9.5** *P* **448** *L* **23** # 508

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) taps*

It is shown in https://grouper.ieee.org/groups/802/3/dj/public/25_05/chayeb_3dj_01_2505.pdf (at 100G) that despite a passing TDECQ value, with non optimum Tx settings that require the reference receiver to have a large difference in value between the 1st precursor tap and the 1st postcursor tap, a receiver has excessive BER and post-FEC errors. It is not expected that well tuned transmitters will have this large difference in the reference equalizer tap values.

*SuggestedRemedy*

Add an extra requirement to table 180.15 that Abs(C(-1)-C(+1))<0.3 . Also to tables 181-13, 182-15 and 183-14

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #343.

*Cl* **180** *SC* **180.9.5** *P* **448** *L* **23** # 392

Rodes, Roberto — Coherent

*Comment Type* **T** *Comment Status* **A** *(Common) taps*

In chayeb_3dj_01_2505, 100G module data showed that transmitters with intentionally excessive group delay can cause issues at the receiver, despite still passing the TDECQ test. Introducing a limit on the maximum absolute difference between the first postcursor and the first precursor would significantly increase the TDECQ penalty for such poorly tuned transmitters, preventing their use and reducing the burden on receivers.

*SuggestedRemedy*

add footnote c: "The absolute difference between c(-1) and c(1) shall be less than 0.3.".
Apply also to clauses 181, 182 and 183

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment is partially addressed by the resolution to comment #343.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/cole_3dj_01e_2507.pdf

Implement slides 13 to 18 of cole_3dj_01e_2507 with the following additions:
- For 182 and 183, use pattern 8 (PRBS31 pattern encoded by the 200GBASE-R, 400GBASE-R, 800GBASE-R, or 1.6TBASE-R Inner FEC)
- the functional receiver is a device independent of the device under test
- Use recovered clock from AUI input (similar to definition TDECQ)
- In Table 180-7 add "per lane" for the "transmitter … mask"

Implement with editorial license.

Straw Poll TF-9 (direction) (pick one)
To resolve comment 392, I support the addition of the transmitter functional symbol error mask test as outlined in slides 13-18 in cole_3dj_01e_2507.pdf with the following changes:
- For 182 and 183, use pattern 8 (PRBS31 pattern encoded by the 200GBASE-R, 400GBASE-R, 800GBASE-R, or 1.6TBASE-R Inner FEC)
- the functional receiver is a device independent of the device under test
- Use recovered clock from AUI input (similar to definition TDECQ)
- In Table 180-7 add "per lane" for the "transmitter … mask"
A: Yes
B: No
C: Need more information
A: 57 B: 9 C: 11

*Cl* **180** *SC* **180.9.5** *P* **448** *L* **25** # 320

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(Common) taps (bucket)*

Table 180-15 footnote a is out of sync with the table. Coefficients are labelled as being normalized, thus saying they are relative to c(0) is redundant. However, it is not stated what normalized means. The table already associates "main tap" with c(0) on row 4.

*SuggestedRemedy*

Change footnote a to: "The normalized tap coefficients are relative to c(0)."
Implement also in Table 181-13, Table 182-15, and Table 183-14.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **180** *SC* **180.9.5** *P* **448** *L* **27** # 321

Brown, Matt — Alphawave Semi

*Comment Type* **T** *Comment Status* **A** *(Common) taps (bucketp)*

Regarding Table 180-15 footnote b. The table specifies an non-normalized range for c(0) and normalized values for the other coeffecients. It is not immediately clear whether to sum the normalized or non-normalized coeffecients.

*SuggestedRemedy*

Change footnote b to: "Equalizer gain is the sum of the non-normalized coefficients." or similar.
Implement also in Table 181-13, Table 182-15, and Table 183-14.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Three changes to table 180-15:
#1 Beside "normalized equalizer coefficient limits" change "c(i)" to "c(i)/c(0)".
#2 Change "Equalizer gain" to "Equalizer DC gain".
#3 Footnote a "The sum of all 15 equalizer coefficients, c(i)"

Implement similarly also in Table 181-13, Table 182-15, and Table 183-14.
Implement with editorial license.

*Cl* **180** *SC* **180.9.6** *P* **449** *L* **14** # 322

Brown, Matt — Alphawave Semi

*Comment Type* **E** *Comment Status* **A** *(Optical) (bucket)*

Use of possesive grammar is inconsistent with similar phrases used through this draft and is unecessary here.

*SuggestedRemedy*

Change "transmitter's" to "transmitter"
Also page 472 line 38, page 499 line 16, page 523 line 46.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy throughout the draft with editorial license.

---

*Cl* **180** *SC* **180.9.12** *P* **450** *L* **38** # 531

Dudek, Mike — Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) precoding*

Whether the precoding is used for Receiver sensitivity and stressed receiver sensitivity should be explicitly stated.

*SuggestedRemedy*

On line 38 inset the setence . "A precoded pattern shall be used if the receiver requests precoding during ILT." between "... Table 180-14" and "The .." Also after Table 180-14 on line 2 of page 451. Make equivalent changes to Clause 181.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #530.

---

*Cl* **180A** *SC* **180A** *P* **850** *L* **4** # 51

D'Ambrosia, John — Futurewei, U.S. Subsidiary of Huawei

*Comment Type* **ER** *Comment Status* **A** *(Optical) Annex title (bucket)*

The title of the Annex is incorrect. This annex only addresses MDIs for the DR family of optics.

*SuggestedRemedy*

Change title to "MDIs for 200GBASE-DR1, 400GBASE-DR2, 800GBASE-DR4, 1.6TBASE-DR8, 200GBASE-DR1-2, 400GBASE-DR2-2, 800GBASE-DR4-2, and 1.6TBASE-DR8-2

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **180A** *SC* **180A** *P* **850** *L* **9** # 520

Dudek, Mike — Marvell

*Comment Type* **E** *Comment Status* **A** *(Optical) Annex title*

The title of the Annex seems over broad as there are many optical PHYs that it is not relevant to (compare the title of Annex 179C where all the relevant PHYs are listed)

*SuggestedRemedy*

Change "optical PHYs" to "Clause 180 and Clause 181 optical PHYs"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #51.

---

*Cl* **180A** *SC* **180A.4.1** *P* **852** *L* **17** # 523

Dudek, Mike — Marvell

*Comment Type* **T** *Comment Status* **R** *(Optical)*

For inter-operability the PMDs on both ends and the fiber cable plant have to match.

*SuggestedRemedy*

Change "should be used" to "shall be used". Also on page 853 line 47

*Response* *Response Status* **C**

REJECT.

No consensus to make a change.

---

*Cl* **181** *SC* **181.5.12** *P* **460** *L* **24** # 195

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *mon) DATA/TRAINING mode*

While it is clear what "DATA mode" is intended to mean here in the context of ILT, that term has specific meaning for 1000BASE-T PHYs that differs from what is intended here (see 1.4.278) Annex 178B.5 indicates that in the context of ILT, "data mode" means the variable tx_mode has the value 'data', which is associated with being in the PATH_UP state per figure 178B-8. As such, it would be more clear if the text in 181.5.12 referred to the PATH_UP state.

*SuggestedRemedy*

Change "coordinate the transition to DATA mode." to "coordinate the transition to the PATH_UP state (see Figure 178B-8)."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #191.

*Cl* **181** *SC* **181.7.1** *P* **462** *L* **16** # 22

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

The minimum TX launch power and OMA must be increased by 0.1dB to account for the changes in MPI+DGD penalty allocation in Table 181-7.

*SuggestedRemedy*

In Table 181-5, make the following changes:
1. Change Average launch power, each lane (min) from -2.2 dBm to -2.1 dBm.
2. Change Outer Optical Modulation Amplitude (OMAouter), each lane (min) from 0.8 dBm to 0.9 dBm, and from -0.1 + max(TECQ,TDECQ) to 0 + max(TECQ,TDECQ).
3. Change footnote (b) to read: "An average launch power of -2.1 dBm corresponds to an OMA of 0.9 dBm with an infinite extinction ratio."

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **181** *SC* **181.7.1** *P* **462** *L* **19** # 429

Ran, Adee — Cisco Systems

*Comment Type* **T** *Comment Status* **A** *(Common) TDECQ (bucket)*

Table 181-5 has a sub-row of OMA_outer (min): "for TDECQ<0.9 dB"

Shouldn't it be "for max(TECQ, TDECQ)<0.9 dB", as in the similar rows in Table 180-7, Table 182-7, and Table 183-6?

*SuggestedRemedy*

Change to "for max(TECQ, TDECQ)<0.9 dB".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **181** *SC* **181.7.1** *P* **462** *L* **26** # 489

Kimber, Mark — Semtech

*Comment Type* **TR** *Comment Status* **R** *(Optical) Ceq*

Over equalizing transmitters can cause BER floor issues as shown in kimber_3dj_01a_2505. Keeping Ceq > 1 (0dB) helps to prevent Tx peaking.

*SuggestedRemedy*

Add additional specification line after TECQ specification.
Noise Enhancement Factor, Ceq (min) 1

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #491.

*Cl* **181** *SC* **181.7.1** *P* **462** *L* **39** # 426

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *(Common) Jitter*

Transmitter jitter specifications are required for optical PMDs. Clock jitter, especially at low frequencies, are not captured adequately by existing specifications, and should be limited by specifications to avoid correlated errors in receivers that would degrade link performance.

A presentation with more details is planned, but the suggested remedy contains a summary of the suggested changes.

*SuggestedRemedy*

Refer to my similar comment against 180.7.1, implement the corresponding changes in Clause 181, with editorial license.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **181** *SC* **181.7.1** *P* **463** *L* **4** # 23

Johnson, John Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

Figure 181-3 must be updated to correspond to the 0.1 dB increase in OMAouter(min) in Table 181-5.

*SuggestedRemedy*

Update the OMAouter(min) curve in Figure 181-3 to correspond to the updated values 0.9 dBm and 0 + max(TECQ,TDECQ), with editorial license.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **181** *SC* **181.7.2** *P* **464** *L* **18** # 24

Johnson, John Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

The minimum RX receive power must be increased by 0.1 dB to account for the changes in MPI+DGD penalty allocation in Table 181-7.

*SuggestedRemedy*

In Table 181-6, change Average receive power, each lane (min) from -5.7 dBm to -5.6 dBm.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **181** *SC* **181.7.3** *P* **465** *L* **32** # 21

Johnson, John Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

The allocation for MPI and DGD penalties of 0.5 dB is too small. It should be increased to 0.4 dB for MPI and 0.2 dB for DGD per consensus presentation johnson_3dj_01_2505.

*SuggestedRemedy*

In Table 181-7, make the following changes:
1. Change Allocation for penalties (for max TDECQ) from 3.9 dB to 4 dB
2. Change Power budget (max TDECQ) from 7.4 dB to 7.5 dB
3. Replace footnotes b, c and d with new footnotes b and c following the form of Table 180- 9, with changes appropriate to CL 181, as given in johnson_3dj_01_2507, slide 6.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **181** *SC* **181.7.3** *P* **465** *L* **35** # 344

Ghiasi, Ali Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

MPI/DGP penalty of 0.5 dB would be too small for 800GBASE-FR4-500

*SuggestedRemedy*

The BS/CD MPI penalty were evaluated with ER of 5 dB which is too high for 200G Si MZM. Analysis need to be based on SER of 5.6E-4, with half the loss at mid-span, and ER=3.5, see https://www.ieee802.org/3/dj/public/25_05/ghiasi_3dj_01b_2505.pdf
and https://www.ieee802.org/3/dj/public/25_05/johnson_3dj_01a_2505.pdf
Given that double link has 4 discrete reflectance -55 dB and -45 dB and 4 discrete reflectacen of -45 dB and -35 dB has 0.5 dB of MPI penalty with addtion of ~0.18 dB, or with ~ 0.7 dB total penalty.
Require following adjsutments:
Table 180-9 power budget increases from 7.4 dB to 7.6 dB
Table 181-5 average launch power increases from -2.2 dBm to -2 dBm, OMA(min) increases by +0.2 dB
Table 181-6 average receive power increases from -5.7 dBm to -5.5 dBm
See ghiasi_3dj_02_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **181** *SC* **181.7.3** *P* **465** *L* **45** # 143

Lambert, Angela — Corning

*Comment Type* **E** *Comment Status* **A** *(Optical) (bucket)*

Cabled fiber attenuation and fiber attenuation are different. As noted at the footnote of other link power budget tables (i.e. Table 180-9 on p. 441 and Table 182-9 on p. 491) and in the respective Optical fiber and cable characteristics tables (in this case, Table 181-9 on page 467), this should be "Cabled optical fiber attenuation"

*SuggestedRemedy*

Change "fiber attenuation" to "cabled optical fiber attenuation"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **181** *SC* **181.7.3** *P* **466** *L* **6** # 25

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

Figure 181-5 must be updated to correspond to the 0.1 dB increase in TX OMAouter in Table 181-5.

*SuggestedRemedy*

Update the Transmitter OMAouter(min) curve in Figure 181-5 to correspond to the updated values in Table 181-5, with editorial license.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **181** *SC* **181.8** *P* **467** *L* **4** # 27

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

Channel insertion loss (max) in Table 181-8 should point to new Table 181-xx.

*SuggestedRemedy*

In Table 181-8,
1. Replace Channel insertion loss(max) value 3.5dB with "See Table 181-xx".
2. Add text in CL 181.8 similar to CL 180.8: "The maximum value of channel insertion loss is dependent on the number and maximum value of the discrete reflectances within the channel as given in Table 181-xx. Discrete reflectances below -55 dB may be ignored when determining the supported channel insertion loss." with editorial license.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **181** *SC* **181.8.2** *P* **467** *L* **48** # 26

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

CL 181.8.2 should be rewritten to mirror the subclause structure and text in CL 180.8.2, with editorial license, including a table of maximum channel insertion loss versus the number of discrete reflections, as discussed in consensus presentation johnson_3dj_01_2505.

*SuggestedRemedy*

Make the following changes to CL 181.8.2:
1. Re-write CL 181.8.2 using the structure and text in CL 180.8.2, with editorial license.
2. Delete old Table 181-10, Maximum value of each discrete reflectance.
3. Insert new Table 181-xx, Maximum channel insertion loss versus number of discrete reflectances, with the values given in johnson_3dj_01_2507, slide 11.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **181** *SC* **181.8.3** *P* **468** *L* **45** # 522

Dudek, Mike — Marvell

*Comment Type* **E** *Comment Status* **R** *(withdrawn)*

It would be good to provide a reference to Annex 180A in this section.

*SuggestedRemedy*

Add a paragraph similar to that in the equivalent section of clause 180. "Annex 180A specifies the details of the MDIs for 200GBASE-DR1-2, 400GBASE-DR2, 800GBASE-DR4-2,
and 1.6TBASE-DR8-2."

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

REJECT.

This comment was WITHDRAWN by the commenter.

---

*Cl* **181** *SC* **181.8.3** *P* **468** *L* **46** # 524

Dudek, Mike — Marvell

*Comment Type* **E** *Comment Status* **R** *(withdrawn)*

Lines 47 to 54 on page 444 in clause 180 provide details of the MDI that also apply to the clause 181 MDI's. Specifying which connectors should be used.

*SuggestedRemedy*

Either add this information in clause 181.8.3 or move that information into Annex 180A.3

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

REJECT.

This comment was WITHDRAWN by the commenter.

---

*Cl* **181** *SC* **181.9.5** *P* **471** *L* **8** # 382

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) TDECQ*

Current TDECQ reference equalizer is only 15 tap FFE where most implemetnation of DSPs are 20-30 taps FFE with DFE and optional MLSE. Many have raised that real receivers perform much better than reference equalizer which is a good thing, but this also leaves all the margin for RX DSP.

*SuggestedRemedy*

A reasonblae next step is to supplement the current TDECQ equalizer based on 15T FFE with 1T DFE. The Scope can already support 1TDFE.
The reference equalizer is a 15-tap feed-forward equalizer (FFE) and 1-tap decision-feedback equalizer (DFE), where T is the symbol
period, with equalizer coefficient constraints as shown in Table 180-15.
In table 180-15 add limits for DFE min=-0.4 max=0
see ghiasi_3dj_04_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #384.

---

*Cl* **181** *SC* **181.9.5** *P* **471** *L* **35** # 345

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) taps*

Contribution https://www.ieee802.org/3/dj/public/25_05/chayeb_3dj_01_2505.pdf showed that for some weired FFE setting still one may have compliant TDECQ but BER can degrade with this 100G DSP likley due to timing recovery

*SuggestedRemedy*

Contribution https://www.ieee802.org/3/dj/public/24_07/ghiasi_3dj_02a_2407.pdf with data from several suppliers was used to set the limits for TDECQ. Limiting the taps can result in many good modules and we are not sure given that we have link training if this type of problem still exist for weired transmitter FFE settigns. Any limit on TDECQ FFE taps must not result in failing good moduels, looking at the data in Chayeb the following tap adjsutments will have minimum impact on module yield and will address the case of weired transmitter FFE casuing receive BER floor:
Change C(1) from 0.2 to to 0.1 and add following restriction Max C(1)-C(-1) taps=0.4
Other improvements are is to use Block TDECQ and functional hardware receiver
see https://www.ieee802.org/3/dj/public/25_05/ghiasi_3dj_03a_2505.pdf
see ghiasi_3dj_03_2507

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #343.

*Cl* **182** *SC* **182.5.12** *P* **487** *L* **41** # 196

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *mon) DATA/TRAINING mode*

While it is clear what "DATA mode" is intended to mean here in the context of ILT, that term has specific meaning for 1000BASE-T PHYs that differs from what is intended here (see 1.4.278) Annex 178B.5 indicates that in the context of ILT, "data mode" means the variable tx_mode has the value 'data', which is associated with being in the PATH_UP state per figure 178B-8. As such, it would be more clear if the text in 182.5.12 referred to the PATH_UP state.

*SuggestedRemedy*

Change "coordinate the transition to DATA mode." to "coordinate the transition to the PATH_UP state (see Figure 178B-8)."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #191.

*Cl* **182** *SC* **182.7.1** *P* **487** *L* **9** # 490

Kimber, Mark — Semtech

*Comment Type* **TR** *Comment Status* **R** *(Optical) Ceq*

Over equalizing transmitters can cause BER floor issues as shown in kimber_3dj_01a_2505. Keeping Ceq > 1 (0dB) helps to prevent Tx peaking.

*SuggestedRemedy*

Add additional specification line after TECQ specification.
Noise Enhancement Factor, Ceq (min) 1

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #491.

*Cl* **182** *SC* **182.7.1** *P* **488** *L* **45** # 29

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

For TX commonality, the minimum TX launch power and OMA must be increased by 0.2dB to align DRn-2 TX launch power with the new values for 500m DRn TX in Table 180-7 as discussed in consensus presentation johnson_3dj_01_2505.

*SuggestedRemedy*

In Table 182-7, make the following changes:
1. Change Average launch power, each lane (min) from -3.3 dBm to -3.1 dBm.
2. Change Outer Optical Modulation Amplitude (OMAouter), each lane (min) from -0.3 dBm to -0.1 dBm, and from -1.2 + max(TECQ,TDECQ) to -1 + max(TECQ,TDECQ).
3. Change footnote (b) to read: "An average launch power of -3.1 dBm corresponds to an OMA of -0.1 dBm with an infinite extinction ratio."

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **182** *SC* **182.7.1** *P* **489** *L* **25** # 427

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *(Common) Jitter*

Transmitter jitter specifications are required for optical PMDs. Clock jitter, especially at low frequencies, are not captured adequately by existing specifications, and should be limited by specifications to avoid correlated errors in receivers that would degrade link performance.

A presentation with more details is planned, but the suggested remedy contains a summary of the suggested changes.

*SuggestedRemedy*

Refer to my similar comment against 180.7.1, implement the corresponding changes in Clause 182, with editorial license.

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

REJECT.

This comment was WITHDRAWN by the commenter.

*Cl* **182** *SC* **182.7.1** *P* **489** *L* **36** # 30

Johnson, John Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

Figure 182-3 must be updated to correspond to the 0.2 dB increase in OMAouter(min) in Table 182-7.

*SuggestedRemedy*

Update the OMAouter(min) curve in Figure 182-3 to correspond to the updated values -0.1 dBm and 1 + max(TECQ,TDECQ), with editorial license.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **182** *SC* **182.7.2** *P* **490** *L* **20** # 31

Johnson, John Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

The minimum RX receive power must be increased by 0.2 dB (RX power) and 0.3 dB (RX sensitivity) to account for the changes in MPI+DGD penalty allocation in Table 182-9, as discussed in consensus presentation johnson_3dj_01_2505.

*SuggestedRemedy*

In Table 182-8, make the following changes:
1. Change Average receive power, each lane (min) from -7.3 dBm to -7.1 dBm.
2. Change Receiver sensitivity (OMAouter), each lane (max) from -4.7 dBm to -4.4 dBm, and from -5.6 + TECQ to -5.3 + TECQ.
3. Change Stressed receiver sensitivity (OMAouter), each lane (max) from -2.2 dBm to -1.9 dBm.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **182** *SC* **182.7.2** *P* **491** *L* **3** # 32

Johnson, John Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

Figure 182-4 must be updated to correspond to the 0.3 dB increases in OMAouter in Table 182-8.

*SuggestedRemedy*

Update the Receiver sensitivity (OMAouter) curve in Figure 182-4 to correspond to the updated values in Table 182-4, with editorial license.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **182** *SC* **182.7.3** *P* **491** *L* **30** # 28

Johnson, John Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

The allocation for MPI and DGD penalties of 0.4 dB is too large. It should be reduced to 0.1 dB for MPI and 0.2 dB for DGD per consensus presentation johnson_3dj_01_2505.

*SuggestedRemedy*

In Table 182-9, make the following changes:
1. Change Allocation for penalties (for max TDECQ) from 3.8 dB to 3.7 dB
2. Change Power budget (max TDECQ) from 7.8 dB to 7.7 dB
3. Replace footnotes b, c and d with new footnotes b and c following the form of Table 180- 9, with changes appropriate to CL 182, as given in johnson_3dj_01_2507, slide 14.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **182** *SC* **182.7.3** *P* **491** *L* **33** # 346

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

MPI/DGP penalty of 0.4 dB would be excessive for 200GBASE-DR1-2/400GBASE-DR2-2/800GBASE-DR4-2/1.6TBASE-DR8-2

*SuggestedRemedy*

The BS/CD MPI penalty were evaluated with ER of 5 dB which is too high for 200G Si MZM. Analysis need to be based on SER of 9.6E-3, with half the loss at mid-span, and ER=3.5, see https://www.ieee802.org/3/dj/public/25_05/ghiasi_3dj_01b_2505.pdf and https://www.ieee802.org/3/dj/public/25_05/johnson_3dj_01a_2505.pdf
Given that double link with 8 discrete reflectance -55 dB and -45 dB MPI penalty is 0.09 dB of MPI penalty with addtion of ~0.18 dB, or with ~ 0.3 dB total penalty instead of current 0.5 dB.
Require following adjsutments:
Table 182-9 power budget decreases from 7.8 dB to 7.6 dB
Table 182-7 average launch power increases from -3.3 dBm to -3.1 dBm, OMA(min) increases by +0.2 dB
Table 182-8 averge receive power increases from -7.3 dBm to -7.1 dBm, Stressed sensitivity becomes -1.9 dBm, and receive sensitivity also improves by +0.3 dB
See ghiasi_3dj_02_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **182** *SC* **182.7.3** *P* **492** *L* **3** # 33

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

Figure 182-5 must be updated to correspond to the changes in OMAouter in Tables 182-7 and 182-8.

*SuggestedRemedy*

Update the Transmitter OMAouter(min) and Receiver OMAouter(max) curves in Figure 182-5 to correspond to the updated values in Table 182-7 and Table 182-8, with editorial license.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **182** *SC* **182.8** *P* **492** *L* **47** # 35

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

Channel insertion loss (max) in Table 182-10 should point to new Table 182-xx.

*SuggestedRemedy*

In Table 182-10,
1. Replace Channel insertion loss(max) value 4 dB with "See Table 182-xx".
2. Add text in CL 182.8 similar to text in CL 180.8: "The maximum value of channel insertion loss is dependent on the number and maximum value of the discrete reflectances within the channel as given in Table 182-xx. Discrete reflectances below -55 dB may be ignored when determining the supported channel insertion loss." with editorial license.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **182** *SC* **182.8.2** *P* **493** *L* **49** # 34

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

CL 182.8.2 should be rewritten to mirror the subclause structure and text in CL 180.8.2, with editorial license, including a table of maximum channel insertion loss versus the number of discrete reflections, as discussed in consensus presentation johnson_3dj_01_2505.

*SuggestedRemedy*

Make the following changes to CL 182.8.2:
1. Re-write CL 182.8.2 using the structure and text in CL 180.8.2, with editorial license.
2. Delete old Table 182-12, maximum value of each discrete reflectance.
3. Insert new Table 182-xx, Maximum channel insertion loss versus number of discrete reflectances, with the values given in johnson_3dj_01_2507, slide 15.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **182** *SC* **182.8.3** *P* **494** *L* **52** # 135

Parsons, Earl — CommScope

*Comment Type* **T** *Comment Status* **A** *(Optical) (bucket)*

The phrase "option to connect to a single fiber MDI" is incorrect since there are two fibers in that MDI.

*SuggestedRemedy*

Change "For 200GBASE-DR1, besides the option to connect to a single fiber MDI, there are two additional specified MDI optical receptacles, a single-row 12-fiber interface and a single-row 16 fiber interface."

to

"For 200GBASE-DR1, besides the option to connect to an MDI with two fibers, there are two additional specified MDI optical receptacles, a single-row 12-fiber interface and a single-row 16 fiber interface."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **182** *SC* **182.8.3** *P* **494** *L* **52** # 197

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Optical) (bucket)*

DRn-2 MDIs use pairs of fibers.

*SuggestedRemedy*

Change "...besides the option to connect to a single fiber MDI, ..." to ".besides the option to connect to a single fiber-pair MDI, ."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #135.

*Cl* **182** *SC* **182.9.5** *P* **497** *L* **41** # 383

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) TDECQ*

Current TDECQ reference equalizer is only 15 tap FFE where most implemetnation of DSPs are 20-30 taps FFE with DFE and optional MLSE. Many have raised that real receivers perform much better than reference equalizer which is a good thing, but this also leaves all the margin for RX DSP.

*SuggestedRemedy*

A reasonblae next step is to supplement the current TDECQ equalizer based on 15T FFE with 1T DFE. The Scope can already support 1TDFE.
The reference equalizer is a 15-tap feed-forward equalizer (FFE) and 1-tap decision-feedback equalizer (DFE), where T is the symbol
period, with equalizer coefficient constraints as shown in Table 180-15.
In table 180-15 add limits for DFE min=-0.4 max=0
see ghiasi_3dj_04_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #384.

*Cl* **182** *SC* **182.9.5** *P* **498** *L* **18** # 347

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) taps*

Contribution https://www.ieee802.org/3/dj/public/25_05/chayeb_3dj_01_2505.pdf showed that for some weired FFE setting still one may have compliant TDECQ but BER can degrade with this 100G DSP likley due to timing recovery

*SuggestedRemedy*

Contribution https://www.ieee802.org/3/dj/public/24_07/ghiasi_3dj_02a_2407.pdf with data from several suppliers was used to set the limits for TDECQ. Limiting the taps can result in many good modules and we are not sure given that we have link training if this type of problem still exist for weired transmitter FFE settigns. Any limit on TDECQ FFE taps must not result in failing good moduels, looking at the data in Chayeb the following tap adjsutments will have minimum impact on module yield and will address the case of weired transmitter FFE casuing receive BER floor:
Change C(1) from 0.2 to to 0.1 and add following restriction Max C(1)-C(-1) taps=0.4
Other improvements are is to use Block TDECQ and functional hardware receiver
see https://www.ieee802.org/3/dj/public/25_05/ghiasi_3dj_03a_2505.pdf
see ghiasi_3dj_03_2507

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #343.

*Cl* **183** *SC* **183.1** *P* **505** *L* **48** # 93

Bruckman, Leon — Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Optical) (bucket)*

Wrong singular in note c

*SuggestedRemedy*

In note c change: "If one or two 800GAUI-n is implemented"
To: "If one or two 800GAUI-n are implemented"

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **183** *SC* **183.5.12** *P* **510** *L* **33** # 198

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *mon) DATA/TRAINING mode*

While it is clear what "DATA mode" is intended to mean here in the context of ILT, that term has specific meaning for 1000BASE-T PHYs that differs from what is intended here (see 1.4.278) Annex 178B.5 indicates that in the context of ILT, "data mode" means the variable tx_mode has the value 'data', which is associated with being in the PATH_UP state per figure 178B-8. As such, it would be more clear if the text in 183.5.12 referred to the PATH_UP state.

*SuggestedRemedy*

Change "coordinate the transition to DATA mode." to "coordinate the transition to the PATH_UP state (see Figure 178B-8)."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #191.

---

*Cl* **183** *SC* **183.5.12** *P* **510** *L* **33** # 417

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **A** *(Common) ILT local_pattern*

In order to bring up a link that includes multiple ISLs, the functionality of ILT as specified by Annex 178B (specifically Figure 178B-7 and Figure 178B-8) is required across ISLs.

In PMDs that have a training protocol but it's disabled, the "quiet" and "local pattern" modes are the method of communicating the RTS to the peer. However, the local pattern is currently not defined.

*SuggestedRemedy*

Specify that PRBS31 encoded by Inner FEC as defined in 177.6.1.1 (which may be generated by the inner FEC sublayer) is the pattern used when mr_training_enable is false and tx_mode has the value local_pattern (see 178B.14.3.1).

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #416.

---

*Cl* **183** *SC* **183.7.1** *P* **512** *L* **29** # 329

Landry, Gary — Texas Instruments

*Comment Type* **E** *Comment Status* **R** *(Optical) (bucket2)*

min OMA limits for higher TECQ/TDECQ values are referenced to an equation outside the table (Eq 183-1).

*SuggestedRemedy*

To increase readability and maintain parallel structure to to other clauses (e.g., 180, 181, and 182), bring external equation into the table

*Response* *Response Status* **C**

REJECT.

Including the equation within the table would ideally improve readability and maintain consistency with clauses 180, 181, and 182.

However, the table in clause 183 has only half the space available compared to those clauses, and the equation does not fit within the current layout. Thus the equations are provided outside of the table and referenced from within the table.

*Cl* **183** *SC* **183.7.1** *P* **512** *L* **31** # 330

Landry, Gary — Texas Instruments

*Comment Type* **E** *Comment Status* **R** *(Optical) (bucket2)*

min OMA limits for higher TECQ/TDECQ values are referenced to an equation outside the table (Eq 183-2).

*SuggestedRemedy*

To increase readability and maintain parallel structure to to other clauses (e.g., 180, 181, and 182), bring external equation into the table

*Response* *Response Status* **C**

REJECT.

Including the equation within the table would ideally improve readability and maintain consistency with clauses 180, 181, and 182.

However, the table in clause 183 has only half the space available compared to those clauses, and the equation does not fit within the current layout. Thus the equations are provided outside of the table and referenced from within the table.

---

*Cl* **183** *SC* **183.7.1** *P* **512** *L* **37** # 491

Kimber, Mark — Semtech

*Comment Type* **TR** *Comment Status* **R** *(Optical) Ceq*

Over equalizing transmitters can cause BER floor issues as shown in kimber_3dj_01a_2505. Keeping Ceq > 1 (0dB) helps to prevent Tx peaking.

*SuggestedRemedy*

Add additional specification line after TECQ specification.
Noise Enhancement Factor, Ceq (min) 1

*Response* *Response Status* **U**

REJECT.

Given the changes to the reference equalizer as noted in comment #384 , there is no consensus to make a change at this time. There is more than one candidate method to address the comment.

Further work using the new reference receiver is encouraged.

---

*Cl* **183** *SC* **183.7.1** *P* **512** *L* **50** # 428

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *(Common) Jitter*

Transmitter jitter specifications are required for optical PMDs. Clock jitter, especially at low frequencies, are not captured adequately by existing specifications, and should be limited by specifications to avoid correlated errors in receivers that would degrade link performance.

A presentation with more details is planned, but the suggested remedy contains a summary of the suggested changes.

*SuggestedRemedy*

Refer to my similar comment against 180.7.1, implement the corresponding changes in Clause 183, with editorial license.

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

REJECT.

This comment was WITHDRAWN by the commenter.

---

*Cl* **183** *SC* **183.7.3** *P* **515** *L* **32** # 288

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

The footnotes in Table 183-8 must be updated to refer to the revised structure of CL 183.8.2.

*SuggestedRemedy*

In Table 183-8, make the following changes:

Replace footnotes following the form of Table 180- 9, with changes appropriate to CL 183, as given in johnson_3dj_01_2507, slide 16.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **183** *SC* **183.7.3** *P* **515** *L* **44** # 144

Lambert, Angela — Corning

*Comment Type* **E** *Comment Status* **A** *(Optical) (bucket)*

Cabled fiber attenuation and fiber attenuation are different. As noted at the footnote of other link power budget tables (i.e. Table 180-9 on p. 441 and Table 182-9 on p. 491) and in the respective Optical fiber and cable characteristics tables (in this case, Table 183-10 on page 518), this should be "Cabled optical fiber attenuation"

*SuggestedRemedy*

Change "fiber attenuation" to "cabled optical fiber attenuation"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **183** *SC* **183.8** *P* **517** *L* **24** # 287

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

Channel insertion loss (max) in Table 183-9 should point to new Tables 183-xx for FR4 and 183-yy for LR4.

*SuggestedRemedy*

In Table 183-9,
1. Replace Channel insertion loss(max) value 4 dB with "See Table 183-xx", and 6.3 dB with "See Table 183-yy".
2. Add text in CL 183.8 similar to text in CL 180.8: "The maximum value of channel insertion loss is dependent on the number and maximum value of the discrete reflectances within the channel as given in Table 183-xx for 800GBASE-FR4 and Table 183-yy for 800GBASE-LR4. Discrete reflectances below -55 dB may be ignored when determining the supported channel insertion loss." with editorial license.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **183** *SC* **183.8.2** *P* **518** *L* **26** # 286

Johnson, John — Broadcom

*Comment Type* **TR** *Comment Status* **A** *(Optical) IMDD parameters*

CL 183.8.2 should be rewritten to mirror the subclause structure and text in CL 180.8.2, with editorial license, including tables of maximum channel insertion loss versus the number of discrete reflections, as discussed in consensus presentation johnson_3dj_01_2505.

*SuggestedRemedy*

Make the following changes to CL 183.8.2:
1. Re-write CL 183.8.2 using the structure and text in CL 180.8.2, with editorial license.
2. Delete old Table 183-11, maximum value of each discrete reflectance.
3. Insert new Table 183-xx, Maximum channel insertion loss versus number of discrete reflectances for 800GBASE-FR4, with the values given in johnson_3dj_01_2507, slide 17.
4. Insert new Table 183-yy, Maximum channel insertion loss versus number of discrete reflectances for 800GBASE-LR4, with the values given in johnson_3dj_01_2507, slide 18.

Supporting editorial instructions are provided in johnson_3dj_01_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #16.

*Cl* **183** *SC* **183.9.5** *P* **522** *L* **10** # 384

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) TDECQ*

Current TDECQ reference equalizer is only 15 tap FFE where most implemetnation of DSPs are 20-30 taps FFE with DFE and optional MLSE. Many have raised that real receivers perform much better than reference equalizer which is a good thing, but this also leaves all the margin for RX DSP.

*SuggestedRemedy*

A reasonblae next step is to supplement the current TDECQ equalizer based on 15T FFE with 1T DFE. The Scope can already support 1TDFE.
The reference equalizer is a 15-tap feed-forward equalizer (FFE) and 1-tap decision-feedback equalizer (DFE), where T is the symbol
period, with equalizer coefficient constraints as shown in Table 180-15.
In table 180-15 add limits for DFE min=-0.4 max=0
see ghiasi_3dj_04_2507

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following related contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/ghiasi_3dj_04b_2507.pdf

Add a 1-tap DFE with T equal to the symbol period and with coefficient limits of 0 to 0.3.

Straw poll O-3 (decision)
I support adding a 1-tap DFE with T equal to the symbol period and with coefficient limits of 0 to 0.3 to the TDECQ reference receiver defined in Clauses 180, 181, 182, and 183.
Yes: 23
No: 10

*Cl* **183** *SC* **183.9.5** *P* **522** *L* **18** # 349

Ghiasi, Ali — Ghiasi Qunatum/Marvell

*Comment Type* **TR** *Comment Status* **A** *(Common) taps*

Contribution https://www.ieee802.org/3/dj/public/25_05/chayeb_3dj_01_2505.pdf showed that for some weired FFE setting still one may have compliant TDECQ but BER can degrade with this 100G DSP likley due to timing recovery

*SuggestedRemedy*

Contribution https://www.ieee802.org/3/dj/public/24_07/ghiasi_3dj_02a_2407.pdf with data from several suppliers was used to set the limits for TDECQ. Limiting the taps can result in many good modules and we are not sure given that we have link training if this type of problem still exist for weired transmitter FFE settigns. Any limit on TDECQ FFE taps must not result in failing good moduels, looking at the data in Chayeb the following tap adjsutments will have minimum impact on module yield and will address the case of weired transmitter FFE casuing receive BER floor:
Change C(1) from 0.2 to to 0.1 and add following restriction Max C(1)-C(-1) taps=0.4
Other improvements are is to use Block TDECQ and functional hardware receiver
see https://www.ieee802.org/3/dj/public/25_05/ghiasi_3dj_03a_2505.pdf
see ghiasi_3dj_03_2507

*Response* *Response Status* **U**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #343.

*Cl* **184** *SC* **184.2** *P* **533** *L* **4** # 199

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

It is misleading to present the reordering and deskew functions as optional. The lanes are required to be in the two flow groups (0-15 and 16-31) and deskewed to a 2-symbol boundary. In an implementation that happens to have the inner FEC immediatley next ot the PCS, this may not require any effort, because the PCS will have created the lanes in order and there won't be any skew to remove, but that doesn't make the process optional from a standardization perspective. There are always design optimizations that can be made that we don't spell out as optional functions.

*SuggestedRemedy*

Replace "If necessary, the lanes are reordered and deskewed" with "The lanes are reordered and deskewed."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **184** *SC* **184.2** *P* **533** *L* **8** # 200

Huber, Thomas Nokia

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

Missing a hyphen in the compound adjective 'BCH(126, 110) encoded'

*SuggestedRemedy*

Change to ".interleaving the BCH(126,110)-encoded flows."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change "before interleaving the BCH(126,110) encoded flows"
To: "before interleaving the encoded flows"

*Cl* **184** *SC* **184.2** *P* **533** *L* **18** # 201

Huber, Thomas Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Awkward grammar : "Convolutional interleaving and permutation are undone to restore the original lanes order".

*SuggestedRemedy*

Reword as: "Convolutional interleaving and permutation are undone to restore the original order of the lanes".

*Response* *Response Status* **C**

ACCEPT.

*Cl* **184** *SC* **184.4.1** *P* **534** *L* **5** # 202

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

It is required that the lanes be in the two flow groups and deskewed to a 2-symbol boundary. If the PCS and Inner FEC happen to be adjacent, a designer may be able to omit these functions, but that doesn't make them optional from a standardization perspective

*SuggestedRemedy*

Change "The alignment lock and deskew functions, when implemented, shall be." to "The alignment lock and deskew functions shall be ."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **184** *SC* **184.4.3** *P* **535** *L* **2** # 203

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

Figure 184-3 could be more clear. The labels "RS-FEC in" and "RS-FEC out" are really the values of the index i (mod 4). The permutation isn't doing anything with the symbols in flows 16-31 in columns 0 and 1; they stay where they are. It's the symbols in columns 2 and 3 that are changing to create symbol quartets with one symbol from each RS FEC encoder.

*SuggestedRemedy*

Replace the "RS-FEC in" and "RS-FEC out" labels with "Symbo index i mod 4". Change the left side of the figure to have one box around columns 2 and 3, rows 16-31, and a different style of box around columns 2 and 3, rows 0-15. Change the right hand side of the figure to show that the top and bottom boxes in clumns 2 and 3 from the left hand side have changed positions.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Figure 184-3 is an example as indicated in the text above it. The labels are self explanatory, replacing them may create more confusion and adding "mod 4" is not necessary since this is one example.
Change the left side of the figure to have one box around columns 2 and 3, rows 16-31, and a different style of box around columns 2 and 3, rows 0-15. Change the right hand side of the figure to show that the top and bottom boxes in columns 2 and 3 from the left hand side have changed positions.

*Cl* **184** *SC* **184.4.5** *P* **537** *L* **7** # 204

Huber, Thomas Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

m(x) should have the m in italics

*SuggestedRemedy*

Italicize the m

*Response* *Response Status* **C**

ACCEPT.

*Cl* **184** *SC* **184.4.7** *P* **537** *L* **50** # 205

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Up until this point, the index q has been used for the 32 flows within the inner FEC. It is confusing to use q here as the index for the 4 output flows of the BCH interleaver.

*SuggestedRemedy*

Choose a different index for the 4 flows of intero[]

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement with editorial license.

---

*Cl* **184** *SC* **184.4.7** *P* **537** *L* **51** # 206

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The index I should be avoided if at all possible, as it can be confused for the number 1.

*SuggestedRemedy*

Pick a different letter to use for this index.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **184** *SC* **184.5.7** *P* **543** *L* **42** # 283

Ren, Hao — Huawei

*Comment Type* **TR** *Comment Status* **R** *(Logic) FEC bin counters*

The number of Inner_FEC_codeword_error_bin_k counters can be decreased.
k = 0 should be ignored, because this counter value can be calculated from other counters.
Also in 802.3ck, k=0 is not set for RS-FEC error bin counter as in 161.6.17.

*SuggestedRemedy*

Change:
A set of k+1 32-bit counters where k = 0 to 4.
to:
A set of k 32-bit counters where k = 1 to 4.

*Response* *Response Status* **U**

REJECT.

Resolve using the response to comment #561.

---

*Cl* **184** *SC* **184.5.8** *P* **544** *L* **12** # 94

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

This section describes the deinterleaver, not the interleaver

*SuggestedRemedy*

Change: "the convolutional interleaver process" to: "the convolutional deinterleaver process"

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **184** *SC* **184.7.2.2** *P* **547** *L* **2** # 637

Law, David — HPE

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

I believe that the e DSP frame lock state diagram requests a SYM_SLIP, not a SLIP (see the SYM_SLIP state in Figure 184-9-DSP 'lock state diagram'.

*SuggestedRemedy*

Suggest that '... the SLIP requested by the DSP frame lock state ...' should be changed to read '... the SYM_SLIP requested by the DSP frame lock state ...'.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **184** *SC* **184.10** *P* **551** *L* **47** # 572

Nicholl, Shawn — AMD

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

In the "MDIO register/bit number" column of the Inner_FEC_codeword_error_bin_0 row of "Table 184-5 -- Inner FEC status variables and MDIO mapping", the MDIO bit indices are unnecessarily mentioned.

There are only 16 bits in an MDIO register, thus "15:0" is implied and does not need to be mentioned. Also, other rows (eg. test_block_error_bin_0_16p) of the same table don't include the "15:0". Also, Table 177-8 excludes the "15:0" for the exact same MDIO registers.

*SuggestedRemedy*

Propose "MDIO register/bit number" column of the Inner_FEC_codeword_error_bin_0 row of "Table 184-5 -- Inner FEC status variables and MDIO mapping", contain "1.2424," and "1.2425" on two lines.

Same comment for Inner_FEC_codeword_error_bin_1 through Inner_FEC_codeword_error_bin_4.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **184** *SC* **184.11.4.1** *P* **554** *L* **18** # 207

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The signal presented to the permutation function must have the properties that the lane grouping and deskew functions provide, so the functions are mandatory (even if some implementations may not need to perform these functions, they are not optional)..

*SuggestedRemedy*

Change the status of these items to M

*Response* *Response Status* **C**

ACCEPT.

*Cl* **185** *SC* **185.1** *P* **556** *L* **40** # 547

Maki, Jeffery — Juniper Networks

*Comment Type* **TR** *Comment Status* **R** *non) ILT coherent (bucket2p)*

Associated clause 178B-ILT is missing as Required for 800GBASE-LR1.

*SuggestedRemedy*

Add Associated clause 178B-ILT as Required for 800GBASE-LR1.

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #418.

*Cl* **185** *SC* **185.1** *P* **556** *L* **40** # 418

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *(Common) ILT coherent*

In order to bring up a link that includes multiple ISLs, the functionality of ILT as specified by Annex 178B (specifically Figure 178B-7 and Figure 178B-8) is required across ISLs. This is true regardless of the PMD type, and even if the PMD does not use a training protocol, such as 800GBASE-LR1.

In PMDs that don't have a training protocol, the "quiet" and "local pattern" modes are the method of communicating the RTS to the peer. However, the local pattern is currently not defined.

*SuggestedRemedy*

Add 178B-ILT, Required as row in Table 185-1 (as in other PMD clauses)..

Add a subclause under 185 defining the ILT functionality; it is as specified in Annex 178B, with mr_training_enable always set to false (since 800GBASE-LR1 doesn't have a training protocol). Specify that Inner FEC encoded PRBS31 test pattern defined in 184.6.1 (which may be generated by the inner FEC sublayer) is the pattern used when tx_mode has the value local_pattern (see 178B.14.3.1).

*Response* *Response Status* **U**

REJECT.

The following contributions were reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_07/ran_3dj_03a_2507.pdf
https://www.ieee802.org/3/dj/public/25_07/mi_3dj_01a_2507.pdf

Per straw poll TF-3 there is significant support for providing support for end-to-end path start-up in 802.3dj coherent PMDs.

Also, straw poll TF-4 indicates support in the direction in ran_3dj_03a_2507, but more details and consensus building required.

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

Straw poll TF-3 (directional):
I support adding support for end-to-end path start-up in 802.3dj coherent PMDs.
Yes: 33
No: 1
Abstain: 12

Straw poll TF-4 (directional):
I support the the direction of supporting end-to-end path start-up in 802.3dj coherent PMDs proposed in ran_3dj_03a_2507.
Yes: 22
No: 2
NMI: 16

Abstain: 10

---

*Cl* **185** *SC* **185.1** *P* **556** *L* **45** # 95

Bruckman, Leon — Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Optical) (bucket)*

Wrong singular in note c

*SuggestedRemedy*

In note c change: "If one or two 800GAUI-n is implemented"
To: "If one or two 800GAUI-n are implemented"

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **185** *SC* **185.3.1.3.2** *P* **560** *L* **1** # 400

Mi, Guangcan — Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **R** *mon) ILT coherent (bucket2p)*

the SIGNAL_OK of 800GABSE-LR1 is tied to Global_PMD_signal_detect, which is decided based on the optical power at the receiver. This doesn't guarantee a valid, decodable signal, as suggested by the note below the paragraph. With this definition, the parameter SIGNAL_OK doesn't bear sufficient information to help bring up the link. While the IMDD optical PMDs, by leveraging ILT, SIGNAL_OK can indicate the received signal meets the minimum requirement of communication, making it a meaningful parameter. There is no reason not to do the same in the case of LR1.

*SuggestedRemedy*

change the signal_ok definition, tie it to the state of LR1 Inner FEC, or ILT state if allowed. This comment is related to the comment regarding ILT in coherent PMDs. A contribution will be provided

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #418.

---

*Cl* **185** *SC* **185.5** *P* **560** *L* **27** # 548

Maki, Jeffery — Juniper Networks

*Comment Type* **TR** *Comment Status* **R** *mon) ILT coherent (bucket2p)*

"Inter-sublayer link training (ILT) function" is missting in "185.5 PMD functional specifications."

*SuggestedRemedy*

Add to "185.5 PMD functional specifications" a sub-subclause with approprate numbering entitled "Inter-sublayer link training (ILT) function" with text "A PMD shall provide the ILT function for a Type O1 interface, specified in Annex 178B. When the variable mr_training_enable is true, the ILT function is used to request changes to the peer transmitter state (modulation, training pattern, and precoder state), indicate the receiver state, and coordinate the transition to DATA mode."

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #418.

---

*Cl* **185** *SC* **185.5.1** *P* **561** *L* **7** # 549

Maki, Jeffery — Juniper Networks

*Comment Type* **TR** *Comment Status* **R** *mon) ILT coherent (bucket2p)*

SIGNAL_OK --> ILT and ILT --> SIGNAL_OK missing from Figure 185-3.

*SuggestedRemedy*

Add SIGNAL_OK --> ILT and ILT --> SIGNAL_OK to Figure 185-3. Add text in paragraph above stating, "The ILT function indicated in Figure 185-3 is defined in Annex 178B."

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #418.

---

*Cl* **185** *SC* **185.6** *P* **563** *L* **51** # 96

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Optical) (bucket2)*

An 800GBASE-LR1 PMD that supports 10Km is obviously complaint sinc ethis is the requirement

*SuggestedRemedy*

Change: "could operate over 10 km would meet the operating range requirement of 2 m to 10 km"
To: "could operate over 12 km would meet the operating range requirement of 2 m to 10 km"

*Response* *Response Status* **C**

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

*Cl* **185** *SC* **185.6.1** *P* **564** *L* **27** # 386

Maniloff, Eric Ciena

*Comment Type* **TR** *Comment Status* **A** *'Optical) coherent parameters*

The average launch power on ETCC should be updated to align with any updates to ETCC Max

*SuggestedRemedy*

Update the maximum ETCC value in Average Power with a value of 2.5dB

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #385.

*Cl* **185** *SC* **185.6.1** *P* **564** *L* **33** # 385

Maniloff, Eric Ciena

*Comment Type* **TR** *Comment Status* **A** *'Optical) coherent parameters*

The value of 3.4dB ETCC results in an excessively stringent requirement on the receiver. This value needs to be reduces to allow realistic receiver parameters. A supporting contribution will be presented.

*SuggestedRemedy*

Replace the 3.4dB ETCC Max Value with 2.5 dB

*Response* *Response Status* **C**

ACCEPT.

The CRG reviewed the following presentation.
https://www.ieee802.org/3/dj/public/25_07/maniloff_3dj_01_2507.pdf

Implement slide 15 with editorial license.

*Cl* **185** *SC* **185.6.1** *P* **564** *L* **50** # 398

Mi, Guangcan Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **R** *(Optical) slew rate*

The Tx laser frequency slew rate is required to be measured at the stages of pre-acquisition and post acquisition and satisify the value defined in Table 185-5, however there is no definition of the term of acquisition in the draft. Though "acquisition" is a widely used term for coherent experts, it appears out of context in this draft. It may be able to relate to some of the Inner FEC behaviour or PMA behaviour, but it could use some explanation.

*SuggestedRemedy*

add definition of acquisition in the text where Tx laser frequency slew rate is defined. Looking for help from Coherent experts here.

*Response* *Response Status* **U**

REJECT.

The suggested remedy does not provide sufficient detail to implement. See also the response to comment #389.

*Cl* **185** *SC* **185.6.2** *P* **565** *L* **30** # 387

Maniloff, Eric Ciena

*Comment Type* **TR** *Comment Status* **A** *Optical) Coherent parameters*

OIF 800LR allows a maximum Average transmitter power of -4 dB. To allow interoperability, The 800GBASE-LR1 Average receive power tolerance (max) should be set to -4 dBm

*SuggestedRemedy*

Modify Average receive power tolerance (max) to -4dBm

*Response* *Response Status* **C**

ACCEPT.

*Cl* **185** *SC* **185.8.16** *P* **571** *L* **18** # 2

Stassar, Peter — Huawei

*Comment Type* **TR** *Comment Status* **A** *(Optical) Receiver sensitivity*

The wording for the definition of Receiver Sensitivity is right from the intent but not sufficiently precise. "lowest average receiver input power at TP3 with
no link impairments" is not right. Power is independent of impairments. Also applies to 187.8.17

*SuggestedRemedy*

Change "Receiver sensitivity is an optional parameter defined as the lowest average receiver input power at TP3 with
no link impairments at which the block error ratio requirement in 185.2 is met." to "Receiver sensitivity is an optional parameter defined as the lowest average receiver input power at TP3 with
at which the block error ratio requirement in 185.2 is met. This does not have to be met in the presence of impairments from the link, which are addressed separately in the allocation for penalties in Table 185-7."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy in 185.8.16 and 187.8.17.

With editorial license.

*Cl* **185A** *SC* **185A.1** *P* **859** *L* **16** # 335

Zimmerman, George — ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **T** *Comment Status* **R** *(Optical) ETCC (bucket)*

The annex only contains a single methodology (ETCC), and it really doesn't define the parameter - it specifies the method of calculation.

*SuggestedRemedy*

Replace text of 185A.1 text with: "This annex defines the method for measuring and computing the Extended transmitter constellation closure (ETCC). The ETCC is a

*Response* *Response Status* **C**

REJECT.
While the annex currently only defines ETCC, the intent of the annex is to contain all coherent measurement methodologies that future specifications may require so we do not want to limit the scope of the annex to ETCC only.

*Cl* **185A** *SC* **185A.2.3** *P* **862** *L* **15** # 11

Pfiefle, Joerg — Keysight Technologies

*Comment Type* **T** *Comment Status* **A** *(Optical) ETCC*

Digital signal processing steps should be described in more details in order to ensure consistency of ETCC results, e.g. block-wise processing with a specified block length.

*SuggestedRemedy*

Add to the description a text similar to OIF-400ZR-03.0, Appendix C, footnote 11: "The processing is done block wise with block size N = 1000. It is possible to group multiple blocks for some of the processing steps. The processing steps should perform only the tasks mentioned in the description. Processing steps can be consolidated and changed in order but not perform any additional signal processing with the purpose of compensating for signal distortions resulting for example from CD, PMD, skews, crosstalk, etc."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace the existing 185A.2.3 Digital signal processing subclause with:

"A block diagram for the offline digital signal processing is shown in Figure 185A-4. The offline digital signal processing recovers the information bits carried by the optical signal from the four digitized data streams representing the I/Q components of the baseband of two orthogonal polarizations of the optical input signal, XI, XQ, YI, and YQ. The BER is obtained by comparing the received information bits with the original bits sent by the transmitter, which are specified and known. This processing is done in a series of steps described in 185A.2.3.1 through 185A.2.3.7.
The processing is done block wise with block size N = 1000 in a series of steps described in 185A.2.3.1 through 185A.2.3.7. It is possible to group multiple blocks for some of the processing steps. The processing steps should perform only the tasks mentioned in the description. Processing steps can be consolidated and changed in order but not perform any additional signal processing with the purpose of compensating for signal distortions resulting for example from chromatic dispersion, polarization mode dispersion, skews, and crosstalk.
This digital signal processing is then used in combination with virtual digital noise loading for ETCC calculation, which is described in 185A.2.5."

With editorial license.

*Cl* **185A** *SC* **185A.2.3** *P* **862** *L* **30** # 625

Kota, Kishore — Marvell Semiconductor

*Comment Type* **TR** *Comment Status* **A** *(Optical) ETCC*

The offline digital signal processing described in this section and Fig 185A-4. is missing a post-equalizer after the "carrier phase recovery" block which is required to allow relaxation of the :IQ Quadrature skew (max)" spec to 0.75ps in Table 185-5. The relaxed skew specification is required to allow design of lower complexity 800GBASE-LR1 modules. Without this block the ETCC calculation will result in a large penalty if the skew gets close to the max allowed value.

*SuggestedRemedy*

Add post-equalizer stage to the digital signal processing. Presentation to be provided.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed the following presentation
https://www.ieee802.org/3/dj/public/25_07/kota_3dj_01a_2507.pdf

Implement slides 5 and 6 with editorial license.

*Cl* **185A** *SC* **185A.2.3.5** *P* **863** *L* **12** # 13

Pfiefle, Joerg — Keysight Technologies

*Comment Type* **T** *Comment Status* **R** *(Optical) ETCC*

Reference equalizer misses to specify the number of taps.

*SuggestedRemedy*

Add a specified number of taps to the description. For example: "... with an adaptive 45 tap (TBC) T-spaced feed-forward equalizer ..."

*Response* *Response Status* **C**

REJECT.

The number of taps was also discussed in slides 11 and 12 of
https://www.ieee802.org/3/dj/public/25_07/kota_3dj_01a_2507.pdf.

While there was general agreement that the number of taps needs to be specified there was no agreement on 45.

*Cl* **185A** *SC* **185A.2.3.5** *P* **863** *L* **12** # 12

Pfiefle, Joerg — Keysight Technologies

*Comment Type* **T** *Comment Status* **A** *(Optical) ETCC*

Reference equalizer comprises two steps, which do not necessarily need to be combined.

*SuggestedRemedy*

Add a separate block for the polarization demultiplexing. Or add a comment stating that polarization demultiplexing may also be performed as a separate processing block.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add a second sentence "Polarization demultiplexing may be performed as a seperate processing step".

*Cl* **185A** *SC* **185A.2.4** *P* **863** *L* **28** # 14

Pfiefle, Joerg — Keysight Technologies

*Comment Type* **T** *Comment Status* **A** *(Optical) ETCC*

Effective number of bits (ENOB) specification needs further details to be meaningful. There is a standard, which defines ENOB and how to measure it: IEEE Standard 1241-2023. This standard requires that the "amplitude and frequency at which the measurement was made shall be specified.". Therefore, it is also needed to specify the amplitude of the sine wave, which may also be translated to a percentage of the full-scale of the ADC, and the frequency.

*SuggestedRemedy*

Add a citation to IEEE Standard 1241-2023, Section 9.4.
Add the sine wave amplitude and frequency information for which the specified value shall be achieved.
Propose to specify the amplitude as 90% of the full-scale of the ADC and the frequency as at least 10 evenly spaced values between DC and the 3-dB bandwidth (according to Table 185A-1). The final ENOB number is then the average of these points.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add a new second paragraph to 185A.2.4.1 ENOB

"ENOB can be measured using sine waves as described in IEEE Standard 1241-2023, Section 9.4 provided that the amplitude and frequency of the sine wave used for the measurement are specified. Here, the ENOB is calculated from at least 10 measurements with sine waves at frequencies that are spaced equally across the specified 3-dB bandwidth as per Table 185A-1 and with an amplitude corresponding to 90% utilization of the full-scale of the ADC. The final ENOB number is then the average of the individual points."

With editorial license.

*Cl* **185A** *SC* **185A.2.5.2** *P* **865** *L* **39** # 337

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **T** *Comment Status* **A** *(Optical) (bucket)*

The required signal to noise ratio (in general) is not what is in equation 185A-2. Equation 185A-2 is the Required signal to noise ratio in the presence of virtual ASE. (RSNR_ase) not just RSNR.

*SuggestedRemedy*

change "required signal to noise ratio (RSNR)" to "required signal to noise ratio in the presence of virtual ASE (RSNR_ase)" at line 39

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **185A** *SC* **185A.2.5.2** *P* **865** *L* **46** # 338

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **E** *Comment Status* **A** *(Optical) (bucket)*

DeltaRSNR_trx doesn't relate to "RSNR" in equation 185A-3, it relates to RSNR_ASE.

*SuggestedRemedy*

Change RSNR to RSNR_ase at line 46

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **185A** *SC* **185A.2.5.2** *P* **866** *L* **7** # 525

Dudek, Mike Marvell

*Comment Type* **E** *Comment Status* **A** *(Optical) (bucket)*

Unnecessary duplication of "waveforms"

*SuggestedRemedy*

Delete "as waveforms"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change
"captured waveforms as waveforms as described in Figure 185A-5"
to
"captured waveforms as described in Figure 185A-5"

---

*Cl* **186** *SC* **186** *P* **579** *L* **1** # 208

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) ER1 loopback*

This clause is missing information on loopbacks

*SuggestedRemedy*

Add a subclause for loopbacks that is aligned to what is in OIF 800ZR

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slides #48-50 of the editorial presentation at:
https://www.ieee802.org/3/dj/public/25_07/nicholl_3dj_01_2507.pdf

There is consensus to add host side TX and media side RX loopbacks.

Add host TX loopback from "RS-FEC decode" to "RS-FEC encode". Add media RX loopback from "FEC deinterleave and decode" to "FEC encode and interleave".

Add subclause 186.2.5 to describe these two loopbacks. Add appropiate management variables and PICS.

Implement with editorial license.

---

*Cl* **186** *SC* **186.2.1** *P* **582** *L* **4** # 209

Huber, Thomas Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

In the second sentence, clarify "800GBASE-ER1 FEC" is referring to the sublayer rather than the ER1 FEC code.

*SuggestedRemedy*

Change "800GBASE-ER1 FEC" to "800GBASE-ER1 FEC sublayer". This should be applied throughout the subclause.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license

*Cl* **186** *SC* **186.2.1** *P* **582** *L* **19** # 210

Huber, Thomas Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The "8 lanes" should not be called lanes since they are not an interface between two sublayers.

*SuggestedRemedy*

Change 8 lanes to "8 ER1 FEC flows" throughout the paragraph and in the last paragraph of this subclause This change also needs to be made in 186.2.3.2, 186.2.3.3, Figure 186-7, and perhaps other places

*Response* *Response Status* **C**

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

*Cl* **186** *SC* **186.2.1** *P* **582** *L* **23** # 211

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The interface between the FEC and PMA sublayers is FEC codewords, not symbols.

*SuggestedRemedy*

Delete "as a stream of symbols" from the end of the last sentence of the 3rd-to-last paragraph.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **186** *SC* **186.2.1** *P* **582** *L* **30** # 212

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The interface between the FEC and PMA sublayers is FEC codewords, not digitized DP16QAM symbols.

*SuggestedRemedy*

Change the second clause of the second sentence from: ". the 800GBASE-ER1 FEC synchronization process accepts a stream of m-bit digitized DP-16QAM symbols via the PMA:IS_UNITDATA.indication primitive and forms a stream of ER1 FEC codewords"
to
". the 800GBASE-ER1 FEC synchronization process accepts a stream of FEC codewords in the form of m-bit digitized bitstreams representing the four components of DP-16QAM symbols."

*Response* *Response Status* **C**

ACCEPT.

*Cl* **186** *SC* **186.2.2** *P* **582** *L* **47** # 213

Huber, Thomas Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The text here says the UNITDATA parameter is a symbol, whereas 186.3.2 says it is FEC codewords

*SuggestedRemedy*

Since the PMA includes the Gray coding and symbol mapping processes, it makes more sense to describe the service interface to the PMA as FEC codewords. Change tx_symbol and rx_symbol to tx_codeword and rx_codeword, respectively.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **186** *SC* **186.2.3.3** *P* **584** *L* **24** # 97

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) ER1 pad bits*

In Figure 186-4 it is hard to identify the 5 bits of pad

*SuggestedRemedy*

In Figure 186-4 label the 5 bits of pad in the payload area

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

It is hard to distinguish the first 5-bit field from the rest of the payload.

Shade the small 5-bit field that starts the payload area to make it more visible. Make similar changes to other figures with the same fields.

Implement with editorial license.

*Cl* **186** *SC* **186.2.3.3** *P* **584** *L* **42** # 214

Huber, Thomas Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) ER1 pad bits*

The description of the purpose of the pad could be more clear. The idea is that the 5 pad bits create a payload area that is an integer number of 257b blocks.

*SuggestedRemedy*

Change "This aligns the encoded MAC frames to 257-bit boundaries." to "This creates an integer number of 257-bit positions within the payload area of the 800GBASE-ER1 tributary frame."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #98.

*Cl* **186** *SC* **186.2.3.3** *P* **584** *L* **47** # 98

Bruckman, Leon — Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Logic) ER1 pad bits*

The contents of the 5 bits of pad during test are ambigous. Are these bits removed or do they carry test data ? This is defined later on in section 186.2.3.12, but better have it clear from the beginning

*SuggestedRemedy*

Change: "there is no 5-bit pad following the OH field"
To: "the 5-bit pad following the OH field carry test data"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Combine items 4 and 5 and enhance the text as follows:
4) The remaining 3865 bits of row 0, plus all bits in rows 1 through 127, comprise the payload area of the frame. When the transmit function is in normal mode, the first 5 bits are padding bits (transmitted as zero), and the remaining bits are treated as 2555 blocks of 257 bits each. When the transmit function is in test pattern mode, the entire payload area carries the test pattern data.

Implement with editorial license.

*Cl* **186** *SC* **186.2.3.4.1** *P* **586** *L* **28** # 215

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The AM field is defined in G.709.1, but the values used in it are in G.709.6 (as indicated in the normative text of this clause).

*SuggestedRemedy*

Change the note to say "Recommendation ITU_T G.709.1, Recommendation ITU-T G.709.6, and OIF-800ZR-01.0"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **186** *SC* **186.2.3.4.1** *P* **586** *L* **34** # 216

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The EOH field is defined in G.709.1 rather than G.709.6

*SuggestedRemedy*

Change G.709.6 to G.709.1.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **186** *SC* **186.2.3.5.5** *P* **588** *L* **14** # 217

Huber, Thomas — Nokia

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

The non-zero values of MAP are bytes 6 and 7 of the first row, not 6 and 8

*SuggestedRemedy*

Change "byte 8" to "byte 7"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **186** *SC* **186.2.3.5.9** *P* **589** *L* **2** # 99

Bruckman, Leon — Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Text in this paragraph can be improved

*SuggestedRemedy*

Change: "the test pattern is generated using the clock for the 800GBASE-ER1 tributary frame"
To "the test pattern is generated using the same clock as the one used to generate the 800GBASE-ER1 tributary frame"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the text to read "... the test pattern and 800GBASE-ER1 tributary frame are generated from the same clock"

*Cl* **186** *SC* **186.2.3.5.10** *P* **589** *L* **10** # 100

Bruckman, Leon — Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Missing "the"

*SuggestedRemedy*

Change: "by 800GBASE-ER1 FEC" to "by the 800GBASE-ER1 FEC"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **186** *SC* **186.2.3.5.10** *P* **590** *L* **14** # 242

Gorshe, Steve — Microchip Technology

*Comment Type* **TR** *Comment Status* **A** *(Logic) (bucket)*

Why are there 4 Stuff blocks at the beginning of the row 1 payload area in Figure 186-7? The GMP word size (granularity) in each 800GBASE-ER1 frame is one 257-bit block. As shown in Table 186-1, the first block of each 800GBASE-ER1 frame will be a GMP stuff word. Since each of the 8 lanes are mapped into their own 800GBASE-ER1 frame, and GMP mapping is performed per lane, there should be a single stuff block in the first row of Figure 186-7.

*SuggestedRemedy*

If this comment is correct, Figure 186-7 should be modified to begin the payload area with a single stuff block. If the four stuff blocks are correct, an explanation should be added to explain why.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The comment is correct.
Update the figure to show a single stuff block at the start of the multiframe

---

*Cl* **186** *SC* **186.2.3.8** *P* **591** *L* **52** # 264

Wang, Xuebo — Huawei

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

"OBFG84" should be changed to "OFBG84" as OFBG is the abbreviation of OFEC block group in ITU-T G709.6.

*SuggestedRemedy*

Change "OBFG84" to "OFBG84".

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **186** *SC* **186.2.4.1** *P* **594** *L* **9** # 265

Wang, Xuebo — Huawei

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The number 344064 should be 172032. Each DP-16QAM symbol represents 8 bits, then 1376256 bits should correspond to 172032 DP-16QAM symbols.

*SuggestedRemedy*

Change "344064" to "172032".

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **186** *SC* **186.2.4.4** *P* **594** *L* **16** # 326

Brown, Matt — Alphawave Semi

*Comment Type* **TR** *Comment Status* **A** *(Logic) ER1 error monitoring*

For the 800GBASE-ER1/ER1-20 PMD the error ratio specifications are defined in 187.2 as being a CRC error ratio. In order to measure this a set of counters are required.

*SuggestedRemedy*

Define a set of two counters as follows:
a count of all CRC32 blocks processed
a count of all CRC32 blocks in which error are detected
Add the new counters to the list of status registers in 187.11 and define the registers in Clause 45.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The suggested remedy suggests adding status registers in 187.11, but this appears to be a typo, and should refer to clause 186.

Define the counters as suggested. Add them to the list of status registers in 186.7.1, and in clause 45.

[Editor's note: CC 45 186]

---

*Cl* **186** *SC* **186.2.4.4** *P* **594** *L* **51** # 451

He, Xiang — Huawei

*Comment Type* **TR** *Comment Status* **A** *(Logic) ER1 error monitoring*

A new subclause defining FEC degrade behavior for ER1 and ER1-20 should be added. FEC degrade is intended to warn the degradation before a failure, not until oFEC is unable to correct all errors and caught by CRC32.

*SuggestedRemedy*

Reuse the methodology in OIF 800ZR IA, 4.7.3 and 4.7.4. Define at least one BER level lower than the FEC threshold as the degrade threshold.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Separate current 186.2.4.4 into two level-5 subclauses, one that concerns the CRC-32 and error marking (including the first paragraph), and one that concerns FEC degrade signaling (the rest of the current subclause). Change the title of 186.2.4.4 to include FEC degrade signaling. In the FEC degrade subclause, rewrite the text as proposed in the suggested remedy.

Implement with editorial license

*Cl* **186** *SC* **186.2.4.4** *P* **595** *L* **11** # 452

He, Xiang — Huawei

*Comment Type* **TR** *Comment Status* **A** *(Logic) ER1 error monitoring*

"counts the number of bit errors detected by CRC32 check" is incorrect. CRC32 can only detect errors.

*SuggestedRemedy*

Change the degrade detection method to align with OIF 800ZR IA.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #451.

*Cl* **186** *SC* **186.2.4.6.1** *P* **595** *L* **40** # 101

Bruckman, Leon — Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Strange character

*SuggestedRemedy*

Change: "multi0frame" to "multi-frame"

*Response* *Response Status* **C**

ACCEPT.

*Cl* **186** *SC* **186.2.4.6.7** *P* **596** *L* **40** # 218

Huber, Thomas — Nokia

*Comment Type* **T** *Comment Status* **A** *(Logic) ER1 OH*

While the GID, IID, and MAP fields are fixed values when connected to an 800GBASE-ER1 transmitter, they could have different values if connected to an ITU-T FlexO-8e-DO interface. As such, the receiver probably should verify that they contain the fixed values they are supposed to contain and not demap the signal if they don't.

*SuggestedRemedy*

Add text to 186.2.4.7 to indicate that the client is not demapped if the GID/IID/MAP overhead doesn't have the values that are expected. The SIGNAL_OK parameter should also depend on having a stable and correct value for these fields (as well as the payload type and multiplex structure fields).

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license

*Cl* **186** *SC* **186.2.4.9.3** *P* **597** *L* **32** # 102

Bruckman, Leon — Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Logic) (bucket)*

Inconsistent lenguage

*SuggestedRemedy*

Change: "If the alignment marker location feature is supported (FEC_alignment_marker_location_ability is set to 1) and is enabled by the FEC control variable FEC_alignment_marker_location_enable (set to 1),"
To: "If the alignment marker location feature is supported (FEC_alignment_marker_location_ability is set to 1) and is enabled (FEC control variable FEC_alignment_marker_location_enable is set to 1),"

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the text to read "If the alignment market location function is supported (FEC_alignment_marker_location_ability is set to 1) and is enabled (FEC_alignment_marker_location_enable is set to 1)"

*Cl* **186** *SC* **186.3.2** *P* **599** *L* **40** # 219

Huber, Thomas — Nokia

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

The clause describing the service interface has a large number of additional subheadings (one for each primitive, and within those, a 'semantics', 'when generated', and 'effect of receipt' subclause) compared to the FEC subclause, and compared to other service interface descriptions.in this amendment

*SuggestedRemedy*

Revise the clause to remove all the subheadings, most of which have only one or two sentences in them. Align the overall structure with what is in 186.2.2.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Remove level 4 and level 5 headings throughout subclause 186.3.2, and update the text that remains to align with the style of service interface specification for other PMA layers (e.g. ,173, 176).
Implement with editorial license.

*Cl* **186** *SC* **186.3.3.2** *P* **602** *L* **51** # 267

Wang, Xuebo — Huawei

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

"mfas<0:21>" should be changed to "faw<0:21>", as it is shortened from multi-frame alignment word per CL186.3.3.5.

*SuggestedRemedy*

Change "mfas<0:21>" to "faw<0:21>".

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **186** *SC* **186.3.3.2** *P* **603** *L* **9** # 268

Wang, Xuebo — Huawei

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

"S<7023:7075>" should be changed to "S<7013:7075>". Each 800GBASE-ER1 PMA frame contains 114 rows of 64 symbols per Line 46 on Page 602 in CL186.3.3.2. S<7013:7075> consists of the 63 payload symbols of row 113 leaded by the pilot symbol P113.

*SuggestedRemedy*

Change "S<7023:7075>" to "S<7013:7075>".

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **186** *SC* **186.4.2.1** *P* **610** *L* **35** # 636

Law, David — HPE

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

I believe that the FAW field lock state diagram requests a FAW_SLIP, not a SLIP (see the FAW_SLIP state in Figure 186-16 '800GBASE-ER1 PMA FAW field lock state diagram'.

*SuggestedRemedy*

Suggest that '... the SLIP requested by the FAW field lock state ...' should be changed to read '... the FAW_SLIP requested by the FAW field lock state ...'.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **186** *SC* **186.4.3** *P* **618** *L* **17** # 661

Law, David — HPE

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

Since Figure 186-18 is the '800GBASE-ER1 FEC FAM field lock state diagram', it seems that:

[1] The condition from the GET_BLOCK state to the FIND_1ST state should be test_fam.
[2] The condition from the INVALID_FAM state to the 5_BAD state should be fam_bad_count = 5.
[3] The condition from the COMP_2ND state to the 2_GOOD state should be fam_match.

*SuggestedRemedy*

Change:

[1] The GET_BLOCK state to the FIND_1ST state transition condition from test_amp to test_fam.
[2] The INVALID_FAM state to the 5_BAD state transition condition from amp_bad_count = 5 to fam_bad_count = 5.
[3] The COMP_2ND state to the 2_GOOD state transition condition from amp_match to fam_match.

*Response* *Response Status* **C**

ACCEPT.

---

*Cl* **186** *SC* **186.4.3** *P* **619** *L* **9** # 662

Law, David — HPE

*Comment Type* **T** *Comment Status* **A** *(Logic) (bucket)*

The Figure 186-19 800GBASE-ER1 FEC multi-frame alignment state diagram uses the variable fec_mfas_restart, but only fec_mfas_restart_lock is defined in the associated subclause 186.4.2.1 'Variables'.

*SuggestedRemedy*

Either change the three instances of fec_mfas_restart to read fec_mfas_restart_lock in Figure 186-19, or change fec_mfas_restart_lock to read fec_mfas_restart in subclause 186.4.2.1.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Update Figure 186-19 as suggested.

*Cl* **186** *SC* **186.4.3** *P* **620** *L* **4** # 663

Law, David HPE

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Subclause 186.4.1 'State diagram conventions' says 'The notation used in the state diagrams follows the conventions of 21.5.'. Table 21-1 'State diagram operators' in subclause 21.5 defines the use of the [equal sign] character as ' Equals (a test of equality)'.

*SuggestedRemedy*

Change the five instances of the text '... == ...' in Figure 186-20 to read '... = ...'.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **186** *SC* **186.4.3** *P* **620** *L* **23** # 665

Law, David HPE

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Subclause 186.4.1 'State diagram conventions' says 'The notation used in the state diagrams follows the conventions of 21.5.'. Table 21-1 'State diagram operators' in subclause 21.5 defines the use of the [left arrow] character as the 'Assignment operator'.

*SuggestedRemedy*

Change the five instances of the use of the characters '<=' as the assignment operator in the states in Figure 186-20 '800GBASE-ER1 FEC Alignment marker location state diagram' to use the [left arrow] character.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **186** *SC* **186.4.3.** *P* **620** *L* **39** # 664

Law, David HPE

*Comment Type* **E** *Comment Status* **A** *(Logic) (bucket)*

Subclause 186.4.1 'State diagram conventions' says 'The notation used in the state diagrams follows the conventions of 21.5.'. Table 21-1 'State diagram operators' in subclause 21.5 defines the use of the [greater than or equal sign] character as 'Greater than or equal to'.

*SuggestedRemedy*

Change the text 'zero_aml_cnt >= 5' to read 'zero_aml_cnt [greater than or equal sign] 5' in Figure 186-20 '800GBASE-ER1 FEC Alignment marker location state diagram'.

*Response* *Response Status* **C**

ACCEPT.

*Cl* **186A** *SC* **186A** *P* **868** *L* **17** # 334

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **T** *Comment Status* **R** *(Logic) Test vector*

As the editor's note indicates Annex 186A doesn't have content at this time. Arguably it is informative and therefore not for technical completeness, but also, it does not appear to be referenced elsewhere in the draft, making it difficult to tell whether the material should be considered relevant to completeness.

*SuggestedRemedy*

Either include test vectors at initial WG ballot and provide some link in the normative text explaining where and how it is informative, or delete Annex 186A.

*Response* *Response Status* **C**

REJECT.
The suggested remedy will need to be taken at some point before SA ballot, but it is better to leave the annex, with the editor's note soliciting input, in the draft to remind participants of the need to contribute these test vectors.

*Cl* **187** *SC* **187.1** *P* **630** *L* **39** # 550

Maki, Jeffery Juniper Networks

*Comment Type* **TR** *Comment Status* **R** *mon) ILT coherent (bucket2p)*

Associated clause 178B-ILT is missing as Required for 800GBASE-ER1-20 and 800GBASE-ER1.

*SuggestedRemedy*

Add Associated clause 178B-ILT as Required for 800GBASE-ER1-20 and 800GBASE-ER1.

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #418.

*Cl* **187** *SC* **187.1** *P* **630** *L* **44** # 419

Ran, Adee — Cisco Systems

*Comment Type* **TR** *Comment Status* **R** *mon) ILT coherent (bucket2p)*

In order to bring up a link that includes multiple ISLs, the functionality of ILT as specified by Annex 178B (specifically Figure 178B-7 and Figure 178B-8) is required across ISLs. This is true regardless of the PMD type, and even if the PMD does not use a training protocol, such as 800GBASE-ER1 and 800GBASE-ER1-20.

In PMDs that don't have a training protocol, the "quiet" and "local pattern" modes are the method of communicating the RTS to the peer. However, the local pattern is currently not defined.

*SuggestedRemedy*

Add 178B-ILT, Required as row in Table 187-1 (as in other PMD clauses)..

Add a subclauase under 187 defining the ILT functionality; it is as specified in Annex 178B, with mr_training_enable always set to false (since 800GBASE-ER1/ER1-20 don't have a training protocol). Specify that the 800GBASE-ER1 FEC encoded PRBS31 test pattern defined in 186.2.3.12 (which may be generated by the 800GBASE-ER1 FEC sublayer) is the pattern used when tx_mode has the value local_pattern (see 178B.14.3.1).

*Response* *Response Status* **U**

REJECT.
Resolve using the response to comment #418.

*Cl* **187** *SC* **187.5** *P* **634** *L* **27** # 551

Maki, Jeffery — Juniper Networks

*Comment Type* **TR** *Comment Status* **R** *mon) ILT coherent (bucket2p)*

"Inter-sublayer link training (ILT) function" is missting in "187.5 PMD functional specifications."

*SuggestedRemedy*

Add to "187.5 PMD functional specifications" a sub-subclause with approprate numbering entitled "Inter-sublayer link training (ILT) function" with text "A PMD shall provide the ILT function for a Type O1 interface, specified in Annex 178B. When the variable mr_training_enable is true, the ILT function is used to request changes to the peer transmitter state (modulation, training pattern, and precoder state), indicate the receiver state, and coordinate the transition to DATA mode."

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #418.

*Cl* **187** *SC* **187.5.1** *P* **634** *L* **31** # 103

Bruckman, Leon — Nvidia

*Comment Type* **ER** *Comment Status* **A** *(Optical) (bucket)*

Text can be improved to be consistent with other similar PMD clauses

*SuggestedRemedy*

Change: "A block diagram for the transmit/receive paths is shown in Figure 187-3 and a block diagram of the PMD is shown in Figure 187-4." to "Thetransmit/receive paths block diagram is shown in Figure 187-3 and the PMD block diagram is shown in Figure 187-4."

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change
"A block diagram for the transmit/receive paths is shown in Figure 187-3 and a block diagram of the PMD is shown in Figure 187-4."
to
"A block diagram for the PMD transmit/receive paths is shown in Figure 187-3 and a block diagram of the PMD is shown in Figure 187-4."

*Cl* **187** *SC* **187.5.1** *P* **635** *L* **7** # 552

Maki, Jeffery — Juniper Networks

*Comment Type* **TR** *Comment Status* **R** *mon) ILT coherent (bucket2p)*

SIGNAL_OK --> ILT and ILT --> SIGNAL_OK missing from Figure 187-3.

*SuggestedRemedy*

Add SIGNAL_OK --> ILT and ILT --> SIGNAL_OK to Figure 187-3. Add text in paragraph above stating, "The ILT function indicated in Figure 187-3 is defined in Annex 178B."

*Response* *Response Status* **C**

REJECT.
Resolve using the response to comment #418.

*Cl* **187** *SC* **187.6** *P* **637** *L* **54** # 104

Bruckman, Leon Nvidia

*Comment Type* **TR** *Comment Status* **A** *(Optical) (bucket2)*

An 800GBASE-ER1 PMD that supports 40Km is obviously complaint sinc ethis is the requirement

*SuggestedRemedy*

Change: "could operate over 40 km would meet the operating range requirement of 2 m to 40 km"
To: "could operate over 45 km would meet the operating range requirement of 2 m to 40 km"

*Response* *Response Status* **C**

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

*Cl* **187** *SC* **187.6.1** *P* **638** *L* **24** # 390

Maniloff, Eric Ciena

*Comment Type* **T** *Comment Status* **A** *Optical) Coherent parameters*

The -7dBm Average launch power (max) specification for 800GBASE-ER1-20 is not required based on Rx maximum power specifications. This value can be increased with no consequences.

*SuggestedRemedy*

Increase the Average launch power (max) value for 800GBASE-ER1-20 to -5 dBm

*Response* *Response Status* **C**

ACCEPT.

*Cl* **187** *SC* **187.6.1** *P* **638** *L* **26** # 388

Maniloff, Eric Ciena

*Comment Type* **T** *Comment Status* **A** *Optical) Coherent parameters*

The methodology in 800GBASE-ER1 on defining the Average optical power specifications should be aligned with the coupling to ETCC defined in 800GBASE-LR1. A supporting contribution with details of the values for Tx optical power and ETCC max will be provided

*SuggestedRemedy*

Update the 800GASE-ER1 and 800GBASE-ER1-20 to couple the optical powers to ETCC, to use a methodology aligned with 800GBASE-LR1.

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed the following presentation.
https://www.ieee802.org/3/dj/public/25_07/maniloff_3dj_01_2507.pdf

Implement slide 16 with editorial license.

*Cl* **187** *SC* **187.6.1** *P* **638** *L* **27** # 389

Maniloff, Eric Ciena

*Comment Type* **T** *Comment Status* **R** *Optical) Coherent parameters*

The ± 1.8GHz accuracy specification in Table 187-5 is required for DWDM applications, however is note required for single-wavelength applications such as 800GBASE-ER1. This accuracy can be loosened, and depending on other requirements can still be compatible with DWDM lasers. Loosening the optical frequency accuracy spec allows additional technologies to be used for 800GBASE-ER1

*SuggestedRemedy*

Relax the accuracy spec in 800GBASE-ER1 to ± 20GHz. A supporting contribution will be provided, showing the tradeoffs with different laser implementations.

*Response* *Response Status* **C**

REJECT.

The CRG reviewed the following presentation
https://www.ieee802.org/3/dj/public/25_07/maniloff_3dj_02_2507.pdf

There is support for the approach but further work is needed.

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

*Cl* **187** *SC* **187.6.2** *P* **639** *L* **35** # 399

Mi, Guangcan Huawei Technologies Co., Ltd

*Comment Type* **TR** *Comment Status* **A** *Optical) Coherent parameters*

In the system of coherent optical specification, two parameters are introuced, the Rx. Sensitivity and the Rx AOP tolerance_min. when checking across LR1, ER1-20, and ER1 spec, it is noticed that the relation of the two parameters of ER1 was not consistent with the other two coherent PMDs. for both LR1 and ER1-20, Rx AOP min - Tx AOP min = IL and Rx Sens. - Tx AOP min = Power budget. While for ER1, Rx AOP min - Tx AOP min = Power Budget and Rx Sens. - Tx AOP min = Power budget +1, essentially offset by 1dB, same as ER1 penalty allocation.

*SuggestedRemedy*

either shift Tx AOP down by 1dB or raise the Rx Sens. & Rx AOP tolerance_min up by 1dB

*Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 187-7 change the power budget for 800GBASE-ER1 from 13 to 14 dB.

*Cl* **187** *SC* **187.8.6** *P* **643** *L* **44** # 336

Zimmerman, George ADI,APLgp,Cisco,Marvell,OnSemi,Sony

*Comment Type* **E** *Comment Status* **A** *(Optical) (bucket)*

This section says, "The method and ETCC
calculation are defined in 187.9." - but when I look at 187.9, I only find that it is computed using the test setup and calculation defined in Annex 185A. (and parameter values for the front end in Tables 187-12 and 187-13) - none of this is defines the method and calculation - it just points the reader on to another section - better point to 185A and the tables directly rather than a wild goose chase with an in between reference that just points ahead.

*SuggestedRemedy*

Change "The method and ETCC calculation are defined in 187.9." to "The method and ETCC
calculation are defined in 185A, using the parameters in the Tables 187-12 and 187-13."

*Response* *Response Status* **C**

ACCEPT.