Cl **00** *SC* **0** *P* *L* # 11

Brown, Matt — Alphawave Semi

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

The format used for defining the various status counters for the PCS (175.2.5.3), PMA (176.7.4.1), and Inner FEC (177.5.4.1, 184.5.7) vary wildly from clause to clause.
Rewrite/reformat the counter definitions in the same style.

SuggestedRemedy

Reformat the counter definitions in 175.2.5.3, 176.7.4.1, 177.5.4.1, and 184.5.7 to be the same format. Use either 175.2.5.3 ro 177.5.4.1/184.5.7 as the template.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Reformat the counter definitions on 176.7.4.1, 177.5.4.1, and 184.5.7 to use the same format as 175.2.5.3.
Implement with editorial license.
[Editor's note: CC: 176, 177, 184]

Cl **00** *SC* **0** *P* **261** *L* **47** # 273

Ran, Adee — Cisco

Comment Type **TR** *Comment Status* **A** *Management interface*

"If the MDIO Interface is not implemented, provision of an equivalent mechanism to access the variables is recommended."
This sentence is repeated in multiple clauses and annexes (14 instances).

Access to the management variables is required ("shall") if MDIO is implemented, but otherwise it is only recommended to have them accessible.

MDIO is optional but access to the management variables should be a requirement even if it is not implemented.

SuggestedRemedy

Change "provision of. is recommended" to "shall be provided", with editorial license, in all instances

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
In 175.8, 176.11, 177.10, 178.13, 179.14, 180.11, 181.11, 182.11, 184.9, 185.11, 186.7, 187.11, and 178B.15.
Change "If the MDIO Interface is not implemented, provision of an equivalent mechanism to access the variables is recommended."
To: "If the MDIO Interface is not implemented, an alternate mechanism to access management variables shall be provided."
Implement with editorial license.

Cl **00** *SC* **0** *P* **338** *L* **30** # 302

Ran, Adee — Cisco

Comment Type **T** *Comment Status* **R** *(withdrawn)*

The Skew and Skew Variation at SP2 are specified with the words "is limited to", while for all other measurement points it is specified with "shall be less than".
"is limited to" reads like an informative statement, but it is a normative requirement (it is not related to the fact that SP2 may not be accessible; the same is true for SP5).

This wording appears in multiple places in the draft (per PMD and data rate). Note that the same wording is used in multiple clauses of the base standard. If necessary, it can be dealt with in maintenance.

SuggestedRemedy

Change "is limited to" to "shall be less than" in all instances of Skew and Skew variation at SP2.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **1** *SC* **1.4.92a** *P* **53** *L* **10** # 269

Ran, Adee Cisco

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

The definition of 1.6TAUI-n includes "used for chip-to-chip or chip-to-module electrical interfaces" followed by "For chip-to-module interfaces and for chip-to-chip interfaces". This duplicity is not helpful.

Following the new descriptions introduced in the new AUI annexes, the clarity of this definition can be improved.

Similar concerns exist in the definitions of 200GAUI-n, 400GAUI-n, and 800GAUI-n.

SuggestedRemedy

Change the definition text to:
"A physical instantiation of the PMA service
interface over n lanes, enabling partitioning of a 1.6 Tb/s Physical Layer implementation across multiple devices. Specified separately for chip-to-chip and chip-to-module electrical interfaces. Two
widths of 1.6TAUI-n are defined: 16-lane (1.6TAUI-16 C2C and 1.6TAUI-16 C2M), and eight-lane
(1.6TAUI-8 C2C and 1.6TAUI-8 C2M)."

Apply corresponding changes in the definitions of 200GAUI-n, 400GAUI-n, and 800GAUI-n.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **1** *SC* **1.5** *P* **57** *L* **28** # 270

Ran, Adee Cisco

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

Abbreviations ILcd and ILdc are also used, and should be defined.

SuggestedRemedy

Add definitions for ILcd and ILdc.

Proposed Response *Response Status* **Z**

PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.

Cl **45** *SC* **45.2.1** *P* **70** *L* **7** # 272

Ran, Adee Cisco

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

Inner FEC registers are contained in the PMA/PMD section but there is no reference to the inner FEC positioning in the stack, nor to the clauses where it is defined (177 and 184).

SuggestedRemedy

Add test describing the inner FEC MDIO positioning (in the same MMD as the PMD).

Response *Response Status* **C**

REJECT.
There is precedence for having FEC control and status registers in the PMA/PMD address space and the postioning of this FEC functionility is not called out in 45.2.1. There is no justification for making an exception for the inner FEC registers.

Cl **45** *SC* **45.2.1** *P* **70** *L* **7** # 271

Ran, Adee Cisco

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

The base text of 45.2.1 includes references to multiple PMA sublayers and how MMD addresses are allocated.
This text points to 83.1.4, 109.1.4, and 120.1.4, but does not include the corresponding references to the new PMAs: 173.1.4 (apparently missed by 802.3df) and 176.11.

SuggestedRemedy

Bring in the first paragraph of 45.1.2 and add references to 173.1.4 and 176.11.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Bring in the first paragraph of 45.2.1 from the base standard and add references to 173.1.4 and 176.1.5

Cl **45** *SC* **45.2.1.213a** *P* **92** *L* **13** # 6

Marris, Arthur Cadence Design Systems

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

Replace the 8 enable bits with a single reset bit in Table 45-177a

SuggestedRemedy

In Table 45-177a delete rows "Inner FEC enable lane 1" to "Inner FEC enable lane 7" and in the row for "1.2400.0" change "enable" to "reset"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #1.

Cl **45** *SC* **45.2.1.213a** *P* **92** *L* **14** # 91

Nicholl, Shawn AMD

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

Description column of fields in "Table 45-177a - Inner FEC control register bit definitions" is inconsistent with other MDIO registers.

SuggestedRemedy

Propose the following text for the description column of 1.2400.7 row:
1 = Enable Inner FEC on lane 7
0 = Disable Inner FEC on lane 7

Propose similar update to description column of 1.2400.0 through 1.2400.6 rows.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #1.

Cl **73** *SC* **73.5.1** *P* **118** *L* **38** # 547

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **D** *AN DME swing*

The ancient "DME electrical characteristics" table needs updating. Compare the proposed default preset to start training: 800 to 1000 *0.75 +/-0.025 which is 580 to 775 mV, the traditional C2M max, 900 mV, and the XLPPI max, 850 mV.

SuggestedRemedy

Bring Table 73-1, DME electrical characteristics, into the draft. It contains:
Transmit differential peak-to-peak output voltage 600 to 1200 mV
Receive differential peak-to-peak input voltage 200 to 1200 mV.
Add two more rows, for anything capable of 200G/lane:
Transmit differential peak-to-peak output voltage 600 to 900 mV
Receive differential peak-to-peak input voltage 200 to 1000 mV.
Recommend that new product should comply to the newer limits, except product that only does 1000BASE-KX and/or 10GBASE-KX4 whose output should be 600 to 1000 mV (so they don't have to change voltage swing when going from AN to regular mode - their min is 800 mV). If the recommendation has to go through maintenance, add an editor's note "It has been proposed that" to gather feedback and build consensus.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The following related contribution was reviewed by the task force at a previous ad hoc meeting:
https://www.ieee802.org/3/dj/public/adhoc/optics/0125_OPTX/simms_3dj_optx_02_250109.pdf

It proposes only to limit the transmitter swing to 1000 mV for all PHY types. However, this would be out of scope for this project. It would have to be limited to implementations supporting PHYs defined in this project. Changing the receiver maximum limit to match would have to be conditional upon operating only with other devices which support PHYs defined in this project.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/adhoc/optics/0125_OPTX/simms_3dj_optx_02a_250109.pdf

Implement the changes on slide 4 of simms_3dj_01_2501 except.

State that for the transmit maximum value of 1000 mV applies only to implementations that support PHYs defined in 802.3dj.

State that for the receive maximum value of 1000 mV applies only to the case where the implement is intended to support *only* PHYs defined in 802.3dj.

Cl **73** *SC* **73.6.2.5.3** *P* **122** *L* **46** # 92

Nicholl, Shawn AMD

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

The paragraph that begins "The variable an_rs_fec_int_negotiated_control indicates that RS-FEC-Int ..." is located in the incorrect sub-clause.

SuggestedRemedy

Propose to move the paragraph such that it is inserted after the second paragraph of 73.6.2.5.4 (consistent with editorial guidance found in 802.3ck-2022, Sub-Clause "73.6.5.3 FEC control variables").

Response *Response Status* **C**

ACCEPT.

Cl **73** *SC* **73.6.4** *P* **125** *L* **25** # 93

Nicholl, Shawn AMD

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

Currently says "D[10:0] and D[47:16] contains the Unformatted Code Field ...", but should use the singular verb.

SuggestedRemedy

Propose "D[10:0] and D[47:16] contain the Unformatted Code Field"

Response *Response Status* **C**

ACCEPT.

Cl **73** *SC* **73.8** *P* **128** *L* **21** # 94

Nicholl, Shawn AMD

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

Typo mr_lp_adv_extened_ability[32:1] in "Table 73-6-Backplane Ethernet Auto-Negotiation variable to MDIO register mapping"

SuggestedRemedy

Propose mr_lp_adv_extended_ability[32:1]

Response *Response Status* **C**

ACCEPT.

Cl **73** *SC* **73.10.2** *P* **130** *L* **14** # 546

Dawe, Piers Nvidia

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

This is contrary to the standard order (slow to fast).

SuggestedRemedy

Put the new entry immediately below the 100G/lane one. As the base document is out of order and this project amendment cannot deliver a properly ordered table without cleaning it up, bring the other two link_fail_inhibit_timer rows into the draft and put them in the right order.

Response *Response Status* **C**

REJECT.
This would be best addressed at the revision project to create the updated base standard. Bringing in additional rows not relevant to 802.3dj scope would not be useful.

Cl **73** *SC* **73.10.2** *P* **130** *L* **15** # 545

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **D** *AN/ILT time-out*

According to 178B.14.2.1, there should be no time limit

SuggestedRemedy

Change the two "TBD" to infinity

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #131.

Cl **73** SC **73.10.2** P **130** L **16** # 131

Slavick, Jeff Broadcom

Comment Type **TR** *Comment Status* **D** *AN/ILT time-out*

TBD needs to be filled in.

SuggestedRemedy

Set link fail inhibit timer to be 15 to 15.1s

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_01/slavick_3dj_01_2501.pdf

<response>

Implement the changes on slide 13 of slavick_3dj_01_2501 using a value of ??? +/- ??? for the max_wait_timer duration.

Others?

Cl **73** SC **73.10.2** P **130** L **16** # 184

Brown, Matt Alphawave Semi

Comment Type **T** *Comment Status* **D** *AN/ILT time-out*

Value for link_fail_inhibit_timer is TBD. Need value.

SuggestedRemedy

Expect a contribution with proposals.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #131.

Cl **73A** SC **73A.1a** P **640** L **40** # 97

Nicholl, Shawn AMD

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

Currently says "... indicates additional abilities that were not accommodated in the link codeword Base Page ..." Present tense seems more appropriate.

SuggestedRemedy

Propose "... indicates additional abilities that are not accommodated in the link codeword Base Page ..."

Response *Response Status* **C**

ACCEPT.

Cl **116** SC **116.1.4** P **138** L **18** # 114

Slavick, Jeff Broadcom

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

Table 116-3b has a thick bar on the right side of clause 73 M

SuggestedRemedy

adddress the formatting issue

Response *Response Status* **C**

ACCEPT.

Cl **116** SC **116.3.3.4.1** P **150** L **12** # 152

Bruckman, Leon Nvidia

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

Missing comma

SuggestedRemedy

To make consistent with the text in the previous section penumtimate paragph, add a comma before: but it is considered.
Or delete the coma in the previous section penumtimate paragph, wathever makes sense grammatically.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
On page 149 line 27 delete comma preceding " but it is considered".

Cl **116** SC **116.4** P **150** L **52** # 24

Brown, Matt Alphawave Semi

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

Delay limits for the 200GBASE-R Inner FEC are TBD in Table 116-6 but are indeed defined in 177.7.

SuggestedRemedy

Update Table 116-6 with the delay numbers specified in 177.7.

Response *Response Status* **C**

ACCEPT.

Cl **116** *SC* **116.4** *P* **151** *L* **49** # 25

Brown, Matt — Alphawave Semi

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

Delay limits for the 400GBASE-R Inner FEC are TBD in Table 116-7 but are indeed defined in 177.7.

SuggestedRemedy

Update Table 116-7 with the delay numbers specified in 177.7.

Response *Response Status* **C**

ACCEPT.

Cl **119** *SC* **119.3** *P* **162** *L* **33** # 14

Brown, Matt — Alphawave Semi

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

Error bin counters are provided for 800GBASE-R and 1.6TBASE-R PCS but not for the 200GBASE-R or 400GBASE-R PCS. These counters are needed for accurate testing of a PHY receive path per 174A.7.

SuggestedRemedy

In Clause 119 add bin counters FEC_codeword_error_bin_i as defined in 172.3.6 stating that these counters are optional if the PCS is used in a PHY that includes 200 Gb/s per lane PMD.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
In addition to bin counters FEC_codeword_error_bin_i as defined in 172.3.6, also add FEC_cw_counter as defined in 172.3.5. Since these counters are already optional in Clause 172, there is no need to restrict the optionality to " PHYs that includes 200 Gb/s per lane PMD"
Implement with editorial license.

Cl **120B** *SC* **120B** *P* **642** *L* **1** # 427

Dudek, Mike — Marvell

Comment Type **TR** *Comment Status* **D** *COM (bucket)*

The response to comment 152 on draft D1.2 was not fully implemented. 200GAUI-8 C2C Annex 120B is also listed in tables 178-1 as an allowed optional interface for 200GBASE-KR etc. but it has the same problem as Annex 120D had with an allocated BER of 1e-5 whereas the Phy only allocates 6.7e-6 to the C2C interface when using the 200GAUI-1 C2M interface

SuggestedRemedy

Bring Annex 120B into 802.3dj and add an equivalent modification to the Channel COM test as has been done to Clause 120D for D1.3 with Case 1 And Case 2 and the same DER0 values for 200GAUI-8 and 400GAUI-16

Proposed Response *Response Status* **W**

PROPOSED REJECT.
Annex 120B specifies receiver characteristics with maximum PCS FEC symbol error ratio of 1.1e-5 (consistent with BER<1e-6), transmitter characteristics with probability 1e-6, and COM with DER0=1e-6.
These specifications result in maximum BER lower than the 6.7e-6 allocated for other C2C interfaces, so there is no need to change the COM parameters.

Cl **120F** *SC* **120F.1** *P* **645** *L* **53** # 428

Dudek, Mike — Marvell

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

The reference to 120F.4 should be a hot link as this is changed in 802.3dj

SuggestedRemedy

Make it so.

Response *Response Status* **C**

ACCEPT.

Cl **120F** *SC* **120F.1** *P* **646** *L* **9** # 429

Dudek, Mike — Marvell

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

The reference to 135F.3.2.1 is not correct. That subsection is about Receiver Signalling rate.

SuggestedRemedy

Change the reference to 135F.5

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **169** *SC* **169.2.4** *P* **172** *L* **50** # 42

Huber, Thomas Nokia

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

This clause should include a reference to the 800GBASE-ER1 PMA

SuggestedRemedy

Add a sentence: The 800GBASE-ER1 PMA is specified in clause 186.3

Response *Response Status* **C**

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

Cl **169** *SC* **169.2.10** *P* **173** *L* **45** # 153

Bruckman, Leon Nvidia

Comment Type **TR** *Comment Status* **A** *(bucketp)*

ILT provides a mechanism to control the modulation, not the module. Also ILT coordinates transition to DATA mode.

SuggestedRemedy

Change: "For each ISL, ILT provides a mechanism for a receiver to control transmitter states, such as equalization, module, and precoding states on the link partner transmitter, and to indicate the receiver state."

To: "For each ISL, ILT provides a mechanism for a receiver to control transmitter states, such as equalization, modulation, and precoding states on the link partner transmitter, to indicate the receiver state, and to coordinate transition to DATA mode."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
In 169.2.10:
Change: "For each ISL, ILT provides a mechanism for a receiver to control transmitter states, such as equalization, module, and precoding states on the link partner transmitter, and to indicate the receiver state."

To: "For each ISL, ILT provides a mechanism for a receiver to control transmitter states, such as equalization, modulation, and precoding states on the peer transmitter, to indicate the receiver state, and to coordinate transition to DATA mode."

A similar wording change is needed in Clause 174.2.12 and 116.2.9.

In the context of ILT, the term "link partner" should be changed to "peer" in all 802.3dj clauses.

Implement with editorial license.

[Editor's note: CC 116 174 169 178 179 180 181 182 183]

Cl **169** *SC* **169.4** *P* **178** *L* **22** # 43

Huber, Thomas Nokia

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

Table 169-4 is missing rows for the 800GBASE-ER1 PCS and PMA

SuggestedRemedy

Add a row for the PMA. Depending on the disposition of other comments about ER1 architecture, add a row for the ER1 PCS or the ER1 FEC. The values for both in clause 186 are still TBD.

Response *Response Status* **C**

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

Cl **169** *SC* **169.4** *P* **178** *L* **23** # 44

Huber, Thomas Nokia

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

Clause 176 has delay constraints for 800G 32:4 and 4:4 PMAs, clause 177 has values for 800GBASE-R inner FEC, and clause 184 has values for the LR1 inner FEC

SuggestedRemedy

Replace the TBDs wiith the appropriate values from Table 176-7, Table 177-5, and from clause 184.7 for the LR1 inner FEC.

Response *Response Status* **C**

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

Cl **169** *SC* **169.4** *P* **178** *L* **23** # 154

Bruckman, Leon Nvidia

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

The values for 800GBASE-R Inner FEC and 800GBASE-LR1 are defined in the respective referenced sections.

SuggestedRemedy

Fill the TBDs in Table 169-4 for 800GBASE-R Inner FEC and 800GBASE-LR1 with the values in the referenced sections

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #44.

Cl **171** *SC* **171.1** *P* **190** *L* **8** # 374

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

Comment Type **TR** *Comment Status* **A** *(bucketp)*

1.6TMII is noted as required in first entry in Table 171-1a

SuggestedRemedy

1. Change table entry to optional
2. Add note to 1.6TMII table entry - The 1.6TMII is an optional interface. However, if the 1.6TMII is not implemented, a conforming
implementation behaves functionally as though the RS and 1.6TMII were present.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy.

Make similar changes to Table 118-a and Table 118-b for 200GMII and 400GMII.

Cl **171** *SC* **171.1** *P* **190** *L* **8** # 373

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

Comment Type **TR** *Comment Status* **A** *(bucketp)*

800GMII is noted as required in first entry in Table 171-1

SuggestedRemedy

1. Change table entry to optional
2. Add note to 800GMII table entry - The 800GMII is an optional interface. However, if the 800GMII is not implemented, a conforming
implementation behaves functionally as though the RS and 800GMII were present.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Text from 170.1:
"The 800GMII and 1.6TMII are optional logical interfaces between the MAC sublayer and the PhysicalLayer device (PHY). The 800GMII/1.6TMII Extender may optionally be used to extend the 800GMII/1.6TMII (see Clause 171)."

Table 171-1 should be updated to be consistent with text from 170.1. The wording in Table 171-1 is an obvious error. The same update is being made to Tables 118-a, 118-b and 171-1a (see comment #374). This also makes them consistent with the physical layer clause tables in all the PMD clauses.

Implement the suggested remedy with editorial license.

Cl **171** *SC* **171.7** *P* **200** *L* **41** # 418

Nicholl, Gary — Cisco Systems

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

Annex 176B does not show any MMD numbering.

SuggestedRemedy

Change the second sentence from:
"Annex 173A and Annex 176B show additional examples of 800GXS partitioning and MMD numbering"
to:
"Annex 173A shows additional examples of 800GXS partitioning and MMD numbering using the BM PMA. 176B.6.2 shows additional examples of 800GXS paritioning using both BM PMA and SM PMA".

Change the second sentnce of the second paragrpah from:
"Annex 176B shows additional examples of 1.6TXS partitioning and MMD numbering."
to:
"176B.7.2 shows additional examples of 1.6TXS partitioning"

Change the title of 171.7 from:
"800GXS and 1.6TXS partitioning example"
to:
"800GXS and 1.6TXS partitioning examples"

Make sure to underline any added text and to strikethrough any deleted text.

Response *Response Status* **C**

ACCEPT.

Cl **171** *SC* **171.8** *P* **202** *L* **18** # 3

Marris, Arthur — Cadence Design Systems

Comment Type **TR** *Comment Status* **A** *ER1 architecture*

The variable PHY_XS_enhanced_ptp_accuracy_enable is not present in Clause 172 and so does not belong in Table 171-2

SuggestedRemedy

Create new "Table 171-2a-MDIO PHY 800GXS to Clause 171 control variable mapping" table and move the PHY_XS_enhanced_ptp_accuracy_enable into this this new table

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve with the response to commnet #36.

Cl **171** *SC* **171.8** *P* **203** *L* **16** # 4

Marris, Arthur — Cadence Design Systems

Comment Type **TR** *Comment Status* **A** *(bucketp)*

In Table 171-3 the register names have had "in ns" and "in sub-ns" deleted from their names. This is incorrect, the register names should be as specified in IEEE Std 802.3cx-2023. Also "RX" and "TX" indication does not match between MDIO and Clause 172 variable naming.

SuggestedRemedy

In Table 171-3 the register names have had "in ns" and "in sub-ns" deleted from their names. This was correct in draft 1.2 and the register names need to be reverted to their draft 1.2 state (see IEEE Std 802.3cx-2023 for the correct register names).
The Clause 172 status variable variables names have "RX" in their names when it should be "TX" and vice versa. Please correct this

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Revert the register names to those used in D1.2 as described in the suggested remedy.

No change is required for the Clause 172 status vaiable names. Since the PHY XS is essentially an upside down PCS (Clause 172), there needs to be a Rx/Tx transposition between a Clause 172 status variable and the corresponding PHY XS status variable in Clause 171, for example the Rx path delay in Clause 172 is actually the Tx path delay in the PHY XS in Clause 171.

Add a footnote to the table to explain why RX and TX are sometimes transposed between the MDIO status variable name and the Clause 172 status variable name.

Cl **171** *SC* **171.9.5.5** *P* **216** *L* **22** # 95

Nicholl, Shawn — AMD

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

Currently says "transmits what it receives from the 800GMII". However, this sub-clause pertains to 1.6TXS.

SuggestedRemedy

Propose "transmits what it receives from the 1.6TMII".

Response *Response Status* **C**

ACCEPT.

Cl **174** *SC* **174.2.12** *P* **231** *L* **41** # 155

Bruckman, Leon — Nvidia

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

ILT coordinates transition to DATA mode.

SuggestedRemedy

Change: "equalization, modulation, and precoding states on the link partner transmitter, and to indicate the receiver state."
To: "equalization, modulation, and precoding states on the link partner transmitter, to indicate the receiver state and to coordinate transition to DATA mode."

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

!! Pulled from bucket

Cl **174** *SC* **174.3.2** *P* **235** *L* **20** # 87

Opsasnick, Eugene — Broadcom

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

In Figure 174-4 (1.6T Inter-sublayer interfaces with Inner FEC), there is no AUI. The Inner FEC will (almost) always be in an optical module below an AUI connection to a host. It would be better to show the Inner FEC below an AUI in this figure since the layer stack shown, while logically correct, will rarely, if ever, be used.

SuggestedRemedy

Add a "1.6T BASE-R 8:8 PMA" between the "1.6T BASE-R 16:8 PMA" on line 14 and the "1.6TBASE-R Inner FEC" on line 20 which creates an AUI interface between the two PMAs. And then add the necessary inter-layer signals on the AUI connection between the two PMAs.

Response *Response Status* **C**

REJECT.
The intent of this diagram (see figure title) is to show intersublayer interfaces not provide an exhaustive set of implementation configurations, which is provided instead in Annex 176B.

Cl **174A** *SC* **174A.4** *P* **662** *L* **3** # 161

Bruckman, Leon — Nvidia

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

Pre-FEC BER should be 2.21 × 10-4.

SuggestedRemedy

Change: " 2.21 × 10-14."
To: "2.21 × 10-4."

Response *Response Status* **C**

ACCEPT.

Cl **174A** SC **174A.5** P **662** L **22** # 194

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *ER1 error ratio*

codeword error ratio and pre-correction BER values are TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #77.

Cl **174A** SC **174A.5** P **662** L **22** # 77

Sluyski, Mike — Cisco

Comment Type **TR** *Comment Status* **A** *ER1 error ratio*

FEC ccodeword error ratio of less than TBD

SuggestedRemedy

TBD will be updated in a future contribution.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Thre CRG reviewed the following contribution:
https://www.ieee802.org/3/dj/public/25_01/sluyski_3dj_02a_2501.pdf

Per slide 3 of sluyski_3dj_02a_2501 set the maximum CRC block error ratio to 5.903E-11.

Cl **174A** SC **174A.5** P **662** L **23** # 78

Sluyski, Mike — Cisco

Comment Type **TR** *Comment Status* **A** *ER1 error ratio*

Equivalent to a pre-correction BER (BERtotal) of TBD

SuggestedRemedy

For link based on OFEC the pre-FEC BER is 2.0 x 10-2

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the TBD to 2x10^-2.

Cl **174A** SC **174A.5** P **668** L **14** # 469

Maki, Jeffery — Juniper Networks

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

"Frame loss ratio for entire PHY" is wrong or at least has been unnecessarily truncated to one significant digit compared to other cases in the draft and in the published 802.3-2022 standard.

SuggestedRemedy

Change "Frame loss ratio for entire PHY" to 6.2x10^-11.

Response *Response Status* **C**

REJECT.
Resolve using the response to comment #467.

Cl **174A** SC **174A.5** P **668** L **17** # 470

Maki, Jeffery — Juniper Networks

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

"Frame loss ratio for entire PHY" is wrong or at least has been unnecessarily truncated to one significant digit. In turn, the "Codeword error ratio for entire PHY" is wrong.

SuggestedRemedy

Change "Codeword error ratio for entire PHY" to 1.50x10^-11.

Response *Response Status* **C**

REJECT.
Resolve using the response to comment #467.

Cl **174A** SC **174A.5** P **668** L **19** # 471

Maki, Jeffery — Juniper Networks

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

"Frame loss ratio for entire PHY" is wrong or at least has been unnecessarily truncated to one significant digit. In turn, the "BER for entire PHY (BERtotal)" is wrong.

SuggestedRemedy

Change "BER for entire PHY (BERtotal)" to 2.93x10^-4.

Response *Response Status* **C**

REJECT.
Resolve using the response to comment #467.

Cl **174A** *SC* **174A.6** *P* **663** *L* **7** # 430

Dudek, Mike — Marvell

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

174A.7.1 does not constrain the error ratio of an ISL, only of the PCS to PCS link.

SuggestedRemedy

Delete this sentence

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

!! Pulled from bucket

Cl **174A** *SC* **174A.6.1** *P* **662** *L* **21** # 377

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

Comment Type **ER** *Comment Status* **R** *(bucketp)*

Text in the body of the specification as well as in figures appears inconsistent, as at times it is talking at the PMD level, while other parts seem to be talking about at the PHY. And in the figures it refers to receiver under test.

SuggestedRemedy

Use "PHY" consistently unless specifically testing a PMD

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **174A** *SC* **174A.6.1.1** *P* **663** *L* **25** # 431

Dudek, Mike — Marvell

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

It would be helpful to describe where the pre-coder is in the testing.

SuggestedRemedy

In Figure 174A-1. 174A-2 , 174A-3 and 174A-4 change the title of the boxes to"PMD transmit function (including pre-coder if used)" and "PMD receive function (including pre-coder if used) or add a sentence at line 17 "The Transmit and Receive PMD functions include precoding when it is used."

Proposed Response *Response Status* **W**

PROPOSED REJECT.
This level of detail is beyond the the scope of this annex and is described in detail for each PMD and AUI component.
The proposed change does not improve clarity or accuracy of the draft.

!! Pulled from bucket

Cl **174A** *SC* **174A.6.1.1** *P* **663** *L* **39** # 128

Slavick, Jeff — Broadcom

Comment Type **T** *Comment Status* **A** *Inner FEC test patterns*

The Cl177 and Cl184 Inner FEC blocks are both reliant upon finding the AMs in the data stream to determine the RS-FEC CW boundary. So Figure 174A-2 is not a viable configuration unless that alignment and deskew processes are disabled in a test mode.

SuggestedRemedy

Add a test_mode to Cl177 and Cl184 that causes the input to permutation function in Cl184 and the input to convolutional interleaver in Cl177 to use the PMA service interface input data directly.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #10.

Cl **174A** *SC* **174A.6.1.1** *P* **663** *L* **43** # 150

He, Xiang Huawei

Comment Type **TR** *Comment Status* **D** *Inner FEC test patterns*

The PAM4 encoder should not be in front of the Inner FEC transmit function.
The PRBS31Q patter should not go through the Inner FEC transmit function in order to maintain its characteristics.
A presentation will be provided.

SuggestedRemedy

First, remove "PAM4 encoder" box. Then, either change "PRBS31Q" to "PRBS31", or move "PRBS31Q" into the "Inner FEC transmit function" box.
A presentation will be provided.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Pending CRG review of the following contribution:
<URL>/he_3dj_01_2501

Cl **174A** *SC* **174A.6.1.3** *P* **664** *L* **35** # 162

Bruckman, Leon Nvidia

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

In Hm is not clear what is the meaning of "m"

SuggestedRemedy

Define the meaning of "m" in Hm or remove the "m"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
H_m is a set of measured histograms.
Change: "Hm(i)(k) is a set of 17-bin histograms"
To: "Hm(i)(k) is a set of measured 17-bin histograms"

Cl **174A** *SC* **174A.6.1.3** *P* **664** *L* **41** # 163

Bruckman, Leon Nvidia

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

The polynomial for PRBS31Q is not defined

SuggestedRemedy

Define that the PRBS31Q is produced by the polynomial defined in Equation (49-2) and shown in Figure 49-9.

Response *Response Status* **C**

REJECT.
The PRBS31Q test pattern is defined in the either the PMA clause or the Inner FEC clause. This detail is beyond the scope of this annex. The proposed change does not improve clarity or accuracy of the draft.

Cl **174A** *SC* **174A.6.1.3** *P* **664** *L* **48** # 432

Dudek, Mike Marvell

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

Wrong equation reference

SuggestedRemedy

Change Equation 174A-3 to 174A-1

Response *Response Status* **C**

ACCEPT.

Cl **174A** *SC* **174A.6.1.4** *P* **665** *L* **16** # 164

Bruckman, Leon Nvidia

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

max should not replace m but be target for Hm(k)

SuggestedRemedy

Change: "Hmax(k)"
to: "max(Hm(k))" in the 3 occurencences in this section.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
h_max(k) is a maximum limit for the corresponding measured value h_m(k), for each value k on each lane i. This is a per-lane test, so for any k there is only one measured value. However, the purpose of the histograph should be clarified.
Add the following sentence at the beginning of the second paragraph of 174A.6.1.4: "The upper limit for H_m(i)(k) is defined by the histogram H_max(k)."

!! Pulled from bucket

Cl **174A** *SC* **174A.6.1.4** *P* **665** *L* **24** # 165

Bruckman, Leon Nvidia

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

Define the ranges of k and i

SuggestedRemedy

Change: "for all k and i."
To: "for k = 0 to 16 and i = 0 to p-1"

Response *Response Status* **C**

REJECT.
The lane index i and number of lanes p are defined in 174A.6.1.2. It is not necessary to repeat this elsewhere.

Cl **174A** *SC* **174A.6.1.4** *P* **665** *L* **24** # 180

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **D** *KER, per-lane*

The block error ratio test method in 174A.6.x.x provides a means to constrain the block error ratio due to a single lane by constraining the error histogram to be below a limit curve. This is overly conservative and does not provide a single metric for optical and electrical waterfall curves.

SuggestedRemedy

An effective block error ratio metric for a single lane on a multi-lane PMD is required. A contribution with proposal will be provided.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The following related contribution was reviewed at a previous ad hoc meeting:
https://www.ieee802.org/3/dj/public/adhoc/optics/0125_OPTX/barrie_3dj_optx_01_250109.pdf
Implement both proposals on slide 13 of barrie_3dj_optx_01_250109.

Cl **174A** *SC* **174A.6.1.5** *P* **665** *L* **33** # 183

Brown, Matt — Alphawave Semi

Comment Type **E** *Comment Status* **D** *KER, per-lane*

The method in this subclause was "simplified" as proposed by adopted D1.2 comment #78. However, some intermediate equations which proided context were eliminated. Some of the changes should be reversed, reviving some of the original variables and equations.

SuggestedRemedy

Revive the intermediate equations that we in D1.1, similar to the way they are used in 174A.7.1.4.

Proposed Response *Response Status* **W**

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

Cl **174A** *SC* **174A.6.1.5** *P* **665** *L* **34** # 166

Bruckman, Leon — Nvidia

Comment Type **TR** *Comment Status* **D** *KER, all-lanes*

Point b) is unclear:
- Is equation 174A-5 defining He(k) ? If yes, then it should say: "He(k) = ."
- Not clear how to iterate

SuggestedRemedy

Clarify the meaning of point b).
Maybe add a small pseudocode to describe the iterations

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #384.

Cl **174A** *SC* **174A.6.1.5** *P* **665** *L* **40** # 384

Healey, Adam — Broadcom Inc.

Comment Type **T** *Comment Status* **D** *KER, all-lanes*

The operation defined by Equation (174A-5) and (174A-6) would be better described as a function so that it can be invoked in a more clear and concise way. For example, if the function "combine(Hx(k), Hy(k))" was defined to be result of Equations (174A-5) and (174A-6), the instruction in item b) above could reduce to "For i = 0 to p-1, iteratively assign He(k) the result of combine(He(k), Hm(i)(k))" or similar.

SuggestedRemedy

Add a subclause that defines the combination of two histograms in a functional form. Replace references to Equation (174A-5) and (174A-6), with the corresponding text regarding substitutions, with an expression the uses that new function definition.

Proposed Response *Response Status* **W**

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

Cl **174A** *SC* **174A.6.2** *P* **667** *L* **37** # 8

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **D** *PHY TX KER*

Residual errors are permitted at a C2M component output or PMD transmit output when part of a PHY. This residual error ratio must be constrained in the same way errors generated by a PHY transmitter are constrained.

SuggestedRemedy

Add frame loss error ratio and block error ratio constraints for the transmitter output of a complete PHY. Methodology may need to be added in 174A. A contribution will provide more details.
New specifications are need in each of PMD clauses: 178 through 183.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Pending CRG review of the following contribution:
<URL>/brown_3dj_04_2501.

Cl **174A** *SC* **174A.7** *P* **666** *L* **8** # 376

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

Comment Type **ER** *Comment Status* **D** *KER for PHY*

Title does not reflect what is actually being tested - Per 174A.7.1 - This test method permits measurement of the performance of all physical lanes in a PHY as a group using FEC error counters in the PCS.

SuggestedRemedy

1. Change title of Annex to "Error ration tests for a PHY"
2. In Figure 174A-4, change "receiver under test" to "PHY under test"
3. In figure 174A-4 , change "inner FEC only if required by the PMD" to "inner FEC only if required by the PHY"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Change the title of 174A.7 to "Error ratio tests for a PHY"
In Figure 174A-4...
Change "Receiver under test" to "PHY receiver under test"
Change "Inner FEC only if required by the PMD" to "Inner FEC only if required by the PHY"
Implement with editorial license.

Cl **174A** *SC* **174A.7** *P* **666** *L* **9** # 130

Slavick, Jeff — Broadcom

Comment Type **TR** *Comment Status* **D** *KER for xMII Extender*

This method is also valid for between a DTE_XS and PHY_XS.

SuggestedRemedy

Rename 174A.7 as "Error ratio tests for a PHY or XS using PCS statistics"

Add this to the end of the first paragraph of 174A.7 "The same method works for an Extender Sublayer which includes 200Gb/s signaling on one or more ISLs."

Remove PCS-to-PCS from the second paragph and add "or XS" to the end of the first sentence in the second paratph of 174A.7

Remove "in a PHY" and "in the PCS" from the first sentence and add "or XS" after PHY in the second sentence of 174A.7.1

Add "Note: The DTE and PHY XS sub-layers are functionally equivalent to a PCS for the purpose of this test method." to 174A.7.1

Create a new figure for the XS test structure leveragin Fig 174A-4 removing hte Inner FEC and PMD and changing PCS to XS.

Remove PCS from the title of 174A.7.1.2 and the first sentence of the section.

Implement with editorial license.

Proposed Response *Response Status* **W**

PROPOSED REJECT.
In principal, a method for the the xMII Extender can be provided and would be similar that for the PCS to PCS link. However, the method as currently defined is for measurement of the PHY (PMD/.../PCS) only. Whereas, the XS to XS link within an xMII Extender (XS/PMA/.../PMA/XS) is somewhat different. A complete proposal is required.

Cl **174A** *SC* **174A.7.1.1** *P* **666** *L* **41** # 107

Mi, Guangcan — Huawei Technologies Co., Ltd

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

the purpose of PCS-to-PCS error ratio test is to test the performance of a PHY, which should include transmitting-side PCS, PMA and PMD, the Medium, and the receiving-side PMD, PMA and PCS. Therefore the test configuration should include the fulll link, with the testing pattern generated by the PCS Transmitter under test.

The current drawing is more suitable for a receiver test, with a generic test source, an unspecified test channel and receiver under test.

SuggestedRemedy

The PMA transmit function should also consider the three variations with different AUI instantiation.

Proposed Response *Response Status* **W**

PROPOSED REJECT.
The test configuration showing in Figure 174A-4 is for measurement of the PHY receiver path only. Contribution of errors from a real PHY transmit path is accomodated by step f and g in 174A.7.1.4.
Note that comment #8 proposes adding a new test for PHY transmitter

!! Pulled from bucket

Cl **174A** *SC* **174A.7.1.3** *P* **667** *L* **1** # 129

Slavick, Jeff — Broadcom

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

This section is not really "measuring" or comparing the hisograms to anything it's just acquiring the data. In 174A.6.1.3 we don't incluce the word measurement in the section title.

SuggestedRemedy

Remove the word "measurement" from the title of 174A.7.1.3

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The text literally says that these are measurements "An error histogram using PCS counters is measured using the following method:"
However, it makes sense to align the subclause titles in 174A.6.1.3 and 174A.7.1.3.
Change the title of 174A.6.1.3 to "PMA error histogram measurement"

Cl **174A** *SC* **174A.7.1.4** *P* **667** *L* **17** # 385

Healey, Adam — Broadcom Inc.

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

An "error mask" test method can also be defined for PCS-based measurements. This option can be used for lane-by-lane testing and would enable a quick assessment of whether or not the block error ratio requirement is met with reduced (or no additional) post-processing. As is the case for PMA-based measurements, failure to meet the error mask does not necessarily mean the block error ratio requirement is not met. It instead means that the method currently defined in 174A.7.1.4 would need to be used to confirm whether the block error ratio requirement is, or is not, met.

SuggestedRemedy

Consider adding a subclause for "Error mask test method using PCS-based measurements". The error mask is computed in the same way as defined in 174A.6.1.4 (using the value of BERadded appropriate for PCS-based measurments). The new subclause should also note that errors on unstressed lanes will be (incorrectly) attributed to the lane under test and should be minimized for the most accurate results.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **174A** *SC* **174A.7.1.4** *P* **667** *L* **20** # 167

Bruckman, Leon — Nvidia

Comment Type **TR** *Comment Status* **D** *KER stress*

It is not clear what is "stress" or where is it applied in the lane.

SuggestedRemedy

In point a) change: "with no stress applied to any lane"
to "with no stress applied to the receiver of any lane"
InPoint b) change: "with stress applied only to lane i"
to: "with stress applied only to the receiver of lane i"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Pending review of related slides in the following editorial contribution:
<URL>/brown_3dj_03?_2501

Cl **174A** *SC* **174A.7.1.4** *P* **667** *L* **26** # 168

Bruckman, Leon — Nvidia

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

Point e) is unclear

SuggestedRemedy

Change: "substituting Hms(k) for Hx(k) for Hms (i)(k) for Hy(k)"
To: "substituting Hms(k) for Hx(k) and Hms (i)(k) for Hy(k)"

Response *Response Status* **C**

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

Cl **174A** *SC* **174A.7.1.4** *P* **667** *L* **35** # 106

Mi, Guangcan — Huawei Technologies Co., Ltd

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

The last sentence of this subclause "The measured codeword error ratio is expected be less than 1.45 e-11." is misleading.

At the beginning, it states "The following method is used to calculate the block error ratio using FEC bin counters provided in the PCS."
Step h defines the block error ratio as Hms(16), not the code word error ratio.

CL174A.8 provides the definition of FEC codeword error ratio, which seems to be Hm(16).

It is unclear which error ratio shoule be less than 1.45e-11.

SuggestedRemedy

change to "the measured block error ratio is expected to be less..". Or state the relation between codeword error ratio and block error ratio in the subclause.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change "The measured codeword error ratio"
To "The measured block error ratio"

Cl **174A** *SC* **174A.9** *P* **668** *L* **11** # 151

He, Xiang — Huawei

Comment Type **TR** *Comment Status* **D** *Error ratio budget*

Table 174A-1 has a single 2.28E-4 number for "BER per sublayer in a PHY" column, and this table is for all optical PHYs. It did not include the 4.85E-3 BER number for PHYs using Inner FEC.

SuggestedRemedy

Put two numbers in the field with footnotes:
2.28 x 10-4 b
4.85 x 10-3 c
Where footnote b says "If the PMD is a type defined in Clause 180 and Clause 181"
and footnote c says "If the PMD is a type defined in Clause 182 and Clause 183"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This BER budget is in the context of the RS-FEC in the PCS. The BER measurement point is defined as being in the PMA, this would be after Inner FEC decoding when Inner FEC is required by the PHY. The BER is therefore common for PMD with Inner FEC or PMD without Inner FEC.
However, it would be helpful to point this out.
Add a footnote to "PMD-to-PMD" saying "As measured at the PMA closest to the PMD".

Cl **174A** *SC* **174A.9** *P* **668** *L* **12** # 467

Maki, Jeffery — Juniper Networks

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

"Frame loss ratio for entire PHY" is wrong or at least has been unnecessarily truncated to one significant digit. In turn, the "Codeword error
ratio for entire PHY" is wrong and the "BER for entire PHY (BERtotal)" is wrong.

SuggestedRemedy

Change "Frame loss ratio for entire PHY" to 6.2x10^-11, "Codeword error
ratio for entire PHY" to 1.50x10^-11, and change "BER for entire PHY (BERtotal)" to 2.93x10^-4.

Proposed Response *Response Status* **Z**

PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.

Cl **174A** *SC* **174A.9** *P* **668** *L* **16** # 433

Dudek, Mike Marvell

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

Footnote a should be applied to the xAUI-n C2C in the bottom row as well as the top.

SuggestedRemedy

Make this change in tables 174A-1 and 174A-2 Also in a74A-1 delete the extraneous "at" in the last sentence of footnote a where it says "to meet at the BER allocations .."

Response *Response Status* **C**

ACCEPT.

Cl **174A** *SC* **174A.9** *P* **668** *L* **16** # 434

Dudek, Mike Marvell

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

AUI's from Annex 120B also need to meet the requirement described in footnote a

SuggestedRemedy

Add "Annex 120B (i.e. 25Gb/s per lane)" to the list in Tables 174A-1, 174A-2 and 174A-3

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **174A** *SC* **174A.9** *P* **668** *L* **29** # 468

Maki, Jeffery Juniper Networks

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

"Frame loss ratio for entire PHY" is wrong or at least has been unnecessarily truncated to one significant digit. In turn, the "Codeword error
ratio for entire PHY" is wrong and the "BER for entire PHY (BERtotal)" is wrong.

SuggestedRemedy

Change "Frame loss ratio for entire PHY" to 6.2x10^-11, "Codeword error
ratio for entire PHY" to 1.50x10^-11, and change "BER for entire PHY (BERtotal)" to 2.93x10^-4.

Response *Response Status* **C**

REJECT.
Resolve using the response to comment #467.

Cl **174A** *SC* **174A.9** *P* **668** *L* **43** # 435

Dudek, Mike Marvell

Comment Type **TR** *Comment Status* **D** *Error ratio budget*

As stated in the editor's note the random BER target far exceeds the sum of random BER targets. There is no need to constrain the C2C BER allocation in the extender to 0.08e-4. (particularly for the lower speed C2C's where the historical BER is 0.1 e-4).

SuggestedRemedy

Change the BER per sublayer in an xMII Extender for the C2C to 0.1e-4.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
A complete proposal is required to show how an alternate BER would be practical given that in most cases the host xAUI-n might be either within a PHY (e.g., if no XS + PCS is provided on the module) or within an xMII extender. Also, the proposal would need to show precisely how the specifications would be modified in order to test for interoperability. This would affect specifications in annexes 120B, 120C, 120D, 120E, 120F, 120G, 176C, and 176D.
The draft is complete and accurate as written.
Delete the editor's note.

Cl **175** *SC* **175.2.4.6.1** *P* **247** *L* **1** # 181

Brown, Matt Alphawave Semi

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

The acronym AM (and plural AMs) is used a few times but never defined. Better to just spell it out.

SuggestedRemedy

Change "AM" to "alignment marker" is several places at page/line: 247/1, 248/12, 249/42, 249/51,249/54, 251/32 x2, 253/16 x2

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

Cl **175** *SC* **175.2.4.6.2** *P* **266** *L* **2** # 476

Opsasnick, Eugene Broadcom

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

Typo in variable name tx_acrambled_f1_i<256:0>.

SuggestedRemedy

Change tx_acrambled_f1_i<256:0> to be tx_scrambled_f1_i<256:0>.

Response *Response Status* **C**

ACCEPT.

Cl **175** *SC* **175.2.5.3** *P* **254** *L* **41** # 21

Brown, Matt — Alphawave Semi

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

The following description is overly specific: "The following counters shall be implemented to aid a network operator in determining the link quality." It is also for PHY and LINK testing in general.

SuggestedRemedy

Change to "The following counters shall be implemented:"

Response *Response Status* **C**

ACCEPT.

Cl **176** *SC* **176.1.3** *P* **270** *L* **32** # 16

Brown, Matt — Alphawave Semi

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

The terms defined in this subclause are not ordered in a consistent way. Typically for definitions we order them alphanumerically according to the rules according to the guidelines here:
http://www.ieee802.org/3/WG_tools/editorial/requirements/words.html#sort

SuggestedRemedy

Reorder the terms alphanumerically according to the guidelines.

Response *Response Status* **C**

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

Cl **176** *SC* **176.1.4** *P* **271** *L* **33** # 477

Opsasnick, Eugene — Broadcom

Comment Type **E** *Comment Status* **R** *(bucketp)*

Should modify "Delay alternating PCSLs by two RS-FEC codewords ." to be "Delay of alternating PCSLs by two RS-FEC codewords ."

SuggestedRemedy

Change:
"Delay alternating PCSLs by two RS-FEC codewords ."
To:
"Delay of alternating PCSLs by two RS-FEC codewords .".

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **176** *SC* **176.1.4** *P* **271** *L* **42** # 478

Opsasnick, Eugene — Broadcom

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

Now that PMAL is a defined term, the parenthetical "(lanes)" on line 43 should be updated to "(PMALs)".

SuggestedRemedy

Replace "(lanes)"
with: (PMALs).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Since PMAL has been defined as lanes operating at 212.5Gb/s, it will be better to simply replace "... and data streams (lanes) operating at 212.5 Gb/s" with "and PMALs".
Implement the suggested remedy with editorial license.

Cl **176** *SC* **176.2** *P* **273** *L* **47** # 480

Opsasnick, Eugene — Broadcom

Comment Type **E** *Comment Status* **A** *(bucketp)*

Prior to line 47 on page 273, at the start of four paragraphs that describe the various PMA *.request and *.indication primitives, it would be good to add a cross-reference to the PMA block diagrams which illustrate the interface primitives and their positions either above or below the PMA to orient the reader to their position.

SuggestedRemedy

Suggest adding a single sentence paragraph prior to the pargraph starting at line 47 with wording similar to "The PMA service interfaces are illustrated in Figure 176-2, 176-11 and 176-12."

Response *Response Status* **C**

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

Editor should consider inserting the cross-reference at line 35 or line 47.

Cl **176** *SC* **176.2** *P* **274** *L* **17** # 85

Opsasnick, Eugene Broadcom

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

In the last sentence of the pargraph right before Table 176-5, the statement "[the parameter] is set to the value of the received SIGNAL_OK value" is ambigous. Which received SIGNAL_OK is to be used? There are two different SIGNAL_OK inputs.

The same kind of statement is made in the last sentence of the paragraph immediately before Table 176-6 on page 275, in subclause 176.3, line 29.

Both of these statements should be made more clear.

SuggestedRemedy

In 176.2, immediately prior to Table 176-5 change the sentence from:
"For the n:n PMAs, the SIGNAL_OK parameter at the client interface is set to the value of the received SIGNAL_OK value.
to:
"For the n:n PMAs, the SIGNAL_OK parameter at the client interface is set to the value of the received SIGNAL_OK parameter from the sublayer below the PMA (inst:IS_SIGNAL.indication(SIGNAL_OK))."

And in subclause 176.3, change the last sentence immediately prior to Table 176-6 from:
"For the n:n PMAs, the SIGNAL_OK parameter at the interface below the PMA is set to the value of the received SIGNAL_OK value."
to:
"For the n:n PMAs, the SIGNAL_OK parameter at the interface below the PMA is set to the value of the received SIGNAL_OK parameter from the sublayer above the PMA (PMA:IS_SIGNAL.request(SIGNAL_OK))."

Response *Response Status* **C**

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

Cl **176** *SC* **176.3** *P* **275** *L* **6** # 479

Opsasnick, Eugene Broadcom

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

Verb tense is not correct.

SuggestedRemedy

Change: "., the m:n PMAs sends n parallel symbol streams ."
to: "., the m:n PMAs send n parallel symbol streams .".

And on line 11 of the same page 275,
Change: "., the n:m PMAs sends m parallel symbol streams ."
to: "., the n:m PMAs send m parallel symbol streams ..."

And on line 18 of the same page 275,
Change: "., the n:n PMAs sends n parallel symbol streams ."
to: "., the n:n PMAs send n parallel symbol streams ..."

Response *Response Status* **C**

ACCEPT.

Cl **176** *SC* **176.4** *P* **276** *L* **16** # 481

Opsasnick, Eugene Broadcom

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

Now that PMAL is a defined term, it can be used to replace term "212.5 Gb/s interface lanes".

SuggestedRemedy

Replace:
"Note that m equals the number of PCSLs and n equals the number 212.5 Gb/s interface lanes for each xBASE-R m:n PMA."
With:
"Note that m equals the number of PCSLs and n equals the number PMALs for each xBASE-R m:n PMA."

Similar updates can be made thoughout Clause 176 where there are referecnes to "212.5 Gb/s interface lanes" such as line 51 on page 292.

Response *Response Status* **C**

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

Cl **176** *SC* **176.4.1** *P* **276** *L* **21** # 482

Opsasnick, Eugene Broadcom

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

Should add "PMAL" term when referring to the appropriate PMA interface lanes.

SuggestedRemedy

Replace:
"In the transmit (multiplexing) direction, the m:n PMAs perform a transmit function which multiplexes RS-FEC symbols from m PCSL input lanes received at the PMA service interface to n output lanes at the service interface below the PMA. In the receive (demultiplexing) direction, the m:n PMAs perform a receive function which demultiplexes RS-FEC symbols from n input lanes at the service interface below the PMA to m PCSL output lanes toward the PMA service interface."

With:
"In the transmit (multiplexing) direction, the m:n PMAs perform a transmit function which multiplexes RS-FEC symbols from m PCSL input lanes received at the PMA service interface to n PMAL output lanes at the service interface below the PMA. In the receive (demultiplexing) direction, the m:n PMAs perform a receive function which demultiplexes RS-FEC symbols from n PMAL input lanes at the service interface below the PMA to m PCSL output lanes toward the PMA service interface."

Similar updates can be made to 176.5.1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 176.4.1
Change:
"In the transmit (multiplexing) direction, the m:n PMAs perform a transmit function which multiplexes RS-FEC symbols from m PCSL input lanes received at the PMA service interface to n output lanes at the service interface below the PMA. In the receive (demultiplexing) direction, the m:n PMAs perform a receive function which demultiplexes RS-FEC symbols from n input lanes at the service interface below the PMA to m PCSL output lanes toward the PMA service interface."
To:
"In the transmit (multiplexing) direction, the m:n PMAs mutiplex RS-FEC symbols from m PCSLs at the PMA service interface to n PMALs at the service interface below the PMA. In the receive (demultiplexing) direction, the m:n PMAs demultiplex RS-FEC symbols from n PMALs at the service interface below the PMA to m PCSLs toward the PMA service interface."

In 176.5.1
Change:
"In the transmit (demultiplexing) direction, the n:m PMAs perform a transmit function which demultiplexes RS-FEC symbols from n input lanes at the PMA service interface to m PCSL output lanes at the service interface below the PMA. In the receive (multiplexing) direction, the n:m PMAs perform a receive function which multiplexes RS-FEC symbols from m PCSL input lanes at the service interface below the PMA to n output lanes at the PMA service interface."
To:
"In the transmit (demultiplexing) direction, the n:m PMAs demultiplex RS-FEC symbols from n PMALs at the PMA service interface to m PCSLs at the service interface below the PMA. In the receive (multiplexing) direction, the n:m PMAs multiplex RS-FEC symbols from m PCSLs at the service interface below the PMA to n PMALs at the PMA service interface."

Implement the with editorial license.

Cl **176** *SC* **176.4.1** *P* **277** *L* **52** # 420

Nicholl, Gary Cisco Systems

Comment Type **T** *Comment Status* **A** *Symbol Demux*

Figure 176-2. I find the "symbol demultiplexing" block to be somewhat confusing as this block is essentially a "blind 20-bit demux and slip" function , and only truly represents a symbol demux when the 20-bit demux aligns with the 20-bit symbol-pair boundaries as confirmed by the subsequent 'alignment marker lock" function. It is actually the combination of the "blind 20-bit demux and slip" and "alignment marker lock" functions that perform the "symbol demux" .

SuggestedRemedy

I think at this level the functional block diagram would be much easier to understand if we were to combine the "symbol demultiplexing" and "Alignment marker lock" funcitonal blocks into a single functional block called "Symbol demultiplexing" . This functional block would internally be comprised of two blocks, "20-bit demux and slip" and "alignment marker lock". These two blocks would be described later in the subclause (perhaps with their own block diagram).

A presentation will be provided with more details on this proposal.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed the presentation at:
https://www.ieee802.org/3/dj/public/25_01/nicholl_3dj_02_2501.pdf

Implement changes described on slides 4-6 of nicholl_3dj_02_2501, with the exception to remove the variable name on dotted line connection between "Alignment Marker Lock" and "20-bit demux and slip".

In addition, make similar updates to subclause 177.4.1 for the symbol demultiplexing function.

Implement with editorial license.

[Editor's note: CC 176 177]

Cl **176** *SC* **176.4.2.4.2** *P* **281** *L* **32** # 96

Nicholl, Shawn AMD

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

Currently says ". and for the 400GBASE-R 32:4 PMA, the odd lanes ."

SuggestedRemedy

Propose ". and for the 400GBASE-R 16:2 PMA, the odd lanes ."

Response *Response Status* **C**

ACCEPT.

Cl **176** *SC* **176.4.3.2.1** *P* **286** *L* **30** # 86

Opsasnick, Eugene Broadcom

Comment Type **E** *Comment Status* **A** *(bucketp)*

The statement ". continues until all eight PCS lanes have alignment marker lock using the same 20-bit symbol-pair boundary" can be made more clear by stating what is meant by the "same boundary".

SuggestedRemedy

Change the sentence on page 286, line 30
from:
"This process of a one-bit slip followed by alignment marker search continues until all eight PCS lanes have alignment marker lock using the same 20-bit symbol-pair boundary."
to:
"This process of a one-bit slip followed by alignment marker search continues until all eight PCS lanes have alignment marker lock using the 20-bit boundary set by the demultiplexer."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
In the Suggested Remedy, replace the word "set" by "selected".
Change:
"This process of a one-bit slip followed by alignment marker search continues until all eight PCS lanes have alignment marker lock using the same 20-bit symbol-pair boundary."
To:
"This process of a one-bit slip followed by alignment marker search continues until all eight PCS lanes have alignment marker lock using the 20-bit boundary selected by the demultiplexer."

Implement with editorial license.

Cl **176** *SC* **176.4.4.2.1** *P* **289** *L* **25** # 483

Opsasnick, Eugene Broadcom

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

Definition of variable restart_lock_demux<y> states that it is set to true in the SYMBOL_LOCK_RESTART state, but is is actually set to true in two separate states in state diagram Figure 176-10.

SuggestedRemedy

Change: "Boolean variable that is set to true in the SYMBOL_LOCK_RESTART state to restart ."
To: "Boolean variable that is set to true in the SYMBOL_LOCK_RESTART and SLIP_CONTROL states to restart ."

Response *Response Status* **C**

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

Cl **176** *SC* **176.4.4.2.3** *P* **290** *L* **4** # 484

Opsasnick, Eugene Broadcom

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

Numbers less than or equal to 10 (ten) should be written out.

SuggestedRemedy

Change: "Counts 3 alignment marker intervals."
To: "Counts three alignment marker intervals."

Response *Response Status* **C**

ACCEPT.

Cl **176** *SC* **176.4.4.3** *P* **290** *L* **34** # 145

He, Xiang Huawei

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

The index y is not a PMAL but a PAML number.

SuggestedRemedy

Change "where y is the input PMAL" to "where y is the input PMAL number"

Response *Response Status* **C**

ACCEPT.

Cl **176** *SC* **176.4.4.3** *P* **291** *L* **2** # 84

Opsasnick, Eugene Broadcom

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

The initial condition (open arrow) to enter the LOSS_OF_ALIGNMNET state in Figure 176-9 is "reset + !all_locked_mux". (!signal_ok_mux) should be added to this condition

SuggestedRemedy

Change the open arrow condition to enter LOSS_OF_ALIGNMENT state from:
reset + !all_locked_mux
to:
reset + !signal_ok_mux + !all_locked_mux

Response *Response Status* **C**

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

Cl **176** *SC* **176.4.4.3** *P* **291** *L* **16** # 83

Opsasnick, Eugene Broadcom

Comment Type **T** *Comment Status* **R** *(bucketp)*

In the Figure 176-9 state diagram, after entering ALIGNMENT_FAIL state, the state machine will transition immediately to LOSS_OF_ALIGNMENT_STATE. There should be an arc added from ALIGNMENT_FAIL to LOSS_OF_ALIGNMENT (as an unconditional transition). Adding this arc will make the state diagram easier for the reader to understand. Without this arc, the reader must figure out that setting restart_lock_mux to true causes restart_lock in Figure 119-2 to be true, and that variable causes the Fig. 119-12 state machine to go to the LOCK_INIT state which sets the amps_lock<x> variable to false and when any amps_locks<x> is false for x = 0 to 31, then the variable all_locked in clause 119 also becomes false. And then all_lock_mux in CL 176 takes the value of CL 119 all_locked. And finally the user can see that (!all_locked_mux) is an open arrow global transition condition to the LOSS_OF_ALIGNMENT state.

SuggestedRemedy

In the Figure 176-9 state diagram, add an unconditional transition arc (UCT) from the ALIGNMENT_FAIL state to the LOSS_OF_ALIGNMENT state.

Response *Response Status* **C**

REJECT.

The state diagram is correct as shown. It follows similar state diagrams in CL 119 and CL 172 which do not show the UCT transition. The comment has a fair point that in CL176, the level of indirection is greater, but it is not needed since setting the restart_lock_mux variable to true will result in all_locked_mux becoming false after the state machine in Fig. 119-12 is forced to its init state.

Cl **176** *SC* **176.4.4.3** *P* **292** *L* **17** # 485

Opsasnick, Eugene Broadcom

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

In Figure 176-10, the state transitions out of SLIP_CONTROL and SYMBOL_LOCK_RESTART do not have a condition.

SuggestedRemedy

Unconditional state transitions should be labelled "UCT".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
In Fig 176-10, label the unconditional state transitions out of SLIP_CONTROL and SYMBOL_LOCK_RESTART with "UCT"

Cl **176** *SC* **176.5.4.1.5** *P* **319** *L* **48** # 20

Brown, Matt Alphawave Semi

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

The index "i" is typically used for the lane number. Since counters need to be defined per lane, this index "i" will cause some ambiguity in the management variables and MDIO register definitions. For similar bin counters defined in 174A.6 and 176.7.4.1 the index "k" is used for this purpose.

SuggestedRemedy

For the bin counters defined in 177.5.4.1.5 change the index "i" to "k". Also update Table 177-7 and definitions in Clause 45 appropriately.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **176** *SC* **176.7.4** *P* **298** *L* **3** # 18

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *(bucketp)*

Subclause 176.7.4 specifies that test pattern generators and checker defined in 120.5.11.2 are optional but does not elaborate which ones. Necessary pattern generators are PRBS31Q, PRBS13Q, SSPRQ, and square wave. Necessary pattern checkers are PRBS31Q and PRBS13Q.

SuggestedRemedy

Create a subclause for each pattern generator and checker that is optionally required and refer back to 120.5.11.2.x for details.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Create subclauses for PRBS31Q, PRBS13Q, SSPRQ and Square wave patterns. State that PRBS31Q pattern generator and checker are mandatory. State that PRBS13Q, SSPRQ and square wave generators are optional. Within each subclause, point to the subclause that describes the pattern in 120.5.11.2 for further details.

Implement with editorial license.

Cl **176** *SC* **176.7.4** *P* **298** *L* **3** # 19

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *(bucketp)*

Draft 1.2 comment #135 adopted response said that the PRBS31Q block error counters were mandatory but not the checker. The PRBS31Q pattern checker with block error checking is needed for PMD and AUI component testing.

SuggestedRemedy

Specify that the PRBS31Q pattern check is mandatory.

Response *Response Status* **C**

ACCEPT.

Cl **176** *SC* **176.7.4.1** *P* **298** *L* **16** # 394

Shrikhande, Kapil — Marvell

Comment Type **TR** *Comment Status* **A** *counter format*

The definition and format of the test block error bin counters should be aligned to match the bin counters defined in the PCS clauses (see FEC codeword error bin counter definition in 175.2.5.3). The counter size is not included in 176.7.4.1, whereas bin counters in PCS/FEC clauses include counter size.

SuggestedRemedy

Align bin counter definition format in 176.7.4.1 to the bin counter definition in 175.2.5.3, and also include counter size in the definition in 176.7.4.1.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #11.

Cl **176** *SC* **176.7.4.1** *P* **298** *L* **26** # 12

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *(bucketp)*

Some of the block error counters may increment closed to once per block. As such, these counters, if 32 bits, will saturate around 30 seconds after being reset to zero. In order to ensure that there is at least 15 minutes between reset and saturation, bin counters for 0, 1, 2, and 3 should be larger.

SuggestedRemedy

Specify the counter size for test_block_error_bin_i_k to be 48 bits for k from 0 to 3 and 32 bits otherwise.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

During CRG discussion, it was pointed out that it is undesirable to special-case 4 of the 16 counters and they are test counters where the quality of the link is unknown.

Since the 32-bit width is too small, change all 16 test_block_error_bin_i_k counters from 32-bits to 48-bits in width.

Implement with editorial license.

Cl **176** *SC* **176.8** *P* **199** *L* **9** # 22

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *PMA delay*

Delay limits for 200GBASE-R, 400GBASE-R, and 1.6TBASE-R PMAs are TBD and the one for 800GBASE-R PMAs may need to be refined.

SuggestedRemedy

Expect a contribution with proposals.
Update Table 116-6, Table 116-7, 169-4, and Table 174-4 with the adopted numbers.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #451.

Cl **176** *SC* **176.8** *P* **299** *L* **4** # 451

Shrikhande, Kapil — Marvell

Comment Type **TR** *Comment Status* **A** *PMA delay*

In Table 176-7, complete the TBD delay values for the SM-PMAs.

SuggestedRemedy

A presentation will be provided for the TBD values in Table 176-7.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the CRG.
https://www.ieee802.org/3/dj/public/25_01/shrikhande_3dj_01b_2501.pdf

Implement the proposals on slide 16 and 17 for all sublayers listed on slide 16, including changing CR/KR PMD delay values to 74.24 ns.

Implement with editorial license.

Cl **176** *SC* **176.8** *P* **299** *L* **6** # 222

de Koos, Andras — Microchip Technology

Comment Type **T** *Comment Status* **A** *PMA delay*

For Table 176-6, the delay of the 1:8 and 8:1 (for 200GBASE-R) and 2:16 and 16:2 (for 400GBASE-R) PMAs is complicated because of the 2CW skew introduced. Must be careful to avoid double-accounting the delay due to this skew! The max delay constraint (which is for the *sum* of Rx and Tx) should thus be calculated as the max base delay plus the intentional skew, (not 2x the intentional skew). This way, the total constraint will count the skew's contribution only once.

SuggestedRemedy

For the 1:8, 8:1, PMAs use the base max delay value (same as the 800GBASE-R 4:32 PMA or 32:4 PMA, presumably?) plus the intentional skew.
Skew = 2 FEC CWs = 51.2ns for 200Gbps

200GBASE-R 1:8 PMA or 8:1 PMA :
Maximum (bit time): 36864 + 40960 = 77824
Maximum (pause_quanta): 72 + 80 = 152
Maximum (ns): 46.08 + 51.2 = 97.28

For the 2:16, 16:2, PMAs use the base max delay value (same as the 800GBASE-R 4:32 PMA or 32:4 PMA, presumably?) plus the intentional skew.
Skew = 2 FEC CWs = 25.6ns for 400Gbps

400GBASE-R 2:16 PMA or 16:2 PMA :
Maximum (bit time): 36864 + 20480 = 57334
Maximum (pause_quanta): 72 + 40 = 112
Maximum (ns): 46.08 + 25.6 = 71.68

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #451.

Cl **176** *SC* **176.8** *P* **299** *L* **6** # 225

de Koos, Andras Microchip Technology

Comment Type **T** *Comment Status* **A** *PMA delay*

The max delay values for the '1.6TBASE-R 8:16 PMA or 16:8 PMA' should be roughly equal to those of the 800GBASE-R 4:32 PMA or 32:4 PMA. It is true that the 1.6T PMA does not have the 'Delay odd PCSLs by one symbol' function (176.4.2.4.1), but the latency of one 10-bit symbol is negligible in the context of these delays.

SuggestedRemedy

For the '1.6TBASE-R 8:16 PMA or 16:8 PMA' delay constraints, use the same values as the '800GBASE-R 4:32 PMA or 32:4 PMA'

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #451.

Cl **176** *SC* **176.8** *P* **299** *L* **6** # 226

de Koos, Andras Microchip Technology

Comment Type **T** *Comment Status* **A** *PMA delay*

In the table, why is the value for a 4:4 PMA so large (2x the 4:32 / 32:4 PMA)? Wouldn't it just be a wire?
Is it because it could resonably be implemented with a 4:32 PMA in series with a 32:4 PMA?
Assuming the 4:4 PMA value is correct, the same rules can be used for the 1:1, 2:2 and 8:8 PMAs, i.e double the values of the 1:8, 2:16 , and 8:16 PMA, respectively.

SuggestedRemedy

For the '200GBASE-R 1:1 PMA' delay constraint values, double the delay constraint values of the '200GBASE-R 1:8 PMA or 8:1 PMA' delay constraints.
For the '400GBASE-R 2:2 PMA' delay constraint values, double thedelay constraint values of the '400GBASE-R 2:16 PMA or 16:2 PMA' delay constraints.
For the '1.6TBASE-R 8:8 PMA' delay constraint values, double the delay constraint values of the '1.6TBASE-R 8:16 PMA or 16:8 PMA' delay constraints.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #451.

Cl **176** *SC* **176.8** *P* **299** *L* **6** # 223

de Koos, Andras Microchip Technology

Comment Type **T** *Comment Status* **A** *PMA delay*

Should the 4-codeword deskew (compensating for skew across an AUI) be included in the PMA delay constraint? I think not. This should be seen as the delay of the AUI itself, and should not be included in the PMA's delay constraint.

SuggestedRemedy

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #451.

Cl **176** *SC* **176.8** *P* **299** *L* **21** # 224

de Koos, Andras Microchip Technology

Comment Type **T** *Comment Status* **A** *PMA delay*

Whatever method is used to specify the max delay for the 1:8, 8:1, 2:16, 16:2 SM-PMAs in Table 176-6, a footnote to the table is required to explain the method. Otherwise, readers may get confused: looking at the delay through the Rx PMA in isolation, and the Tx PMA in isolation, one could conclude that they should each have a 2CW delay for the skew.

SuggestedRemedy

Add the following note after the table:
Note that since the delay constraint is respect to the sum of Rx and Tx delays, the intentional skew for the 1:8 and 8:1 PMAs (51.2ns) and for the 2:16 and 16:2 PMAs (25.6ns) contributes only ONCE.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #451.

Cl **176** *SC* **176.9** *P* **299** *L* **23** # 452

Shrikhande, Kapil — Marvell

Comment Type **TR** *Comment Status* **A** *PMA skew*

Complete the subclause 176.9 on Skew Constraints of the SM-PMA.

SuggestedRemedy

A presentation will be provided to update the Skew constraints subclause

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

CRG reviewed slides 6-16 of the logic track editoral slides, nicholl_3dj_01_2501.

Update SP1 and SP6 skew point definitions in Clause 169.
Change the definition of SP1 from:
SP1 on the 800GAUI-n interface, at the input of the PMA closest to the PMD.
to:
SP1 on the 800GAUI-n interface closest to the PMD, at the input of the PMA.

Change the defintion of SP6 from:
SP6 on the 800GAUI-n interface, at the output of the PMA closest to the PCS or DTE 800GXS
to:
SP6 on the 800GAUI-n interface closest to the PCS or DTE 800GXS, at the output of the PMA

Make similar changes to the definitions of SP1 and SP6 in Clauses 116 and 174.

Update skew contraints in Clause 176 to define SP1 and SP6 using the format from Clause 179.7.

Delete subclause 177.8.

Update skew contraints in optical PMD clauses 180, 181, 182 and 183, as suggested in slide 16 of nicholl_3dj_01.

Implement with editorial license.
[Editor's noter: CC 176 177 116 169 174 180 181 182 183]

Cl **176** *SC* **176.9** *P* **299** *L* **24** # 26

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *PMA skew*

Skew constraints are not defined for the PMAs. However, the skew at each interface is defined in 116, 169, and 174 and thus the numbers. The PMA skew constraints may be derived from these.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #452.

Cl **176** *SC* **176.11** *P* **300** *L* **15** # 5

Marris, Arthur — Cadence Design Systems

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

Table 176-8 needs populating

SuggestedRemedy

Refer to "Table 45-3-PMA/PMD registers" in IEEE Std 802.3 for the correct MDIO register bit references

Response *Response Status* **C**

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

Cl **176B** *SC* **176B.3** *P* **683** *L* **12** # 378

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

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

This subclause is included to highlight the co-existence of bit and symbol muxing in an implementation, but the figure uses generic language fort he PMA sublayers that doesn't help.

SuggestedRemedy

Add "BM-" or "SM-" as appropriate to the PMA sublayer boxes in Fig 176B-4.`

Response *Response Status* **C**

ACCEPT.

Cl **176B** *SC* **176B.4.1** *P* **660** *L* **51** # 424

Dudek, Mike Marvell

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

The editor's notes do not appear to be correct for the AUI's in the tables. E.g. 200GAUI-8 is not clause 176C. It should only apply to the PMA's and the changes to the PMA's are not what the editor's note implies. E.G. The sublayer in the first row of Table 176B-1 should not be changed from 200GBASE-R 8:n PMA to 200GBASE-R 8:8 PMA it appears to be correct as it is:

SuggestedRemedy

Make the necessary changes and delete the editor's note. Also on page 663 line 35, page 665 line 3, and page 668 line 3

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The editor's notes convey that the tables should also include guidance for use of AUIs with 50 Gb/s per lane and 25 Gb/s per lane (e.g., 200GAUI-8). Including these was deferred since it was not clear initially these were specified for use with the new PHY types defined in 802.3dj. However, updates to D1.2 and D1.3 imply that indeed these lower lane-rate AUIs are intended.
Update the tables per the editor's notes in 176B.4.1, 176B.4.2, 176B.5.1, and 176B.5.2.
Implement with editorial license.

!! Pulled from bucket

Cl **176B** *SC* **176B.6.2** *P* **695** *L* **28** # 417

Nicholl, Gary Cisco Systems

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

Incorrect reference. Reference to "Figure 176B-2" should be "Fgure 176B-3"

SuggestedRemedy

Change "Figure 176B-2" to "Figure 176B-3".

Response *Response Status* **C**

ACCEPT.

Cl **176C** *SC* **176C.3** *P* **701** *L* **47** # 436

Dudek, Mike Marvell

Comment Type **T** *Comment Status* **A** *(bucketp)*

It might be confusing that "any PMA" includes bit muxed PMA's

SuggestedRemedy

replace "PMA" with "SM-PMA" just in these sentences where it is talking about "any PMA". E.g. change "The PMA above the 200 Gb/s per lane AUI-C2C is any m:1 PMA for 200GAUI-1, m:2 PMA for
400GAUI-2, m:4 PMA for 800GAUI-4, and m:8 PMA for 1.6TAUI-8, as specified in Clause 176." to "The PMA above the 200 Gb/s per lane AUI-C2C is any m:1 SM-PMA for 200GAUI-1, m:2 SM-PMA for
400GAUI-2, m:4 SM-PMA for 800GAUI-4, and m:8 SM-PMA for 1.6TAUI-8, as specified in Clause 176.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license and in alignment with the response to comment #486.

Cl **176C** *SC* **176C.4.1** *P* **702** *L* **43** # 437

Dudek, Mike Marvell

Comment Type **T** *Comment Status* **D** *Test points (bucket)*

The procedure in Annex 163A calls for the computations in 163A.3.1 and 163.4.1 which refer to calculations in Annex 93A that are different from those for 200G in Annex 178A.

SuggestedRemedy

Change to "using the procedure in Annex 163A but replacing the COM related calculations in Annex 93A with those of Annex 178A"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **176C** *SC* **176C.4.3** *P* **703** *L* **23** # 439

Dudek, Mike Marvell

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

The common-mode to common-mode return loss is TBD. It is likely that similar performance devices will be used for C2C as for KR

SuggestedRemedy

Change TBD to 3.25 the same as for KR.

Response *Response Status* **C**

ACCEPT.

Cl **176C** SC **176C.4.3** P **703** L **23** # 195

Brown, Matt — Alphawave Semi

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

Value for "Signal to AC common-mode noise ratio, SCMR (min)" is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 548.

Cl **176C** SC **176C.4.3** P **703** L **23** # 548

Heck, Howard — TE Connectivity

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

Minimum signal to AC common-mode noise ratio (SCMR) is TBD in D1.3.

SuggestedRemedy

Change TBD to 15 dB, taken from KR Table 178-6. A presentation is planned to support the suggested remedy.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slide 4 in
https://www.ieee802.org/3/dj/public/25_01/heck_3dj_01b_2501.pdf .

Implement the suggested remedy with editorial license.

Cl **176C** SC **176C.4.3** P **703** L **23** # 438

Dudek, Mike — Marvell

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

The Signal to AC common-mode ratio is TBD. It is likely that similar performance devices will be used for C2C as for KR

SuggestedRemedy

Change TBD to 15 the same as for KR. Remove the Editor's note on page 705 line 19

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 548.

Cl **176C** SC **176C.4.3** P **703** L **26** # 549

Heck, Howard — TE Connectivity

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

Minimum common-mode to common-mode return loss (RLcc) is TBD in D1.3.

SuggestedRemedy

Change TBD to 3.25 dB, taken from KR Table 178-6. A presentation is planned to support the suggested remedy.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 439.

Cl **176C** SC **176C.4.3** P **703** L **26** # 196

Brown, Matt — Alphawave Semi

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

Value for "Common-mode to common-mode return loss, RLcc (min)" is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 439.

Cl **176C** SC **176C.4.3.1** P **704** L **17** # 169

Bruckman, Leon — Nvidia

Comment Type **T** *Comment Status* **A** *ILT (bucketp)*

inter-sublayer link training has a defined acronnym already used in this Annex in 176C.3.

SuggestedRemedy

Change: "inter-sublayer link training"
To: "ILT"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy, and in addition, add the expansion of the acronym ILT in its first occurrence, the 3rd paragraph of 176C.3.

Cl **176C** *SC* **176C.4.3.1** *P* **704** *L* **19** # 139

Slavick, Jeff Broadcom

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

steady state measurement is also needed by ILT

SuggestedRemedy

Add "The steady state voltage specifiction needed in 178B.11.4 is specified in 178.9.2.4" to the subclause.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #138.

Cl **176C** *SC* **176C.4.3.1** *P* **704** *L* **19** # 134

Slavick, Jeff Broadcom

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

Listing the coefficients and presets that are supported by the PMD here will lay the groundwork for reuse of the 178B over interfaces with differing support.

SuggestedRemedy

Add the following with editorial license at the end of the second paragraph of 176C.4.3.1
"The coefficients and presets supported by the C2C transmiter during link training are:
-- k_list = {-3, -2 -1, 0, 1}
-- preset 1
-- preset 2
-- preset 3
-- preset 4
-- preset 5"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with considerations of any changes due to other comments about presets.

Cl **176C** *SC* **176C.4.3.2** *P* **705** *L* **4** # 440

Dudek, Mike Marvell

Comment Type **TR** *Comment Status* **A** *C2C ACCM*

The C2C target BER is lower than the C2M target. The probability for measurement should be at least as low as that for C2M (p=-7) which should be adequate even for the C2C BER target.

SuggestedRemedy

Remove the exception.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slide 27 in https://www.ieee802.org/3/dj/public/25_01/ran_3dj_04_2501.pdf .

Implement the suggested remedy with editorial license.

Cl **176C** *SC* **176C.4.3.4** *P* **705** *L* **24** # 197

Brown, Matt Alphawave Semi

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

Exceptions for SNR_ISI method is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #550.

Cl **176C** *SC* **176C.4.3.4** *P* **705** *L* **25** # 550

Heck, Howard — TE Connectivity

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

The method specified for signal-to-residual-intersymbol-interference ratio (SNR_ISI) is defined in 179.9.4.3 with exceptions TBD.

SuggestedRemedy

Remove "with exceptions TBD." A presentation is planned to support the suggested remedy.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slide 6 in https://www.ieee802.org/3/dj/public/25_01/heck_3dj_01b_2501.pdf .

Implement the suggested remedy with editorial license.

Cl **176C** *SC* **176C.4.3.5** *P* **705** *L* **43** # 442

Dudek, Mike — Marvell

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

The procedure in 163A.3.2.2 refer to calculations in Annex 93A that are different from those for 200G in Annex 178A.

SuggestedRemedy

Change to "using the procedure in Annex 163A.3.2.2 but replacing the COM related calculations in Annex 93A with those of Annex 178A" Make the same change on page 706 line 35

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **176C** *SC* **176C.4.3.5** *P* **705** *L* **50** # 551

Heck, Howard — TE Connectivity

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

The length of the reflection signal, N, for ERL calculation is TBD.

SuggestedRemedy

Change TBD to 400 UI, taken from KR Table 178-8. This is consistent with prior standards (.cd, .ck) wherein the values for KR and C2C identical. The proposed value scales to account for the reduction in unit interval. A presentation is planned to support the suggested remedy.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slide 7 <https://www.ieee802.org/3/dj/public/25_01/heck_3dj_01b_2501.pdf>.
Implement the suggested remedy with editorial license.

Cl **176C** *SC* **176C.4.3.5** *P* **705** *L* **50** # 198

Brown, Matt — Alphawave Semi

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

Value for "Length of the reflection signal", N, is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 551.

Cl **176C** *SC* **176C.4.3.5** *P* **705** *L* **51** # 441

Dudek, Mike — Marvell

Comment Type **TR** *Comment Status* **A** *ERL N*

The length of the reflection signal is listed as TBD. It should be long enough to include reflections from the end of the longest path expected within a component and, as similar components are expected to be used as for KR, the same value as for KR is reasonable

SuggestedRemedy

Change TBD to 400. Remove the editor's note on page 706 line 4

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 551.

Cl **176C** SC **176C.4.4.3** P **706** L **47** # 199

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *RX RLcd*

Values/equations for RL_cd are TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 443.

Cl **176C** SC **176C.4.4.3** P **706** L **47** # 443

Dudek, Mike — Marvell

Comment Type **T** *Comment Status* **A** *RX RLcd*

The differential-mode to common-mode return loss is TBD. It is an important parameter for system performance, but proceeding to working group ballot will be delayed if values are not available. Without further evidence that it could be relaxed it should be scaled from 100G.

SuggestedRemedy

Use 25-0.36f from 0.05 to 27.8GHz and 15 from 27.8GHz to 60GHz. Modify the editor's note on page 707 line 26 to still encourage further work.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slide 28 of <https://www.ieee802.org/3/dj/public/25_01/ran_3dj_01_2501.pdf>.
Implement the suggested response with editorial license.

Cl **176C** SC **176C.4.4.4.1** P **707** L **44** # 444

Dudek, Mike — Marvell

Comment Type **T** *Comment Status* **D** *ITT Np (bucket)*

The noise source emulates non-equalizable distortions not equalizable

SuggestedRemedy

Change "equalizable" to "non-equalizable"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **176C** SC **176C.4.4.4.2** P **708** L **31** # 200

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *ITT Np*

Values for N_p is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #557.

Cl **176C** SC **176C.4.4.4.2** P **708** L **31** # 552

Heck, Howard — TE Connectivity

Comment Type **T** *Comment Status* **A** *ITT Np*

The linear fit pulse length, Np, for ITT noise calibration is TBD in D1.3.

SuggestedRemedy

Change TBD to 22 UI. This is scaled from N=11 in p802.3ck to account for the reduction in unit interval. A presentation is planned to support the suggested remedy.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #557.

Cl **176C** SC **176C.4.4.4.2** P **708** L **31** # 446

Dudek, Mike — Marvell

Comment Type **T** *Comment Status* **A** *ITT Np*

The value of Np is TBD. This should be related to the reference equalizer length. As the floating taps can move to 50 make Np=50

SuggestedRemedy

Change Np to 50

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 557.

Cl **176C** *SC* **176C.4.4.4.2** *P* **708** *L* **33** # 445

Dudek, Mike — Marvell

Comment Type **T** *Comment Status* **A** *ITT Cal*

The target BER is approx 1e-5 so a lower probability than 1e-3 should be used. J4u03 is now used for KR.

SuggestedRemedy

Use J4u03 and equations 178-2 and 178-3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The specification for C2C is indeed J4u03, not J3u03.

In item c of 176C.4.4.4.2, change J3u03 to J4u03, and replace the references to Equation (176C-2) and Equation (176C-3) with references to equations 178-2 and 178-3, respectively.

Delete equations Equation (176C-2) and Equation (176C-3).

Implement with editorial license.

Cl **176C** *SC* **176C.4.4.4.3** *P* **709** *L* **30** # 252

Ghiasi, Ali — Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **A** *ITT ILdd*

Receiver interference tolerance parameters are TBD

SuggestedRemedy

Per https://www.ieee802.org/3/dj/public/24_07/heck_3dj_01a_2407.pdf recommend the folowing parameters:
Receiver package class A or B
Test1: 10.5 to 11.5 dB
Test2: 31.5 to 32.5 dB

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #553.

Cl **176C** *SC* **176C.4.4.4.3** *P* **709** *L* **30** # 201

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *ITT ILdd*

Values for IL_dd are TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 553.

Cl **176C** *SC* **176C.4.4.4.3** *P* **709** *L* **31** # 448

Dudek, Mike — Marvell

Comment Type **T** *Comment Status* **A** *ITT ILdd*

Table 176C-4 contains many TBDs. The minimum insertion loss should be the same for both package class A and classB (as it is for KR). It should however be related to the shortest C2C link we expect. The Maximum should be the max TP0d to TP5d supported minus the package loss. 32dB has been adopted for C2M with a more relaxed BER requirement, so suggest 30dB as a reasonable value for C2C

SuggestedRemedy

Make the Test 1 values 9.5 min 10.5max as they were for 100G and make the Test 2 Class A values 23.5 min 24.5max and class B values 19.5min 20.5max. In section 176.5.2 and Table 176-5 clarify that the Maximum channel insertion loss is from TP0d to TP5d and make the value 30dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #553 and #554.

Cl **176C** *SC* **176C.4.4.4.3** *P* **709** *L* **31** # 553

Heck, Howard — TE Connectivity

Comment Type **T** *Comment Status* **A** *ITT ILdd*

Min/max insertion loss, Ildd, for Rx ITT is TBD for all combinations of low/high loss channel and class A/B package.

SuggestedRemedy

A presentation is planned to propose specific values.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slide #11 in https://www.ieee802.org/3/dj/public/25_01/heck_3dj_01b_2501.pdf .

For test 1 (low loss) and test 2 (high loss), use the values provided on slide 11 of heck_3dj_01b_2501.

Cl **176C** *SC* **176C.4.4.5** *P* **710** *L* **4** # 253

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

Real links must operate with noise, ISI, and SJ. Recomending that jitter tolerance test have no broadband noise will render JTOL test useless. C2M JTOL has always included broadband noise with SJ, the test method exist to perform such as test and given the concern about block error the JTOL test should be comprehensive. The KR/C2C JTOL leagcy goes back to 25G-KR which only tested the receiver with SJ, we all know any SerDes unstress will do good job tracking SJ and any SerDes can do good job with ISI in absent of SJ!

SuggestedRemedy

Given that the same JTOL test is used for C2M which historiclaly had comprehensive JTOL test change No broadband noise added to Broadband noise is redcued by 0.05 UI.

Proposed Response *Response Status* **W**

PROPOSED REJECT.
The comment proposes a change that breaks with prior methods without providing sufficient justification.
For CRG discussion.

Cl **176C** *SC* **176C.5** *P* **710** *L* **25** # 554

Heck, Howard — TE Connectivity

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

Recommended maximum insertion loss at 53.125 GHz in Table 176C-5 is TBD in D1.3.

SuggestedRemedy

Change TBD to 32 dB, based upon results presented in https://ieee802.org/3/dj/public/24_07/heck_3dj_01a_2407.pdf.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slides 8-10 in https://www.ieee802.org/3/dj/public/25_01/heck_3dj_01b_2501.pdf .

Implement the suggested remedy with editorial license.

Cl **176C** *SC* **176C.5** *P* **710** *L* **25** # 202

Brown, Matt — Alphawave Semi

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

Value for "Maximum insertion loss at 53.125 GHz (recommended)"

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 554.

Cl **176C** *SC* **176C.5.1** *P* **711** *L* **37** # 559

Heck, Howard — TE Connectivity

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

The value for COM single-ended receiver transmitter termination resistance in Table 176C-6 is highlighted in orange. This value is consistent with those in 178 and 179.

SuggestedRemedy

Remove the orange highlighting.

Response *Response Status* **C**

ACCEPT.

Cl **176C** *SC* **176C.5.1** *P* **711** *L* **37** # 203

Brown, Matt — Alphawave Semi

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

46.25 has orange highlight.

SuggestedRemedy

Remove highlight.

Response *Response Status* **C**

ACCEPT.

Cl **176C** *SC* **176C.5.2** *P* **713** *L* **33** # 449

Dudek, Mike — Marvell

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

The Channel performance cannot easily be described by a frequency domain limit line and the equivalent equations and figure have been removed from Clause 178. The COM specification provides the critical requirement for the channel.

SuggestedRemedy

Delete equation 176C-4 and figure 176C-6.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #555.

Cl **176C** *SC* **176C.5.2** *P* **713** *L* **36** # 204

Brown, Matt — Alphawave Semi

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

Value for maximum IL_dd at Nyquist frequency is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 555.

Cl **176C** *SC* **176C.5.2** *P* **713** *L* **36** # 254

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

Channel ILD is TBD

SuggestedRemedy

Per https://www.ieee802.org/3/dj/public/24_07/heck_3dj_01a_2407.pdf recommend channel ILD of 32 dB

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
It is assumed that the comment and suggested remedy pertain to ILdd.

Resolve using the response to comment 554.

Cl **176C** *SC* **176C.5.2** *P* **713** *L* **37** # 555

Heck, Howard — TE Connectivity

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

Recommended maximum insertion loss at 53.125 GHz and its defining equation is TBD in D1.3.

SuggestedRemedy

Change the sub-clause to be consistent with the approach in 178.10.2: Remove the equation and plot, and set the maximum insertion loss to be consistent with the value adopted in Table 176C-5 (subject of another comment).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slides 8-9 in https://www.ieee802.org/3/dj/public/25_01/heck_3dj_01b_2501.pdf .

Implement the suggested remedy with editorial license.

See also comment #554.

Cl **176C** *SC* **176C.5.3** *P* **714** *L* **34** # 556

Heck, Howard — TE Connectivity

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

In D1.3, sub-annex 176C.5.3 lists the channel ERL as TBD, while Table 176C-5 specifies a value of 9.7 dB (minimum), which was the value adopted in the resolution of comment #66 against D1.2.

SuggestedRemedy

Set the minimum ERL in 176C.5.3 to a value of 9.7 dB, consistent with Table 176C-5 per comment #66 againtst D1.2. A presentation is planned to support the suggested remedy.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slide 12 of <https://www.ieee802.org/3/dj/public/25_01/heck_3dj_01b_2501.pdf>.
Change the text in 176C.5.3 to refer back to Table 176C-5 with editorial license.

Cl **176C** *SC* **176C.5.3** *P* **714** *L* **34** # 205

Brown, Matt — Alphawave Semi

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

Value for minimum channel ERL is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 556.

Cl **176C** *SC* **176C.5.3** *P* **714** *L* **34** # 450

Dudek, Mike — Marvell

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

The ERL requirement is TBD. Reflections from the channel will cause more of a problem for C2C with its more stringent BER requirement than for KR therefore the channel ERL should be more stringent than the KR value of 11dB.

SuggestedRemedy

Make the min ERL value equal to 13dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment 556.

Cl **176D** *SC* **176D.5.3** *P* **724** *L* **6** # 350

Ran, Adee — Cisco

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

R_peak for host output is TBD.

Since we have a reference model for the C2M host, the "difference" method can be used for R_peak, as has been done for SNDR (now dSNDR). This would remove dependence of the requirements on the test fixture specifications and on the host model (in case these change in future drafts).

SuggestedRemedy

Define the minimum R_peak requirement to be relative to what the reference transmitter will create with the test fixture used.
A contribution with more details will be provided.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #303.

Cl **176D** *SC* **176D.5.3** *P* **724** *L* **24** # 206

Brown, Matt — Alphawave Semi

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

Value for "Linear fit pulse peak ratio, Rpeak (min)" is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #303.

Cl **176D** *SC* **176D.5.3** *P* **724** *L* **38** # 219

Rysin, Alexander NVIDIA

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

J3u and JRMS measurements at TP1a are highly affected by the effects of slew rate and noise and do not reflect actual uncorrelated jitter. These effects are exacerbated by the characteristics of practical channels between TP0d and TP1a - loss and reflections, and are highly dependent on the transmitted signal amplitude. Accounting only for the faster edges does not work for practical channels at 106.25 Gbd rate and the currently proposed numbers cannot be met (and sometimes cannot be measured) even with commercial test equipment PPG. The issue was demonstrated in rysin_3dj_01a_2407. A different methodology that will better quantify phase-only uncorrelated jitter has to be explored. Presentation is planned.

SuggestedRemedy

Other method of uncorrelated jitter measurement should be considered.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #306.

Cl **176D** *SC* **176D.5.3** *P* **724** *L* **39** # 261

Ghiasi, Ali Ghiasi Qunatum/Marvell

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

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 wihout any demonstration that using transmit jitter is sufficent for receive compliance.

SuggestedRemedy

TDECQ method works given all the data presentated and with the work of OIF LPO and RTLR developing. 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. EECQ for receive stress measurement and caliburation we need to do the follwing:
Add editor note encouraging data if current jitter test method can be used for receive compliance and encourage data on EECQ for receive compliance.

Response *Response Status* **C**

REJECT.

This comment is a restatement of comment #315 against D1.2.
The response to that comment was:
"REJECT.
Resolve using the response to comment #404."
The response to comment #404 was:
"REJECT.
The CRG reviewed slides 11-14 of https://www.ieee802.org/3/dj/public/24_11/ran_3dj_01a_2411.pdf, and the contribution https://www.ieee802.org/3/dj/public/24_11/dawe_3dj_01_2411.pdf, related to this comment and a related group of comments.
There was no support to make the proposed changes in comment 404 and related comments 400, 308, 411, 416, 405, 315, 316, and 401."

TDECQ (and EECQ, not defined in 802.3) are not specifications of AUI-C2M, but of optical transmitters. The claims made in previous comments and repeated here (comment and 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 with a high-loss host channel).
Tx jitter measurements and Rx jitter tolerance are part of well-established CR compliance methodology, which has been adopted for C2M in this project (comments #186-#189 against D1.0).
This comment includes neither new information to support changing previous decisions, nor sufficient detail to implement a change to the draft.

Cl **176D** *SC* **176D.5.3** *P* **724** *L* **40** # 540

Dawe, Piers
Nvidia

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

As already pointed out, the "jitter measurement" method here doesn't work for the relevant bandwidths, losses and amplitudes for host output. This is particularly obvious for J3u03; J4u03 seems to be beyond the state of the art. EOJ should be part of an eye spec like EECQ, not a separate spec item.

SuggestedRemedy

Delete this method. Use an eye spec to control signal quality, following the evolution of xECQ.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #306.

Cl **176D** *SC* **176D.5.4** *P* **725** *L* **24** # 207

Brown, Matt
Alphawave Semi

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

Value for "Linear fit pulse peak ratio, Rpeak (min)" is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #303.

Cl **176D** *SC* **176D.5.4** *P* **725** *L* **24** # 351

Ran, Adee
Cisco

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

R_peak for module output is TBD.

Since we have a reference model for the C2M module, the "difference" method can be used for R_peak, as has been done for SNDR (now dSNDR). This would remove dependence of the requirements on the test fixture specifications and on the module model (in case these change in future drafts).

The module reference model in Table 176D-5 includes two test cases for "transmission line 1 length". Case 2 is the longer one and should be used for the reference R_peak.

SuggestedRemedy

Define the minimum R_peak requirement to be relative to what the reference transmitter will create with the test fixture used.
A contribution with more details will be provided.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #303.

Cl **176D** *SC* **176D.5.4** *P* **725** *L* **38** # 262

Ghiasi, Ali
Ghiasi Qunatum/Marvell

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

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 wihout any demonstration that using transmit jitter is sufficent for receive compliance.

SuggestedRemedy

TDECQ method works given all the data presentated and with the work of OIF LPO and RTLR developing. 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. EECQ for receive stress measurement and caliburation we need to do the follwing:
Add editor note encouraging data if current jitter test method can be used for receive compliance and encourage data on EECQ for receive compliance.

Response *Response Status* **C**

REJECT.
Resolve using the response to comment #261.

Cl **176D** *SC* **176D.5.4** *P* **725** *L* **38** # 220

Rysin, Alexander NVIDIA

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

J4u and JRMS measurements at TP4 are highly affected by the effects of slew rate and noise and do not reflect actual uncorrelated jitter. These effects are exacerbated by the characteristics of practical test fixtures - loss and reflections, and are highly dependent on the transmitted signal amplitude. Accounting only for the faster edges does not work for practical channels at 106.25 Gbd rate. The issue was demonstrated in rysin_3dj_01a_2407. A different methodology that will better quantify phase-only uncorrelated jitter has to be explored. Presentation is planned.

SuggestedRemedy

Other method of uncorrelated jitter measurement should be considered.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #306.

Cl **176D** *SC* **176D.6.2** *P* **729** *L* **16** # 389

Noujeim, Leesa Google

Comment Type **TR** *Comment Status* **D** *Partial channel model*

Capacitance C0 in table 176D-5, "Single ended package capacitance at port 1" description is incorrect; C0 represents part of the partial host channel, while Cp is "Single ended package capacitance at the package-to-board interface".

SuggestedRemedy

Change "Single ended package capacitance at port 1" to "Single ended board capacitance at the package-to-board interface (port 1)"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #391.

Cl **176D** *SC* **176D.6.2** *P* **729** *L* **22** # 390

Noujeim, Leesa Google

Comment Type **TR** *Comment Status* **D** *Partial channel model*

Capacitance C1 in table 176D-5 is not associated with the package, so description "Single ended package capacitance at Port 2" is incorrect.

SuggestedRemedy

Change "Single ended package capacitance at port 2" to "Single ended board capacitance at board-model-to-test_connector interface (port 2)"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #391.

Cl **176D** *SC* **176D.6.2** *P* **730** *L* **26** # 265

Ghiasi, Ali Ghiasi Qunatum/Marvell

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

Typical gDC1 gain for C2M is just few dB's, and there is no reason to have the same gDC1 as KR/CR

SuggestedRemedy

Reduce gDC1 to -12 dB

Response *Response Status* **C**

REJECT.
This comment is an exact restatement of comment #318 against D1.2.
The response to that comment was:
"REJECT.
The comment does not provide sufficient justification to support the suggested remedy.
It is unclear what benefit the change would achieve. The reference receiver is only used to calibrate the noise in input tests. Even if the typical gDC1 value is limited as stated (without data to support this claim) the results would not changed by reducing the range."
This comment does not include new information to support changing previous decisions.
There is no consensus to make the suggested change.

Cl **176D** *SC* **176D.7.1** *P* **731** *L* **25** # 539

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *Differential peak-to-peak*

A "square wave with a period of at least 128 UI" is statistically off-the-scale unlikely for a scrambled signal, so it's not relevant. Also the scope CRU is not likely to lock to it. A probability of 1e-7 implies an expensively long time collecting data. Signals should be assessed on PRBS13Q or SSPRQ wherever feasible to avoid multiple data captures.

SuggestedRemedy

Change to a more reasonable and statistically relevant method, using extrapolation where feasible. For module output where the loss to the observation point is very moderate, go back to PRBS13Q.

Response *Response Status* **C**

REJECT.
Test patterns are specified to be useful for specific measurements. For peak to peak measurements, a square wave is quite useful, while PRBS13Q has been shown to be inadequate. See comment #82 against D1.2, its supporting presentation https://www.ieee802.org/3/dj/public/24_11/ran_3dj_05a_2411.pdf, and additional references therein.
A CRU is not necessary for measurement of peak to peak. Regardless, there is no evidence that a scope's CRU cannot lock on a periodic square wave.
A probability of 1e-7 is relevant for peak-to-peak measurements. The minimum measurement time is 10^7*128 UI or about 12 milliseconds. Even with a sampling scope with effective undersampling, it is not prohibitively long.
The argument "statistically off-the-scale unlikely for a scrambled signal" can be made for any test pattern.
Multiple data captures are performed for C2M and other interfaces anyway, for multiple reasons, including variable Tx equalizer settings. A single peak-to-peak measurement does not add a significant burden.

Cl **176D** *SC* **176D.7.6** *P* **732** *L* **50** # 135

Slavick, Jeff Broadcom

Comment Type **TR** *Comment Status* **D** *ILT (bucket)*

Listing the coefficients and presets that are supported by the PMD here will lay the groundwork for reuse of the 178B over interfaces with differing support.

SuggestedRemedy

Add the following with editorial license at the end of the first paragraph of 176D.7.6
"The coefficients and presets supported by the C2M transmiter during link training are:
-- k_list = {-3, -2 -1, 0, 1}
-- preset 1
-- preset 2
-- preset 3
-- preset 4
-- preset 5"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with considerations of any changes due to other comments about presets.

Cl **176D** *SC* **176D.7.6** *P* **732** *L* **50** # 140

Slavick, Jeff Broadcom

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

steady state measurement is also needed by ILT

SuggestedRemedy

Add "The steady state voltage specifiction needed in 178B.11.4 is specified in 176D.7.4" to the subclause.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #138.

Cl **176D** *SC* **176D.7.6** *P* **733** *L* **2** # 425

Dudek, Mike Marvell

Comment Type **T** *Comment Status* **A** *Tx FFE presets*

There is a significant advantage to not overloading the receiver on short links at the start of transmitter training. This is particularly important for chip to module where multi-rate implementations are only required to support a maximum peak to peak output amplitude of 900mV at the lower speeds.

SuggestedRemedy

Change the OUT-OF-SYNC value of c(0) to 0.5+/-0.025 in table 176D-8. Consider making that change for KR, CR and C2C as well.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #125.

Cl **176D** *SC* **176D.7.7** *P* **733** *L* **45** # 423

Dudek, Mike Marvell

Comment Type **TR** *Comment Status* **A** *Host output*

The referenced measurement for the measurement of SNDR does not include crosstalk from the Rx into the Tx. This is OK for 100GBASE-CR1 as the Rx signal at the measurement point is relatively small due to having to get through the channel to get to the measurement point and for the most critical systems the channel loss will be large. This is not the case for the host output where with a high loss channel the module will be requested to provide a large amplitude output.

SuggestedRemedy

Add an additional exception "- For the measurement of SNDR for the host output, the inputs to the host compliance board at TP4a shall be 1000mV peak to peak PAM4 signals with 5ps risetime and PRBS31Q, or PCS data. " Consider whether a similar requirement should be added for the module output with 500mV peak to peak amplitude and 10ps risetime.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment addresses the potential problem of the host's connector or internal routing having excessive NEXT that could degrade the signal that reaches the module's receiver.

The CRG reviewed slides 2-6 in
https://www.ieee802.org/3/dj/public/25_01/ran_3dj_01_2501.pdf .

Implement the recommendation on slide 6 of ran_3dj_01_2501, with the following:
Keep "preset 1" (no change to a new preset).
Add an additional requirement that the target of the pattern generator's transition time is 6 ps.

Implement with editorial license.

Cl **176D** *SC* **176D.7.11** *P* **734** *L* **33** # 396

Healey, Adam — Broadcom Inc.

Comment Type **T** *Comment Status* **A** *Amplitude tolerance*

The amplitude tolerance of a receiver is defined to be the maximum amplitude at which the block error ratio requirement is met when in DATA mode. The test condition is stated to be preset 1 (no equalization). However, the subclause also states that the receiver "is allowed to control the transmit equalizer coefficients of its partner using the ILT protocol (see 176D.7.6) to create suitable output signal." This means that receiver can change the transmitter configuration to something other than preset 1 resulting in a signal with lower amplitude, higher equalization, or some combination thereof prior to reaching DATA mode. This calls into question why the receiver is required to meet block error ratio requirements for preset 1 in DATA mode. It would be more justifiable to require a receiver to be able to acquire training frame lock when connected to a transmitter with maximum amplitude and in the preset 1 configuration. However, this only requires reliable detection of DME-encoded (PAM-2) data at a lower effective rate. This can be expected to be a (much) lower bar than meeting block error ratio requirements in DATA mode. Note the Clause 178 and Annex 176C do not include amplitude tolerance requirements while Clause 179 and Annex 176D do. There is no obvious reason why amplitude tolerance requirements are needed in some cases but not in others since ILT is available throughout.

SuggestedRemedy

Remove the amplitude tolerance requirements from Clause 179 and Annex 176D. If it is deemed necessary to state that a receiver must be able to acquire training frame lock over some range of transmitter parameters, and thereby enable transmitter configuration via ILT, then the requirement should be restated in these terms and applied to all relevant clauses and annexes (including Clause 178 and Annex 176D).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The existing text in 176D.7.11 defines amplitude tolerance specifically as the "maximum initial peak-to-peak output", where that "initial" is defined as the value with preset 1. This initial value is a characteristic of the transmitter used in the test. The DUT is allowed to control the equalization state using ILT (before going into DATA mode), and thus the error ratio requirements are not required to be met at preset 1. However, the initial value may still affect the signal after ILT (e.g. if the DUT only selects another preset, the swing will be scaled by the "initial" value).

Note that the response to comment #352 rephrased the specification such that tolerance is defined as v_f of the transmitter (which is specified more precisely, including measurement with preset 1), instead of the peak-to-peak value, aligning it with the definition in 179.9.5.2. This may clarify the intent of the amplitude tolerance.
The comment highlights the lack of amplitude tolerance requirements in clause 178 and annex 176C. This has been addressed by comment #426.

Resolve using the responses to #352 and #426.

Cl **176D** *SC* **176D.7.11** *P* **734** *L* **34** # 352

Ran, Adee — Cisco

Comment Type **TR** *Comment Status* **A** *Amplitude tolerance*

It is preferable to define amplitude tolerance in terms of v_f of the connected transmitter at its compliance point (as done in 179.9.5.2, following comment #406 against D1.2) rather than peak-to-peak differential voltage, which depends on the pattern and the loss at the measurement point.

SuggestedRemedy

In the first paragraph, change "defined as the maximum initial peak-to-peak output" to "defined as the maximum steady-state voltage (see 176D.7.4)".

In the second paragraph, change "The initial peak-to-peak output is defined as the peak-to-peak differential output (see 176D.7.1), with equalization set to preset 1 (see Table 176D-8), of the transmitter that is connected" to "The steady-state voltage is measured for the transmitter that is connected".

In Table 176D-3 and Table 176D-5, change the parameter name from "Amplitude tolerance" to "Amplitude tolerance (v_f)" and change the value from 1 to 0.5.

Implement with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In the first paragraph, change "defined as the maximum initial peak-to-peak output" to "defined as the maximum steady-state voltage (see 176D.7.4)".

In the second paragraph, change "The initial peak-to-peak output is defined as the peak-to-peak differential output (see 176D.7.1), with equalization set to preset 1 (see Table 176D-8), of the transmitter that is connected" to "The steady-state voltage is measured for the transmitter that is connected".

In Table 176D-3 and Table 176D-5, change the value of "Amplitude tolerance" from 1 to 0.5, and add a footnote stating that the required value is defined as v_f at the test transmitter's output.

Implement with editorial license.

Cl **176D** *SC* **176D.7.12** *P* **735** *L* **13** # 259

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

Receiver interference tolerance parameters are TBD

SuggestedRemedy

Per https://www.ieee802.org/3/dj/public/24_05/kareti_3dj_01_2405.pdf, and recommend the folowing parameters:
Receiver package class A or B
Test1: 12.5 to 13.5 dB
Test2: 31.5 to 32.5 dB

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The referenced presentation does not seem to recommend, or directly mention, the loss values provided in the suggested remedy.
Package class is not part of the test channel, although it does affect the test calibration (see items a and b of 176D.7.12.2). It is not TBD and does not require a change.
The loss values for test 2 match the ones suggested by comment #353.
The values for test 1 do not match the ones suggested by comment #353; they are substantially larger than the ILdd of nominal mated test fixtures (9.75 dB), which is the assumed minimum channel.

Resolve using the response to comment #353.

Cl **176D** *SC* **176D.7.12** *P* **735** *L* **13** # 208

Brown, Matt — Alphawave Semi

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

Values for channel ILdd are TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #353.

Cl **176D** *SC* **176D.7.12** *P* **735** *L* **13** # 353

Ran, Adee — Cisco

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

In Table 176D-9, the test channel insertion loss for all module tests is TBD.

The IL should be the min/max die-to-die IL minus the IL allocation for the module, plus the nominal HCB IL (which is equal to the IL allocation for the module).

The test channel includes a mated test fixture as a minimum.

The minimum IL case (for test 1) should represent a direct connection to the MCB (such that the test channel is just the mated test fixture, with a nominal IL of 9.75 dB).

The maximum IL case (for Test 2) should be based on the adopted C2M die-to-die channel budget of 32 dB, as shown in Figure 176D-6.

SuggestedRemedy

In row "Test channel IL", change column values (currently TBD) as follows:
Module test 1 (low loss) - Min: 9.25, Max: 10.25
Module test 2 (high loss) - Min - 31.5, Max: 32.5

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy, and add a footnote for the min/max of test 1:
"The minimum loss test channel consists of a mated test fixture with no Frequency dependent attenuator".

Cl **176D** *SC* **176D.7.12** *P* **735** *L* **14** # 354

Ran, Adee — Cisco

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

In Table 176D-9, "Host channel parameters" is TBD.

The host channel model has been adopted, and is summarized in Table 176D-5. This table is specified to be used in item a of 176D.7.12.2. Therefore, the "TBD" is already defined.

SuggestedRemedy

In row "Host channel parameters", change "Host test" column from TBD to "Table 176D-5".

Response *Response Status* **C**

ACCEPT.

Cl **176D** *SC* **176D.7.12** *P* **735** *L* **14** # 209

Brown, Matt — Alphawave Semi

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

Value for "Host channel parameters" is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #354.

Cl **176D** *SC* **176D.7.13.2** *P* **739** *L* **9** # 260

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

Real links must operate with noise, ISI, and SJ. Recomending that jitter tolerance test have no broadband noise will render JTOL test useless. C2M JTOL has always included broadband noise with SJ, the test method exist to perform such as test and given the concern about block error the JTOL test should be comprehensive. The KR/C2C JTOL leagcy goes back to 25G-KR which only tested the receiver with SJ, we all know any SerDes unstress will do good job tracking SJ and any SerDes can do good job with ISI in absent of SJ!

SuggestedRemedy

Lets not weaken C2M JTOL test by not including broadband noise, change No broadband noise added to Broadband noise is redcued by 0.05 UI.

Proposed Response *Response Status* **W**

PROPOSED REJECT.
SJ is not an inherent impairment of links. It is a model of bounded uncorrelated jitter that transmitters can have, which is used in tests.

The interference tolerance (ITOL) test is calibrated with additive broadband noise using COM, in consideration of the jitter of the test transmitter (which is recommended to be adjusted to "such that the jitter parameters are as close as practical to their specified limits"; this typically requires injection of both RJ and BUJ). Thus, the ITOL itself requires tracking the maximum jitter that a transmitter is allowed to generate.
Note that the specified jitter limit is based on a dual-Dirac model with DJ amplitude A_DD=0.02 UI (peak-to-peak is 0.04 UI) and RJ with RMS of 0.01 UI.

Jitter tolerance (JTOL) is a separate test that covers the jitter tracking capability at multiple frequencies considering the expected CDR bandwidtrh. The jitter is sinusoidal and has a minimum peak-to-peak of 0.05 UI, larger than that of the dual-Dirac model, and at low frequencies that create colored noise, so it has a larger stress on the receiver than the COM model. As the NOTE under Table 176D-10 indicates, it is possible that this jitter will cause failure to meet the COM requirement even without additive noise. The statement "with the exception that no noise is injected" in 176D.7.13.2 pertains to the additive noise used in ITOL.

Contrary to the claim in the comment, C2M JTOL in previous generations does not include any broadband noise, only jitter (RJ and BUJ, whose values are not specified). See Figure 120G-10, Figure 120E-12, and Figure 83E-15. Thus the current C2M requirements are no weaker than in previous generations (in fact, ITOL is a new addition that make them stronger).

In practice, a receiver that is unable to track jitter as required will likely fail at one or more of the test frequencies regardless of the noise stress, which has a minor effect compared to untracked jitter. Adding more complexity to the test that is unrelated to the purpose (jitter tolerance) is not required.

Cl **177** *SC* **177.1.4** *P* **307** *L* **26** # 274

Ran, Adee Cisco

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

In Figure 177-2, the receive direction is shown as if the first function is PAM4 decoding and the rest of the data path is defined as bits.
This description matches a hard-decoding operation, but the inner FEC is assumed to have a soft decoder, as stated in 177.5.4.

In a soft-decoding receiver, the "PAM4 decoding" operation is actually part of the "Inner FEC decode" block.

The PAM4 (hard) decoding is required for the inner FEC sync - since this cannot rely on the decoder output - but the rest of the data path (deinterleaving and decoding) should operate on the input symbols directly. The suggested remedy is based on this idea.

SuggestedRemedy

Move the "PAM4 decoding" and "inner FEC sync" operations to a separate branch. Make the output of the "Inner FEC sync" a dashed-line input into the "pad removal" (a separate block) and the deinterleaver (renamed from "1:8 bit-pair deinterleaver" to "1:8 symbol deinterleaver").

The main input to the deinterleaver block is the signal from the sublayer below.

In the "PAM4 decoding" subclause 177.5.1, add a statement that this function includes hard decision and is used only for initial synchronization. The output of this function is not used in the remainder of the data path, since the "Inner FEC decode" function in 177.5.4 performs the required decoding.

In the "PAM4 deinterleaving" subclause 177.5.3 change the title to "1:8 symbol deinterleaving" and in its text change "bit pairs" to "input symbols".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slides 3-5 of the logic editoral slides at:
https://www.ieee802.org/3/dj/public/25_01/nicholl_3dj_01_2501.pdf

Implement the changes specified in nicholl_3dj_01_2501 on slides 4 and 5 with editorial license.

Cl **177** *SC* **177.1.4** *P* **307** *L* **31** # 148

He, Xiang Huawei

Comment Type **TR** *Comment Status* **A** *Inner FEC test patterns*

There should be some test patter checker on the receive path.
A contribution will be provided to support this with block diagrams.

SuggestedRemedy

Add "test pattern check" on the receive path on the PAM4 decode box, similar as in Figure 176-2.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed the following presentation:
https://www.ieee802.org/3/dj/public/25_01/he_3dj_01_2501.pdf

Add test pattern checker indication to the receiver function as shown on slide 3 of he_3dj_01_2501.pdf with text added as shown on slide 6.

Implement with editorial license.

Cl **177** *SC* **177.2** *P* **307** *L* **47** # 486

Opsasnick, Eugene Broadcom

Comment Type **E** *Comment Status* **A** *(bucketp)*

"may" indicates an optional function. In the context of the first paragraph in 177.2, "might" could be preferred.

SuggestedRemedy

Change: "For the 200GBASE-R Inner FEC, the client sublayer may be the 200GBASE-R 8:1 SM-PMA or 200GBASE-R 1:1 SM-PMA."

To: "For the 200GBASE-R Inner FEC, the client sublayer might be a 200GBASE-R 8:1 SM-PMA or a 200GBASE-R 1:1 SM-PMA."

And make similar changes to each sentence in the first paragraph of 177.2.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change:
"For the 200GBASE-R Inner FEC, the client sublayer may be the 200GBASE-R 8:1 SM-PMA or 200GBASE-R 1:1 SM-PMA. For the 400GBASE-R Inner FEC, the client sublayer may be the 400GBASE-R 16:2 SM-PMA or 400GBASE-R 2:2 SM-PMA. For the 800GBASE-R Inner FEC, the client sublayer may be the 800GBASE-R 32:4 SM-PMA or 800GBASE-R 4:4 SM-PMA. For the 1.6TBASE-R Inner FEC, the client sublayer may be the 1.6TBASE-R 16:8 SM-PMA or 1.6TBASE-R 8:8 SM-PMA."

to:
"For the 200GBASE-R Inner FEC, the client sublayer is a 200GBASE-R 8:1 SM-PMA or a 200GBASE-R 1:1 SM-PMA. For the 400GBASE-R Inner FEC, the client sublayer is a 400GBASE-R 16:2 SM-PMA or a 400GBASE-R 2:2 SM-PMA. For the 800GBASE-R Inner FEC, the client sublayer is an 800GBASE-R 32:4 SM-PMA or an 800GBASE-R 4:4 SM-PMA. For the 1.6TBASE-R Inner FEC, the client sublayer is a 1.6TBASE-R 16:8 SM-PMA or a 1.6TBASE-R 8:8 SM-PMA."

Make similar changes in 184.3.

[Editor's note: CC: 177, 184]

Cl **177** *SC* **177.2** *P* **308** *L* **22** # 487

Opsasnick, Eugene Broadcom

Comment Type **T** *Comment Status* **A** *(bucketp)*

The last sentence prior to Table 177-1 states "When the value of SIGNAL_OK is IN_PROGRESS or FAIL, the corresponding rx_symbol parameters on all lanes are unspecified.". This implies the rx_symbol parameters have valid values when SINGAL_OK is OK or READY. However, the READY value is set when "all_synced==false". Shouldn't the rx_symbol parameter also be invalid/unspecified when the SIGNAL_OK is READY?

The same may be true for the SINGNAL_OK description immediately prior to Table 177-2 on page 309.

SuggestedRemedy

Change: "When the value of SIGNAL_OK is IN_PROGRESS or FAIL, the corresponding rx_symbol parameters on all lanes are unspecified."

To: "When the value of SIGNAL_OK is READY, IN_PROGRESS or FAIL, the corresponding rx_symbol parameters on all lanes are unspecified."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy.

In addition, in 116.3.3.3.1 on page 149, line 30, change:
"The rx_symbol parameters presented to the next higher sublayer are valid but do not represent traffic data."
to:
"The rx_symbol parameters presented to the next higher sublayer do not represent traffic data and may be invalid".

Implement with editorial license.
[Editor's note: CC 116]

Cl **177** *SC* **177.3.** *P* **308** *L* **44** # 275

Ran, Adee Cisco

Comment Type **TR** *Comment Status* **A** *PMD service interface*

The statement that the PMD service interface is in instance of the inter-sublayer service interface is misleading.

The service interface semantics in 116.3.3.1.1 state that tx_symbol and rx_symbol are either from a set of two values (NRZ) or from a set of four values (PAM4).

In this interface (which is the service interface below the inner FEC), the tx_symbol parameters are PAM4 symbol streams, but contrary to what's written here, the rx_symbol are not PAM4 symbol streams - they are converted to PAM4 symbols by the inner FEC's decoding function.

The final sentence of this paragraph states that rx_symbol "may include an implementation-dependent set of values that are beyond the scope of this standard" which is an awkward way of saying it is not PAM4 symbols. In fact, 177.5.4 states that the decoder requires "a higher resolution than two bits for each received PAM4 symbols" (sic), so "more than PAM4" is a requirement, not "may".

A similar problem exists in the definitions of the PMD service interfaces in 182.3 and 183.3, and in 185.3 (this PMD uses the inner FEC in 184 - but there is no definition of the interface below the inner FEC in clause 184).

SuggestedRemedy

Separate this paragraph into two, one for transmit direction and one for receive direction.

In the transmit direction, the service interface primitives (PMD:IS_UNITDATA_i.request and PMD:IS_SIGNAL.indication) are as defined in the generic inter-sublayer service interface (as written in D1.3).
In the receive direction, PMD:IS_SIGNAL.indication is as defined by the generic inter-sublayer service interface, but PMD:IS_UNITDATA_i.indication is modified from that service interface, in that the rx_symbol parameters are taken from a set of more than four values, as generated by the PMD's service interface. The size of this set is implementation dependent.

Apply similar changes in the PMD service interface definitions in 182.3, 183.3, and 185.3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed the related slides in
https://www.ieee802.org/3/dj/public/25_01/brown_3dj_03a_2501.pdf

Implement the changes outlined on slide 8 of brown_3dj_03a_2501 with editorial license.

[Editor's note: CC 182, 183, 185]

Cl **177** *SC* **177.4** *P* **309** *L* **27** # 121

Slavick, Jeff Broadcom

Comment Type **T** *Comment Status* **A** *(bucketp)*

Introductory sentence could be useful

SuggestedRemedy

Add the following to 177.4 "The following processes are performed independently on each FEC service interface input lane.

Response *Response Status* **C**

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

In addition, add a similar introduction to 177.5 with editorial license.

Cl **177** *SC* **177.4** *P* **332** *L* **26** # 10

Brown, Matt Alphawave Semi

Comment Type **T** *Comment Status* **A** *Inner FEC test patterns*

In order to properly test the performance of an optical link for PMD that uses the Inner FEC a PRBS31 test pattern with Inner FEC encoding is required. The generator and checker may be defined in the Inner FEC sublayer or in the PMA sublayer above the Inner FEC.

SuggestedRemedy

At the input to the convolutional interleaver on the transmit path add the ability to insert a PRBS31 (not PRBS31Q) test pattern and at the output of the convolutional deinterleaver on the receive path add the ability to check a PRBS31 pattern. If the PRBS31 checker is defined in the Inner FEC sublayer then the block error counters as defined in 176.7.4.1 will also need to be added. Alternately source and terminate the PRBS31 pattern on the PMA above the Inner FEC; PRBS31 will need to be added (in addition to PRBS31Q).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add a test mode to include the PRBS31 test pattern from the above PMA sublayer pattern generator and checker on the PMA above the Inner FEC. Implement suggested remedy with editorial license.

Add the PRBS31 pattern encoded by 800GBASE-R inner FEC to tables 182-16, 182-17, 183-12, 183-13.

Cl **177** *SC* **177.4.1** *P* **309** *L* **32** # 276

Ran, Adee Cisco

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

"4-symbol" is used only here, elsewhere the term "symbol quartet" is used instead.

SuggestedRemedy

Change to "symbol quartet"

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.4.1.1** *P* **310** *L* **29** # 120

Slavick, Jeff Broadcom

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

The demultiplexing function refers to "service interface below the PMA" but this is above the Inner FEC.

SuggestedRemedy

Add "with the exception that it operates on the Inner FEC service interface input lanes"

Response *Response Status* **C**

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

Cl **177** *SC* **177.4.1.2** *P* **310** *L* **36** # 419

Nicholl, Gary Cisco Systems

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

I think the sentence "The data
stream is not altered.", although accurate, is confusing/contradictory as the first sentence in the subclause states that "The alignment marker lock function is performed as defined in 176.4.3.3.", , and 176.4.3.3 by definition does alter the data stream.

I tihnk it would be better to update Figure 177-3 to show the symbol demultiplex and alignment marker lock functions for 200G/400G to be "off to the side" from the main data path, with the main data path drawn as a straight arrow from top to bottom of diagram (indicating that the main data path is passthrough and is not altered in any way).

SuggestedRemedy

Delete the sentence "The data path is not altered" on line 36.

Update the 200GBASE-R/400GBASE-R portion of Figure 177-3 as described in the comment.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Keep the "data stream is not altered", and update the diagram to show a straight arrow. Otherwise implement the suggested remedy with editorial license.

Cl **177** *SC* **177.4.1.3** *P* **310** *L* **47** # 45

Huber, Thomas Nokia

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

The wording here is a bit awkward - the intent is to define a much stricter maximum skew tolerance in the inner FEC than in 800GBASE-R PCS, but the text says ". Skew between PCSLs is removed as defined in 172.2.5.1, except that the 800GBASE-R deskew function shall support a maximum Skew of 25 ns between PCS lanes..."

SuggestedRemedy

Use language more like what 172.2.5.1 uses. Change the text to read ". Skew between PCSLs is removed as defined in 172.2.5.1, except that a maximum Skew of 25 ns is supported between PCS lanes..."

Response *Response Status* **C**

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

Cl **177** *SC* **177.4.1.3** *P* **310** *L* **52** # 46

Huber, Thomas — Nokia

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

The wording here is a bit awkward - the intent is to define a much stricter maximum skew tolerance in the inner FEC than in 800GBASE-R PCS, but the text says ". Skew between PCSLs is removed as defined in 172.2.5.1, except that the 1.6TBASE-R deskew function shall support a maximum Skew of 25 ns between PCS lanes..."

SuggestedRemedy

Use language more like what 175.2.5.1 uses. Change the text to read ". Skew between PCSLs is removed as defined in 175.2.5.1, except that a maximum Skew of 25 ns is supported between PCS lanes..."

Response *Response Status* **C**

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

Cl **177** *SC* **177.4.1.5** *P* **311** *L* **15** # 277

Ran, Adee — Cisco

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

The reader may be curious why symbol multiplexing is not performed for 200GBASE-R and 400GBASE-R PHYs.

This is because the data on each PCS lane already includes 4-way RS-FEC interleaving performed by the PMA (as illustrated in Figure 176-6). But that may be difficult to understand if not stated explicitly.

SuggestedRemedy

Add an informative note at the end of 177.4.1.5:
"NOTE--In 200GBASE-R and 400GBASE-R PHYs, this operation is not required, since the output of the PMA below the PCS is already symbol multiplexed with 4-way interleaving (see Figure 176-6)."

Response *Response Status* **C**

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

Cl **177** *SC* **177.4.2** *P* **311** *L* **18** # 146

He, Xiang — Huawei

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

The term "PMA lane" is not accurate. Within the Inner FEC sublayer, it is an "Inner FEC lane".

SuggestedRemedy

Change "PMA lane" to "Inner FEC lane", to be consistent within the clause.

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.4.2** *P* **311** *L* **24** # 278

Ran, Adee — Cisco

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

The last delay line (labeled "Delay Line 2") is actually not a delay line.
The interleaver can be described as being composed of three data paths, of which the first two include delay lines (0 and 1) and the third does not.

SuggestedRemedy

Rephrase the text in this subclause and change Figure 177-4 per this comment, changing "Delay Line n" to "interleaver path n".

Implement any additional edits required by this change with editorial license.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **177** *SC* **177.4.2** *P* **311** *L* **25** # 34

Huber, Thomas Nokia

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

The text here seems a bit repetetive. The four paragraphs that start at line 25 spell out the delays for each delay line for each rate in detail, and then at line 50 there is a more abstract specification of the same thing.

SuggestedRemedy

Rewrite the first paragraphs to be algorithmic rather than per-rate:
"The first line (Delay Line 0) delays the data by 4x2xQ RS-FEC symbols, the second line (Delay Line 1) by 4x1xQ RS-FEC symbols, and the last line (Delay Line 2) adds no delay. The values of Q are shown in table 177-X."
Add a table with a column for the rate (200GBASE-R, 400GBASE-R, etc.) and a column for the value of Q.
Delete the sentence at lin 51 that starts with "The number Q differs for each..." and the bullet list that follows (this information is replaced by the table).

Response *Response Status* **C**

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

Cl **177** *SC* **177.4.2** *P* **311** *L* **26** # 279

Ran, Adee Cisco

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

Commas are missing in the 4 paragraphs about delay lines, and periods are inconsistent.

SuggestedRemedy

In the first paragraph, add commas after "200GBASE-R" and before "and the last line". Similarly for the other 3 paragraphs.

Add a period at the end of the second and third paragraphs.

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.4.2** *P* **311** *L* **42** # 115

Slavick, Jeff Broadcom

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

The deskewed data is fed into the covolutioner.

SuggestedRemedy

Change " The input data from the FEC service interface lane is fed into" to: "The data from deskewed PMA lane is fed into"

Response *Response Status* **C**

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

Cl **177** *SC* **177.4.2.5** *P* **311** *L* **10** # 489

Opsasnick, Eugene Broadcom

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

The plural of PCSL ahouls be PCSLs, not PCSLS.

SuggestedRemedy

Change "PCSLS" to "PCSLs" (lowercase s).

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.4.2.5** *P* **311** *L* **50** # 490

Opsasnick, Eugene Broadcom

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

Incorrect cross-reference.

SuggestedRemedy

Change "Figure 177-5" to "Figure 177-4".

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.4.4** *P* **312** *L* **34** # 280

Ran, Adee Cisco

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

The last sentence in 177.4.4 is "Within each RS-FEC symbol, bit 0 is transmitted first and bit 9 is transmitted last". The transmission order is relevant for the 120-bit block creation, not for the circular shift (circular shift would be the same regardless of the bit order within a symbol).

SuggestedRemedy

Move the quoted sentence to 177.4.3.

Response *Response Status* **C**

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

Cl **177** *SC* **177.4.5** *P* **313** *L* **24** # 281

Ran, Adee Cisco

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

Missing commas

SuggestedRemedy

Add a comma after "flows".
Add commas before and after "m<119:0>".

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.4.5** *P* **313** *L* **51** # 282

Ran, Adee Cisco

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

the integer i is a scalar, not a vector, so it should not be in boldface here (it is not bold in other instances)..

SuggestedRemedy

Remove the boldface format from i.

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.4.5** *P* **313** *L* **51** # 283

Ran, Adee Cisco

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

"(s0,i, s1,i, s2,i, s3,i, s4,i, s5,i, s6,i) is the binary vector corresponding to the element a_i in the Galois Field GF(2^7) with primitive polynomial x^7 + x^3 + 1"

This reads as if the s bits are the binary representation of the 128 elements of the field - but per Equation 177-2 these are actually the binary coefficients in the linear combination of a_0 through a_6 that creates a_i. I suspect these are not the same.

SuggestedRemedy

Move the quoted sentence after the subsequent one (which states that the elements can be expressed as a linear combination), and change "binary vector corresponding to" to "binary coefficients of the linear combination that creates".

Response *Response Status* **C**

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

Cl **177** *SC* **177.4.5** *P* **314** *L* **1** # 284

Ran, Adee Cisco

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

The second sentence in the first paragraph spans 5 lines and includes 6 commas, 3 instances of "and", and 2 instances of "where". It is difficult to follow.
It also includes "first", but there seems to be no further steps.

SuggestedRemedy

Rewrite this sentence, preferably breaking it into more readable pieces.

Response *Response Status* **C**

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

Cl **177** *SC* **177.4.7** *P* **315** *L* **10** # 285

Ran, Adee Cisco

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

"The rate. is."
The exact rate depends on the input rate which has some tolerance.
It would be helpful for the reader to write the ratio of the output rate and the input rate. This information should preferably be placed in the "summary of functions" in 117.1.3 as well.

SuggestedRemedy

Change "the rate" to "the nominal rate".
Add a statement about the ratio, here and in 177.1.3.

Response *Response Status* **C**

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

Cl **177** *SC* **177.4.7.1** *P* **316** *L* **6** # 421

Dudek, Mike Marvell

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

The FAS descriptions in table 177-4 have the MSB transmitted first as other clauses do and as is shown with the vectors in Annex 177A. In other clauses the MSB is also transmitted first and is shown as the left most bit in diagrams. Figure 177-8 however might be interpreted as the FAS being transmitted in the other order.

SuggestedRemedy

Clarify Figure 177-8 to match the text and Annex

Response *Response Status* **C**

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

Cl **177** *SC* **177.4.9** *P* **317** *L* **4** # 286

Ran, Adee Cisco

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

"These test patterns are used to test adjacent layer interfaces or to perform testing between an Inner FEC and external testing equipment"

Which adjacent layer interfaces? and what is "testing between"?

These generators are only in the output direction, so they can only be used to drive the PMD service interface (which is then used with external testing equipment).

SuggestedRemedy

Change to
"If implemented, these test patterns can be used to drive the PMD service interface for PMD testing purposes".

Response *Response Status* **C**

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

Cl **177** *SC* **177.4.9** *P* **317** *L* **5** # 287

Ran, Adee Cisco

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

It is not specified what happens when more than one generator is enabled on the same lane.
The definitions in clause 120 which are referenced include different control variables and MDIO mappings, and the case where two are enabled is only covered in 45.2.1.170.

Note that some of the patterns in clause 120 are not per-lane but here all patterns have enable bits per lane.

SuggestedRemedy

Add text in 177.4.9 stating that all generators are per-lane, that enabling any of the pattern generators on a lane affects only that lane, and that the behavior when more than one generator is enabled on the same lane is not specified.

Response *Response Status* **C**

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

Cl **177** *SC* **177.5** *P* **317** *L* **27** # 123

Slavick, Jeff — Broadcom

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

Introductory sentence could be useful

SuggestedRemedy

Add the following to 177.5 "The following processes are performed independently on each PMD service interface input lane.

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.5.1** *P* **338** *L* **27** # 9

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *Inner FEC test patterns*

In Draft 1.3, PRBS13Q and PRBS31Q generators were added to the Inner FEC transmit path output (see 177.4.9). A checker on the input of the receive path would be helpful for rudimentary testing of a PMD or link.

SuggestedRemedy

Add PRBS13Q and PRBS31Q pattern checkers to the input of the Inner FEC receive path.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

PRBS13Q is not necessary.

Resolve using the response to comment #148.

Cl **177** *SC* **177.5.1.1** *P* **317** *L* **41** # 288

Ran, Adee — Cisco

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

"If inverse precoding is enabled, the Inner FEC receive function processes the detected data equivalent to the process specified for input lanes in 135.5.7.2"
In practice, the processing is equivalent only if hard decoding is performed (i.e., in the initial synchronization). In the main data path it is assumed that the Inner FEC decoding operation is performed on soft inputs, so inverse precoding is performed separately as part of that decoding.
It may be beneficial to inform the reader of this difference.

The suggested remedy assumes that the Inner FEC decoding operation is performed on soft input from the PMD, as suggested in another comment.

SuggestedRemedy

Add an informative note at the end of 177.5.1.1:
"NOTE--If inverse precoding operation is enabled as part of the PAM4 decoding, it also affects the decoding operation in 177.5.4, which does not use the output of the PAM4 decoding function."

Response *Response Status* **C**

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

Cl **177** *SC* **177.5.1.1** *P* **317** *L* **43** # 491

Opsasnick, Eugene — Broadcom

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

The second and third sentences of the third paragraph of 177.5.1.1 is hard to understand. Also, this is the first use of "ILT" in this clause and it should be spelled out.

SuggestedRemedy

Suggest changing:
"If ILT function is enabled by the management variable mr_training_enable (see 178B.15), the precoding state on the link partner transmitter is requested using the ILT function. If ILT is disabled by the management variable mr_training_enable, the precoding state on the link partner transmitter is set by management."

to:
"If inter-sublayer link training (ILT) is enabled by the control variable mr_training_enable (see 178B.15), precoding of the received data is enabled at the link partner (transmitter) as requested by the receiver using ILT. If ILT is disabled, then the precoding of data at the transmitter is controlled by a management entity."

Response *Response Status* **C**

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

Cl **177** *SC* **177.5.2** *P* **318** *L* **4** # 501

Opsasnick, Eugene Broadcom

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

Extra "to" and missing verb in second sentence of 177.5.2.

SuggestedRemedy

Change:
"The eight codewords inserted as pad (see 177.4.7) are used to frame to the data stream and then removed before the received data is processed."
to:
"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."

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.5.2** *P* **318** *L* **7** # 290

Ran, Adee Cisco

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

The initial ("blind") deinterleaving and synchronization is performed on bit pairs, since they cannot rely on the FEC decoder.
The source of the bit pairs is likely hard decoding of the input symbols into PAM4 and then into bits.
However, the same deinterleaving is later performed on the input symbols, which are more than bit pairs. This is currently not stated.

SuggestedRemedy

Add text stating that the alignment found by the initial synchronization based on the PAM4 hard decoding is used for deinterleaving of soft inputs into the Inner FEC decoding.

Response *Response Status* **C**

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

Cl **177** *SC* **177.5.2** *P* **318** *L* **7** # 289

Ran, Adee Cisco

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

"Blind 1:8 bit-pair deinterleaving (each pair of bits corresponding to a PAM4 symbol) is performed to eight Inner FEC flows"

It is unclear what "blind" refers to in this operation. "blind" is no defined in 802.3 and its occasional use is inconsistent.

Perhaps "initial" is more adequate here.

SuggestedRemedy

Change "blind" to "initial" in the quoted sentence and the one with the other instance of "blind" in this subclause.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the first sentence to:
"1:8 bit-pair deinterleaving (each pair of bits corresponding to a PAM4 symbol) is performed to eight Inner FEC flows. The initial position is not specified."

Cl **177** *SC* **177.5.2** *P* **318** *L* **19** # 116

Slavick, Jeff Broadcom

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

The statement that you can identify flow 0 and how its done should be one paragraph

SuggestedRemedy

Combine paragraph 4 & 5 in 177.5.2.

Response *Response Status* **C**

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

Cl **177** *SC* **177.5.4** *P* **319** *L* **10** # 291

Ran, Adee Cisco

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

"The Inner FEC decoder is a soft-decision decoder that requires a higher resolution than two bits for each received PAM4 symbols"

Wording can be improved.

SuggestedRemedy

Change to
"The Inner FEC decoding assumes soft-decision operation that requires a resolution of more than two bits for each received symbol".

Response *Response Status* **C**

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

Cl **177** *SC* **177.5.4** *P* **319** *L* **10** # 488

Opsasnick, Eugene Broadcom

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

Typo in tense of "PAM4 symbols".

SuggestedRemedy

Change: ". for each received PAM4 symbols."
To: ". for each received PAM4 symbol."

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.5.4** *P* **319** *L* **11** # 292

Ran, Adee Cisco

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

The assumed correction capability of the decoder is not stated.
Also, it is not stated what happens when a codeword is uncorrectable. I assume the decoder does not mark the data as error in any way (since it is an inner code) but it is not stated. The error patterns that appear in this case are not described.

Compare to the RS-FEC decoder specification in 91.5.3.3 (where there are normative specifications for correction capability and uncorrectable error marking).

This is important information for testing, monitoring and analyzing the performance of an implementation.

The suggested remedy is based on slide 9 of
https://www.ieee802.org/3/df/public/22_05/22_0517/bliss_3df_01a_220517.pdf.

SuggestedRemedy

Add some test e.g.
"The decoder is expected to correct all codewords in which hard decision would result in up to one bit error and most codewords with up to three bit errors. Codewords that are not decoded correctly will contain at least four bit errors"
Or modifications of the above if necessary.

If there is no consensus for additional text (either the one above or otherwise), add an editor's note inviting contributions in this area.

Response *Response Status* **C**

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

Cl **177** *SC* **177.5.4** *P* **319** *L* **11** # 293

Ran, Adee Cisco

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

"The decoder evaluates the incoming codeword and determines the most likely codeword value"

Then input to the decoder is not a codeword (a codeword is a member of a set of 128-bit vectors). The input is a vector of "soft" samples that corresponds to a transmitted codeword.

SuggestedRemedy

Change to "The decoder evaluates the incoming block of 64 rx_symbol inputs and determines the most likely codeword value".

Response *Response Status* **C**

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

Cl **177** *SC* **177.5.4..1.5** *P* **319** *L* **52** # 118

Slavick, Jeff Broadcom

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

We're specifyng the behavior of bin 3, so starting with "Note' could be a bit misleading

SuggestedRemedy

Change the last sentence to read "Error bin 3 incrments when three or more bits are corrected in an Inner FEC codeword."

Response *Response Status* **C**

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

Cl **177** *SC* **177.5.4.1.1** *P* **319** *L* **21** # 294

Ran, Adee Cisco

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

"The output of the Inner FEC decoder will recognize the miscorrected codewords as corrected codewords."

The output is not a separate entity, it is a block of 120 bits that has no information about the type of codeword it came from. The counter is internal to the decoder.

SuggestedRemedy

Change to
"The Inner FEC decoder will treat any miscorrected codeword as a corrected codeword."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change to:
"The Inner FEC decoder interprets miscorrected codewords as corrected codewords."
Implement with editorial license.

Cl **177** *SC* **177.5.4.1.1** *P* **319** *L* **24** # 117

Slavick, Jeff Broadcom

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

There is a reference to clause 45 here, I think we want that all to be in the tables

SuggestedRemedy

Delete the "(see 45.2.1.213h)"
In 177.5.4.1 add the following senetence "Mapping of the counters to management variables is specified in 177.10"

Response *Response Status* **C**

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

Cl **177** *SC* **177.5.4.1.2** *P* **319** *L* **29** # 295

Ran, Adee Cisco

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

"An uncorrected Inner FEC codeword is a codeword that contains errors that were not able to be corrected by the decoders."

The phrase "able to be corrected by the decoders" is convoluted. The ability is in the decoder, not in the codeword.

It is unclear to me if a decoder is even allowed to "not correct" a codeword. Does it mean that hard detection would result in 4 errors, such that the decoder is unsure of the most likely codeword, so it just spits the hard-detected bits (stripping the parity bits)? if that is done, then the (normative?) statement in 177.5.4 "The decoder evaluates the incoming codeword and determines the most likely codeword value" is not true.

SuggestedRemedy

At the minimum change the quoted statement to "An uncorrected Inner FEC codeword is a codeword with errors that the decoder chose not to correct due to a high probability of miscorrection".

Preferably add some text in 177.5.4 to cover this possibility and the likelihood that the message contains several bit errors.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 177.5.4.1.2, change "contains errors that were not able to be corrected by the decoder" to "contains errors that the decoder was unable to correct".

In 177.5.4, line 11, the statement is made:
"The decoder evaluates the incoming codeword and determines the most likely codeword value".

This statement may be made more clear by using a different term than "codeword value" for the output of the inner fec decoder, for example "120-bit block" or "payload". Update this statement with editorial license.

Cl **177** *SC* **177.5.4.1.4** *P* **319** *L* **45** # 108

Mi, Guangcan — Huawei Technologies Co., Ltd

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

inner FEC bin counters can be used to roughly measure pre-Inner FEC BER. Pre-FEC BER is implicit.

SuggestedRemedy

change to "pre-Inner-FEC BER"

Response *Response Status* **C**

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

Cl **177** *SC* **177.5.4.1.5** *P* **319** *L* **48** # 13

Brown, Matt — Alphawave Semi

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

The index "i" is typically used for the lane number. Since counters need to be defined per lane, this index "i" will cause some ambiguity in the management variables and MDIO register definitions. For similar bin counters defined in 174A.6 and 176.7.4.1 the index "k" is used for this purpose.

SuggestedRemedy

For the bin counters defined in 177.5.4.1.5 change the index "i" to "k". Also update Table 177-7 and definitions in Clause 45 appropriately.

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.5.4.1.5** *P* **319** *L* **49** # 395

Shrikhande, Kapil — Marvell

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

The definition of the inner fec codeword error bin counters in 177.5.4.1.5 could be edited to better align to the FEC codeword error bin counter in 175.2.5.3.

SuggestedRemedy

Align bin counter definition format in 177.5.4.1.5 to the bin counter in 175.2.5.3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #11.

Cl **177** *SC* **177.5.7** *P* **320** *L* **15** # 122

Slavick, Jeff — Broadcom

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

We're restoring to the data stream to its original order, but it could have errors in the so we can't state it's the orignial data from the SM-PMA and that'd be the far end SM-PMA not the local one.

SuggestedRemedy

Change "to restore the original data received from the BASE-R SM-PMA." to be "to restore the order of the data received to be compatible with the BASE-R SM-PMA."

Response *Response Status* **C**

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

Cl **177** *SC* **177.6.2.1** *P* **320** *L* **33** # 493

Opsasnick, Eugene — Broadcom

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

The word AND should be lowercase.

SuggestedRemedy

Change: ". for all eight flows AND the Inner FEC ."
to: ". for all eight flows and the Inner FEC ."

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.6.2.1** *P* **320** *L* **34** # 494

Opsasnick, Eugene Broadcom

Comment Type **E** *Comment Status* **A** *(bucketp)*

Remove comma used between phrases when it is not separating independent clauses of a compound sentance.

SuggestedRemedy

change: " . is identified, and is set to false ."
to: " . is identified and is set to false ."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change:
"A Boolean variable that is set to true when sync_flow<x> is true for all eight flows and the Inner FEC flow 0 is identified and is set to false when sync_flow<x> is false for any x."
to:
"A Boolean variable that is true when sync_flow<x> is true for all eight flows and the Inner FEC flow 0 is identified, and is false otherwise."

Implement with editorial license.

Cl **177** *SC* **177.6.2.1** *P* **320** *L* **34** # 296

Ran, Adee Cisco

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

The definition of all_synced does not (strictly) cover the case where sync_flow<x> is true for all eight flows but the Inner FEC flow 0 is not identified.
Also, "and" here has no special meaning and should not be capitalized.

SuggestedRemedy

Change "set to false when sync_flow<x> is false for any x" to "set to false otherwise".
Change "AND" to "and".

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.6.2.1** *P* **320** *L* **43** # 492

Opsasnick, Eugene Broadcom

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

The word boolean should be capitalized.

SuggestedRemedy

Replace "boolean" with "Boolean" in the definition of these variables:
fas_valid
Inner_FEC_sync_status
slip_done
test_cw
test_fas

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.6.2.1** *P* **320** *L* **53** # 88

Opsasnick, Eugene Broadcom

Comment Type **T** *Comment Status* **A** *reset variable*

FEC_reset is referred to in the definition of the "reset" variable, but FEC_reset is not defined except through a cross-reference to 45.2.1.1.1. The MDIO control variable table (Table 177-6) should instead be used for the cross reference to CL 45 registers).

SuggestedRemedy

Remove the cross-reference text "(see 45.2.1.1.1)" from the definition of reset in 177.6.2.1.

Add the definition of "FEC_reset" to the list of variables in 177.6.2.1 as: "Boolean variable that is true when set by a management entity and is false otherwise".

Add FEC_reset to the MDIO control variables table (Table 177-6) in subclause 177.10 with cross-references to 177.6.2.1 and 45.2.1.1 and the MDIO register bit number, 1.0.15.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Editorial slides with topic "Reset variables" in the following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_01/brown_3dj_03a_2501.pdf

Implement the proposed changes in slides 10 to 18 in brown_3dj_03a_2501, except that in Annex 178B align with the resets defined for PMA and PMD, rather than as proposed on slide 17.

Implement with editorial license.

Cl **177** *SC* **177.6.2.1** *P* **321** *L* **2** # 498

Opsasnick, Eugene Broadcom

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

The definition of the variable restart_inner_fec_sync states it is set by a process, but it can now be set by two separate processes.

SuggestedRemedy

Replace: "A Boolean variable that is set by the Inner FEC synchronization process ."

with: "A Boolean variable that is set by the Inner FEC synchronization process or the Inner FEC pad detection process ."

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.6.2.1** *P* **321** *L* **13** # 497

Opsasnick, Eugene Broadcom

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

The definition of sync_flow<x> should be made more clear. What does it mean to be "in a flow of Inner FEC"? Also, a range of values should be given as "A to B" instead of "A:B".

SuggestedRemedy

Suggest changing the definition of sync_flow<x> from:
"A Boolean variable that is set to true when the receiver has found the correct boundary of codewords in a flow of Inner FEC, where x = 0:7"

to:
"A Boolean variable that is set to true after the inner FEC codeword boundary is found for an inner FEC flow, where x=0 to 7 and represents an inner FEC flow ID before identifing the actual inner FEC flow numbering."

Response *Response Status* **C**

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

Cl **177** *SC* **177.6.2.1** *P* **321** *L* **22** # 495

Opsasnick, Eugene Broadcom

Comment Type **TR** *Comment Status* **A** *(bucketp)*

The varaible "valid_cw" is used in the state diagram in Figure 177-10 and should be added to the list of variable definitions.

SuggestedRemedy

Add definition of "valid_cw" to list of variable definitions in 177.6.2.1 in alphabetical order.

Suggested definition (to make CAL_SYNDROME function obsolete):
"A boolean variable that is set to true when the calculated syndrome of the Inner FEC codeword beign tested is zero and is set to false otherwise."

Response *Response Status* **C**

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

Cl **177** *SC* **177.6.2.2** *P* **321** *L* **26** # 496

Opsasnick, Eugene Broadcom

Comment Type **T** *Comment Status* **A** *(bucketp)*

The function CAL_SYNDROME is not necessary and should be removed from the list of functions and from the state diagram in figure 177-10. The variable "valid_cw" (definition is missing), should be defined to make this function not necessary.

SuggestedRemedy

Remove CAL_SYNDROME from the list of functions. Remove CAL_SYNDROME from figure 177-10 in states CW_CHECK_1, CW_CHECK_2 and CW_CHECK_3

Also remove references to CAL_SYNDROME in definition of bad_cw_cnt and valid_cw_cnt counters in 177.6.2.3

Change the definition of bad_cw_cnt from:
"Counts the number of invalid Inner FEC codewords based on the output of CAL_SYNDROME function. A codeword is considered invalid when its syndrome is non-zero."
to:
"Counts the number of invalid inner FEC codewords received within a period of 150 codewords."

Change the definition of valid_cw_cnt from:
"Counts the number of valid Inner FEC codewords based on the output of CAL_SYNDROME function. A codeword is considered valid when its syndrome is zero."
to:
"Counts the number of valid inner FEC codewords within a period of 50 codewords."

Response *Response Status* **C**

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

Modify the suggested remedy for the definition of the bad_cw_cnt and valid_cw_cnt to use the state of the valid_cw variable as an indication of a valid or invalid codeword.

Change the definition of bad_cw_cnt from:
"Counts the number of invalid Inner FEC codewords based on the output of CAL_SYNDROME function. A codeword is considered invalid when its syndrome is non-zero."
to:
"Counts the number of invalid inner FEC codewords received within a period of 150 codewords. An invalid inner FEC codeword is indicated when valid_cw is false."

Change the definition of valid_cw_cnt from:
"Counts the number of valid Inner FEC codewords based on the output of CAL_SYNDROME function. A codeword is considered valid when its syndrome is zero."
to:
"Counts the number of valid inner FEC codewords within a period of 50 codewords. A valid inner FEC codeword is indicated when valid_cw is true."

Cl **177** *SC* **177.6.2.3** *P* **321** *L* **45** # 502

Opsasnick, Eugene Broadcom

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

The definion of "fas_cnt" is "Counts the interval of Inner FEC codewords between two adjacent pads." What is the interval value? How many codewords?

SuggestedRemedy

Add a number to to explicitly state the number of codewrds that need to be counted or else add a cross-reference to the subclause with this information.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add a cross-reference to the subclause, and implement this change with editorial license.

Cl **177** *SC* **177.6.3** *P* **321** *L* **53** # 499

Opsasnick, Eugene Broadcom

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

Should add a statement that the 8 self-sync processes operate independantly of each other and spell out the word synchronization. Should also state that 8 such processes are required on each input lane.

SuggestedRemedy

Change:
"The Inner FEC sublayer shall implement eight self-sync processes as shown in Figure 177-10 to identify the boundaries of the Inner FEC codewords."

to:
"The Inner FEC sublayer shall implement eight self-synchronization processes as shown in Figure 177-10 for each input lane in the receive direction. Each synchronization process operates independantly on an Inner FEC flow to identify the boundaries of the Inner FEC codewords."

Response *Response Status* **C**

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

Cl **177** *SC* **177.6.3** *P* **321** *L* **54** # 500

Opsasnick, Eugene Broadcom

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

Should add a statement that a PAD detection process is required for each input lane.

SuggestedRemedy

Change:
"Pad detection process follows the process shown in Figure 177-10."

to:
"An inner FEC Pad detection process as illustrated in the state diagram in Figure 177-10 shall be implemented for each input lane in the receive direction."

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.6.3** *P* **322** *L* **4** # 507

Opsasnick, Eugene Broadcom

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

In figure 176-10, a space is needed between the logical-OR (+) operator and variable name.

SuggestedRemedy

Replace "+restart_inner_fec_sync" with "+ restart_inner_fec_sync".

And make the same change in Figure 177-11 on page 323, line 4.

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.6.3** *P* **322** *L* **10** # 504

Opsasnick, Eugene Broadcom

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

In figure 176-10, the condition to transition out of stte INNER_FEC_SYNC_INIT is incorrect.

SuggestedRemedy

Change the condition from:"all_synced" to "UCT"

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.6.3** *P* **322** *L* **12** # 505

Opsasnick, Eugene Broadcom

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

In figure 176-10, in CW_CHECK_3 state, the extra space between variable names and increment operator ++ should be removed.

SuggestedRemedy

Replace "cw_cnt ++" with "cw_cnt++"
and
replace "bad_cw_cnt ++" with "bad_cw_cnt++"

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.6.3** *P* **322** *L* **21** # 506

Opsasnick, Eugene Broadcom

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

In figure 176-10, the new state UNSYNC could use a better name.

SuggestedRemedy

Rename state "UNSYNC" to be "RESTART_SYNC"

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.6.3** *P* **322** *L* **22** # 119

Slavick, Jeff Broadcom

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

In Fig 177-10 the exit from INNER_FEC_SYNC can't be all_sync because that's false when any sync_flow is false and in that state we set it false and need to go through the sync process to set it to true.

SuggestedRemedy

Create new variable "none_synced" -- A Boolean variable that is set to true when sync_flow<x> is false for all eight flows and is set to false when sync_flow<x> is true for any x.

In Fig. 177-10 replace the all_sync criteria from INNER_FEC_SYNC_INIT to GET_BLOCK to be UCT

In Fig 177-11 replace the restart_inner_fec_sync criteria for entering FAS_LOCK_INIT with none_synced

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #504.

Cl **177** *SC* **177.6.3** *P* **322** *L* **23** # 503

Opsasnick, Eugene Broadcom

Comment Type **TR** *Comment Status* **A** *(bucketp)*

In figure 176-10, in state CW_CHECK_1, the conditional increment of cw_cnt should be written with the condition in parentheses on the same line as the increment. See figure 1-1 in 1.2.1.

SuggestedRemedy

Change:
"if valid_cw
valid_cw_cnt++"
to:
"valid_cw_cnt++ (if valid_cw)"

in three places: in CW_CHECK1, CW_CHECK_2 and CW_CHECK3 states.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The conditional counter update statement should be indented.

Change:

if valid_cw
valid_cw_cnt++

to:

if valid_cw then
  valid_cw_cnt++

in three places: in CW_CHECK1, CW_CHECK_2 and CW_CHECK3 states.

Cl **177** *SC* **177.6.3** *P* **323** *L* **6** # 508

Opsasnick, Eugene Broadcom

Comment Type **TR** *Comment Status* **A** *(bucketp)*

In figure 177-11, there are three separate states with the name, COUNT_NEXT. They should have different names.

SuggestedRemedy

Leave COUNT_NEXT as-is at line 6.
On line 24, change "COUNT_NEXT" to "COUNT_2ND".
On line 28, change "COUNT_NEXT" to COUNT_3RD".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy considering suggested state names in both comment #508 and comment #297, with editorial license .

Cl **177** *SC* **177.6.3** *P* **323** *L* **9** # 509

Opsasnick, Eugene Broadcom

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

In figure 177-11, there is an incomplete change to FAS_LOCK_INIT state from D1.2 comment #389.

SuggestedRemedy

In FAS_LOCK_INIT state, add:
"fas_lock <= false"

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.6.3** *P* **323** *L* **13** # 510

Opsasnick, Eugene Broadcom

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

In figure 177-11, in BAD_FAS state, the extra space between variable names and increment operator ++ should be removed.

SuggestedRemedy

Replace "bad_fas_cnt ++" with "bad_fas_cnt++"

Response *Response Status* **C**

ACCEPT.

Cl **177** *SC* **177.6.3** *P* **323** *L* **29** # 297

Ran, Adee Cisco

Comment Type **ER** *Comment Status* **A** *(bucketp)*

In Figure 177-11 there are two states titled "COUNT_NEXT", with identical operations and transition conditions.
I assume both are required (if not, the bottom one should be deleted).

SuggestedRemedy

Rename the states to COUNT_NEXT_1 and COUNT_NEXT_2.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #508.

Cl **177** *SC* **177.8** *P* **324** *L* **17** # 27

Brown, Matt Alphawave Semi

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

Skew constraints are not defined for the PMAs. However, the skew at each interface is defined in 116, 169, and 174 and thus the numbers. The PMA skew constraints may be derived from these. Note however, that the combination of the Inner FEC and the PMA above will need to share any skew allocation.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #452.

Cl **177** *SC* **177.10** *P* **325** *L* **9** # 147

He, Xiang Huawei

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

"Inner FEC enable lane x" variables are not defined or backed by any proposal, and should be removed in the next draft.

SuggestedRemedy

Remove rows "Inner FEC enable lane 0" through "Inner FEC enable lane 7" in Table 177-6.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #1.

Cl **177** *SC* **177.10** *P* **325** *L* **29** # 1

Marris, Arthur Cadence Design Systems

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

Change the "enable" control variables to a single "reset" variablef

SuggestedRemedy

In Table 177-6 rename "Inner FEC enable lane 0" to "Inner FEC reset"
Make the variable reference be to 177.6.2.1 (where Inner FEC reset is defined)
Delete rows for "Inner FEC enable lane 1" to "Inner FEC enable lane 7"
Delete editor's note below Table 177-6
In Table 45-177a delete rows "Inner FEC enable lane 1" to "Inner FEC enable lane 7" and in the row for "1.2400.0" change "enable" to "reset"
On page 320 line 53 for the reset variable change the cross reference from "45.2.1.1.1" to "45.2.1.213a"

Response *Response Status* **C**

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

Cl **177** *SC* **177.10** *P* **326** *L* **9** # 17

Brown, Matt Alphawave Semi

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

In Table 177-6 the enable bits are never defined in this clause nor are they necessary.

SuggestedRemedy

Remove the enable bits from Table 177-6 and delete the editor's note below.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #1.

Cl **177** *SC* **177.10.** *P* **325** *L* **9** # 298

Ran, Adee Cisco

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

Table 177-6 includes control variables for per-lane inner FEC enable. As stated in the editor's note, these variables are not defined.

There idea of disabling the FEC and the behaviors of the encoder and decoder in this state have never been discussed.

If the intent is to have a way to power down the FEC logic, then the adjacent PMD's output enable and signal detect functions can be used. However, this would not be observable and need not be specified in a standard.

SuggestedRemedy

Delete the "Inner FEC enable" control variables in table 177-6 and the corresponding MDIO registers in clause 45.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #1.

Cl **177** *SC* **177.10.** *P* **325** *L* **39** # 299

Ran, Adee Cisco

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

The status variable name "pmal_locked_demux" is not mentioned in the referenced 177.4.1.2. It is defined in 176.4.4.2.1.
Also, it is a per-lane variable.

SuggestedRemedy

Either change the cross-reference to clause 176, or add text in 177.4.1.2 that the inner FEC has separate status variables for this function (only in the transmit direction? Or both?)
Add "lane 0 through 7".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the cross reference to clause 176, and implement with editorial license.

Cl **177** *SC* **177.10.** *P* **325** *L* **40** # 300

Ran, Adee Cisco

Comment Type **TR** *Comment Status* **A** *management variables*

Inner_FEC_sync_status is defined here and in clause 45 as per-lane (lane 0 through 7) but the variable definition in 177.6.2.1 includes "all_synced" which is the AND of all lanes, and fas_lock which is not defined per lane.

SuggestedRemedy

Change the mapping to be a single bit.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The bit allocation is correct, but the status variable column description should be updated to be clear the pmal_locked_demux variable is per lane.

Update all variable descriptions, if necessary, to clarify if they are per lane, per-flow, or global.

Implement with editorial license.

Cl **177** *SC* **177.10.** *P* **328** *L* **48** # 301

Ran, Adee Cisco

Comment Type **TR** *Comment Status* **A** *(bucketp)*

The "ability" variables listed in Table 177-7 do not appear in the variable reference subclauses.

Also, for each ability it is sufficient to have one bit for the whole inner FEC sublayer (not a bit per lane).

SuggestedRemedy

Add text describing the ability bits in the corresponding subclauses.
Make these bits global rather than per-lane.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change PRBS13Q_gen_ability<0:7> to a single bit enable, and change the name from PRBS13Q_gen_ability to PRBS13Q_gen_Tx_ability to match the variable name in 120.5.11.2.1. Fill the Clause 45 references in table 177-7 with the same references for the same variable named in table 120-4.

Change PRBS31Q_gen_ability<0:7> to a single bit enable, and change the name from PRBS31Q_gen_ability to PRBS31Q_gen_Tx_ability to match the variable name in 120.5.11.2.2. Fill the Clause 45 references in table 177-7 with the same references for the same variable named in table 120-4.

Make similar changes to the variables SSPRQ_gen_ability<0:7> and Square_wave_gen_ability<0:7> with appropriate references to Clause 45 in the MDIO mapping table.

Implement with editorial license.

Cl **178** *SC* **178.7.1** *P* **338** *L* **42** # 28

Brown, Matt Alphawave Semi

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

The skew numbers from previous generations should be fine.

SuggestedRemedy

Delete the editor's note.

Response *Response Status* **C**

ACCEPT.

Cl **178** *SC* **178.7.2** *P* **339** *L* **12** # 29

Brown, Matt Alphawave Semi

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

Skew constraints for 1.6TBASE-R based on 800GBASE-R should be fine.

SuggestedRemedy

Delete the editor's note.

Response *Response Status* **C**

ACCEPT.

Cl **178** *SC* **178.8.1** *P* **339** *L* **39** # 256

Ghiasi, Ali Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **R** *AC Coupling*

Location of AC coupling may also be on chip and stating TP0 to TP5 would not allow that

SuggestedRemedy

Add note to the figure that AC coupling shown between TP3 and TP5 but actual implementation may be on chip.

Response *Response Status* **C**

REJECT.
The use of on-chip AC coupling is addressed in 178.10.6 and is considered to be an engineered link. There can be additional requirements from devices that are beyond the scope of the standard.
The proposed change would make operation without on-board AC coupling a requirement from all devices, which is a new idea that has not discussed.

Cl **178** *SC* **178.8.9** *P* **340** *L* **32** # 126

Slavick, Jeff Broadcom

Comment Type **TR** *Comment Status* **D** *ILT (bucket)*

Listing the coefficients and presets that are supported by the PMD here will lay the groundwork for reuse of the 178B over interfaces with differing support.

SuggestedRemedy

Add the following with editorial license after the first paragraph of 178.8.9
"The coefficients and presets supported by the PMD transmit function are:
-- k_list = {-3, -2 -1, 0, 1}
-- preset 1
-- preset 2
-- preset 3
-- preset 4
-- preset 5"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with considerations of any changes due to other comments about presets.

Cl **178** *SC* **178.8.9** *P* **340** *L* **34** # 137

Slavick, Jeff Broadcom

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

steady state measurement is also needed by ILT

SuggestedRemedy

Add "The steady state voltage specifiction needed in 178B.11.4 is specified in 178.9.2.4" to the subclause.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #138.

Cl **178** *SC* **178.9.3.3.** *P* **347** *L* **34** # 426

Dudek, Mike Marvell

Comment Type **TR** *Comment Status* **A** *Tx FFE presets*

The test transmitter used in the interference tolerance test is limited to a maximum peak to peak amplitude of 0.8V but it is possible that the allowed 1.0V peak to peak signal from a compliant transmitter will overload the Rx making it incapable of reducing the amplitude through the training protocol.

SuggestedRemedy

Either change the value of C(0) in the OUT-OF_SYNC condition in table 179-8 to 0.8 +/- 0.025 (see separate comment on Chip to Module) or add an additional subsection called "Receiver Overload". That states "The reciver shall also meet the interference tolerance requirements of 178.9.3.3 when the test transmitter has an initial peak to peak output amplitude of 1.0V and the limitation on the output amplitude of the test transmitter is removed. Make similar changes in Clause 179 and Annex 176C

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slide 33 of
https://www.ieee802.org/3/dj/public/25_01/ran_3dj_01_2501.pdf .

Implement the changes listed under "Option 2" in slide 33 of ran_3dj_01_2501, with consideration of the different "initialize" setting for KR and for C2C.
Implement with editorial license.

[Editor's note: CC 179, 176C]

Cl **178** *SC* **178.9.3.3.2** *P* **346** *L* **25** # 557

Heck, Howard TE Connectivity

Comment Type **T** *Comment Status* **A** *ITT Np*

D1.3 has N_p = 400 for ITT noise calibration. This is inconsistent with the value in 179 and with values used in prior standards.

SuggestedRemedy

Change N_p from 400 to 58, consistent with the value in 179.9.4.5.1. A presentation is planned to support the suggested remedy.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/dudek_3dj_01_2501.pdf .

Change Np values for SNDR calculation in interference tolerance test for CR, KR, C2C, and C2M , to the values on slide 6 of dudek_3dj_01_2501.

Implement with editorial license.

Cl **178** *SC* **178.9.3.3.3** *P* **347** *L* **14** # 447

Dudek, Mike — Marvell

Comment Type **T** *Comment Status* **A** *ITT Test Method*

Scrambled idle cannot be used with the test method defined in 174A.6.1

SuggestedRemedy

Change to "method defined in 174A.6.1 or a74A7.1. Make the same change to C2C on page 709 line 21

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy except for "174A.7.1." instead of "a74A7.1", with editorial license.
[Editor's note: CC 176C]

Cl **178** *SC* **178.10.1** *P* **350** *L* **38** # 558

Heck, Howard — TE Connectivity

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

The value for COM single-ended receiver termination resistance is highlighted in orange.This value is consistent with those in 179 and 176C.

SuggestedRemedy

Remove the orange highlighting.

Response *Response Status* **C**

ACCEPT.

Cl **178** *SC* **178.10.6** *P* **354** *L* **52** # 255

Ghiasi, Ali — Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **A** *AC Coupling*

Location of AC coupling may also be on chip and stating TP0 to TP5 would not allow that

SuggestedRemedy

change TP0 to TP5 to TP0d to TP5d

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement with editorial license.

Cl **178** *SC* **178.14.4.5** *P* **361** *L* **29** # 257

Ghiasi, Ali — Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **A** *AC Coupling*

Location of AC coupling may also be on chip and stating TP0 to TP5 would not allow that

SuggestedRemedy

change TP0 to TP5 to TP0d to TP5d

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #255.

Cl **178A** *SC* **178A** *P* **757** *L* **26** # 360

Shakiba, Hossein — Huawei Technologies Canada

Comment Type **T** *Comment Status* **R** *Quantization noise*

Add quantization noise.

SuggestedRemedy

Add a new sub-section "178A.1.7.6 Quantization Noise". Please refer to slides 2-4 of the supporting document for the proposed sub-section content and text.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **178A** *SC* **178A.1.3** *P* **748** *L* **15** # 47

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **D** *COM frequency range*

"It is recommended that the scattering parameters be measured with a uniform frequency step from a start frequency no greater than 10 MHz to a stop frequency of at least 67 GHz

SuggestedRemedy

Referencing wording in 179B.2.1 and 179B.3.1.
Insert line:
If, after specified filtering, significant power exists above the stop frequency or the stop frequency is near a local resonance or anti-resonance, differences in COM and ERL are to be accounted for.
See presentation showing delta COM up to 0.8 dB

Proposed Response *Response Status* **W**

PROPOSED REJECT.
The comment appears to state a concern that the recommended 67 GHz stop frequency may be too low in some cases. However, the suggested remedy states a set of ambiguous conditions under which the lack of higher-frequency content in the measurement should be addressed (what constitutes "significant" power, or what constitutes an "(anti-)resonance"). Furthermore, the suggested remedy provides no guidance on how to account for "differences in COM and ERL" resulting from the lack of higher-frequency information (re-measure the channel with an extended frequency range?). Therefore, it is not clear that the proposed text is actionable by a user of the standard and it could possibly lead to confusion about the requirements for s-parameter measurements.
[Editor's note: The suggested remedy refers to a contribution. It may be mellitz_3dj_02_0125.]

Cl **178A** *SC* **178A.1.3** *P* **748** *L* **15** # 535

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **D** *COM frequency range*

Unnecessary ambiguity, and 802.3 is not a test spec. We define terms by procedures, not write methods of implementation.

SuggestedRemedy

Change "from a start frequency no greater than 10 MHz to a stop frequency of at least 67 GHz" to "from a start frequency of 10 MHz to a stop frequency of 67 GHz."

Proposed Response *Response Status* **W**

PROPOSED REJECT.
This sentence is a recommendation for the maximum start frequency and minimum stop frequency for s-parameter measurements that will used for the calculation of Channel Operating Margin. It is neither ambiguous nor a specification for a method of test implementation. It indicates that it is acceptable for frequencies below the recommended minimum and/or above the recommended maximum to be included in the calculation.
Also see comment #47.

Cl **178A** *SC* **178A.1.4.3** *P* **751** *L* **21** # 387

Noujeim, Leesa Google

Comment Type **TR** *Comment Status* **D** *Partial channel model*

Capacitance C0 in table 178A-5, "Single ended package capacitance at port 1" description is incorrect; C0 represents part of the partial host channel, while Cp (in Table 178A-4) is "Single ended package capacitance at the package-to-board interface".

SuggestedRemedy

Change "Single ended package capacitance at port 1" to "Single ended board capacitance at the package-to-board interface (port 1)"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Change "Single-ended package capacitance at port 1" to "Single-ended board capacitance at the package-to-board interface". This agrees with the description of Cp given in Table 178A-4.
Change "Single-ended package capacitance at port 2" to "Single-ended capacitance at the model-to-measurement interface". This is a more generic, but accurate, description of this capacitor's position in the calculation.
Implement with editorial license.
[Editor's note: CC: 179, 176D.]

Cl **178A** *SC* **178A.1.4.3** *P* **751** *L* **31** # 388

Noujeim, Leesa Google

Comment Type **TR** *Comment Status* **D** *Partial channel model*

Capacitance C1 in table 178A-5 is not associated with the package, so description "Single ended package capacitance at Port 2" is incorrect.

SuggestedRemedy

Change "Single ended package capacitance at port 2" to "Single ended capacitance at board-model-to-test_connector interface (port 2)"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #387.

Cl **178A** *SC* **178A.1.6.4** *P* **754** *L* **9** # 537

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **R** *COM CTLE*

f_p2, the fixed highest pole in the CTLE, always fb, is a relic from a time before we had a proper receiver front-end filter. We need to make a careful compromise between the receiver front-end filter, coax connector and other limitations and the maximum frequency in S-parameters, and f_p2. At least for a BT filter, 5th order works well, but this is a Butterworth filter.

SuggestedRemedy

Combine f_p2 and the receiver front-end filter, take f_p2 out of the COM tables.

Response *Response Status* **C**

REJECT.
The CRG reviewed slide 25 of <https://www.ieee802.org/3/dj/public/25_01/ran_3dj_01_2501.pdf>.
Changes the receiver noise filter would require further study.
There is was no consensus to make a change.

Cl **178A** *SC* **178A.1.7** *P* **754** *L* **32** # 364

Shakiba, Hossein Huawei Technologies Canada

Comment Type **T** *Comment Status* **R** *Quantization noise*

Following first comment, "sampler" should be replaced with "quantizer".

SuggestedRemedy

Change "sampler" to "quantizer".

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **178A** *SC* **178A.1.7** *P* **754** *L* **50** # 361

Shakiba, Hossein Huawei Technologies Canada

Comment Type **T** *Comment Status* **R** *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 5 of the supporting document for the proposed change.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **178A** *SC* **178A.1.7** *P* **755** *L* **2** # 362

Shakiba, Hossein Huawei Technologies Canada

Comment Type **T** *Comment Status* **R** *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 6 of the supporting document for the proposed change.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **178A** *SC* **178A.1.7** *P* **755** *L* **15** # 365

Shakiba, Hossein Huawei Technologies Canada

Comment Type **T** *Comment Status* **R** *Quantization noise*

Following first comment, "sampler" should be replaced with "quantizer".

SuggestedRemedy

Change "sampler" to "quantizer".

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **178A** *SC* **178A.1.7** *P* **755** *L* **19** # 363

Shakiba, Hossein Huawei Technologies Canada

Comment Type **T** *Comment Status* **R** *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 7 of the supporting document for the proposed change.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **178A** *SC* **178A.1.7.3** *P* **756** *L* **12** # 511

Li, Mike — Intel

Comment Type **TR** *Comment Status* **A** *COM Tx noise*

Including sigma_x^2 in EQ (178A-18) is incorrect. It will make the TX noise modualtion depedent which is wrong.

SuggestedRemedy

Remove the sigma_x^2 in EQ (178A-18)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.
Note that this change brings the COM model for transmitter noise into closer alignment with the measurement of SNDR defined in 179.9.4.5.1.

Cl **178A** *SC* **178A.1.8.1** *P* **757** *L* **18** # 367

Shakiba, Hossein — Huawei Technologies Canada

Comment Type **T** *Comment Status* **R** *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 8 of the supporting document for the proposed change.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **178A** *SC* **178A.1.8.1** *P* **757** *L* **43** # 366

Shakiba, Hossein — Huawei Technologies Canada

Comment Type **T** *Comment Status* **R** *Quantization noise*

Following first comment, "sampler" should be replaced with "quantizer".

SuggestedRemedy

Change "sampler" to "quantizer".

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **178A** *SC* **178A.1.8.1** *P* **758** *L* **33** # 534

Dawe, Piers — Nvidia

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

If Nb is the number of feedback taps, Nf is the number of feedforward taps. Obvs. Although OIF use it for something else. 10GBASE-LRM uses EqNf and EqNb. 802.3ck has:
DFE maximum span including floating taps N_f (but it doesn't have receiver FFE taps so the contradiction doesn't apply) and
Number of DFE floating tap banks N_bg.

SuggestedRemedy

Change Number of (FFE) taps per floating tap group, from Nf to N_fg

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
For consistency with the notation used in Annex 93A, change "Number of floating tap groups" from N_{g} to N_{wg} and change "Number of taps per floating tap group" from N_{f} to N_{wf}. The change from "b" to "w" in the subscripts indicates that this floating tap structure is in the feed-forward filter defined in Annex 178A, whose tap coefficients are denoted as w(i), and not in the feedback filter as defined in Annex 93A.
Implement with editorial license.
[Editor's note: CC: 178, 179, 176C, 176D.]

Cl **178A** *SC* **178A.1.8.1** *P* **758** *L* **35** # 536

Dawe, Piers — Nvidia

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

Not clear what "Highest allowed tap index" means. The reader doesn't know if tap 0 is the cursor, or he should count from 1, or from 0, or something else. Also, Fig 178A-9 and 178A-10 have N_w which might be the same thing. 802.3ck has "DFE maximum span", not "index"

SuggestedRemedy

Please align and explain the terminology

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
[Editor's note: Changed subclause from 178A.1.3 to 178A.1.8.1.]
<https://www.ieee802.org/3/dj/public/25_01/ran_3dj_01_2501.pdf> was reviewed.
Implement the changes on slides 24 of ran_3dj_01_2501.
In addition, add footnotes to the COM parameter tables in Clauses 178 and 179, and Annexes 176C and 176D, to explain the number of post-cursor taps and the maximum allowed tap index for floating taps corresponding to the specified values for Nfix and Nmax.
Implement with editorial license.

Cl **178A** *SC* **178A.1.9** *P* **761** *L* # 372

Shakiba, Hossein Huawei Technologies Canada

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

Xtalk noise has not been mentioned in this section. This is important because this noise will also be amplified by the receiver FFE.

SuggestedRemedy

Add sufficient text and possibly equation to the section to include xtalk noise and highlight its amplification by Hrxffe.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The crosstalk signals are subject to filtering by the receiver feed-forward filter (see page 760, line 50). In 178A.1.10.2, it is stated that the terms defined in 178A.1.9 are to be used for the calculation of the distribution of noise and interference amplitude. Therefore, the impact of the feed-forward filter on crosstalk is included.
However, it is recognized that the relationships between 178A.1.9, 178A.1.10.2, and 93A.1.7.3 may be difficult to follow.
Resolve using the response to comment #371.

Cl **178A** *SC* **178A.1.9** *P* **761** *L* **10** # 368

Shakiba, Hossein Huawei Technologies Canada

Comment Type **T** *Comment Status* **R** *Quantization noise*

Following first comment, Equation (178A-34) should include quantization noise PSD.

SuggestedRemedy

Add quantization noise PSD to the equation. Please refer to slide 9 of the supporting document for the proposed change.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **178A** *SC* **178A.1.9** *P* **761** *L* **14** # 371

Shakiba, Hossein Huawei Technologies Canada

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

Dual-Dirac jitter also goes through receiver FFE noise amplification. This is not captured in the referenced section 93A.1.7.2 and needs to be mentioned here.

SuggestedRemedy

Add sufficient text and possibly equation to the section to highlight dual-Dirac jitter noise amplification by Hrxffe.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Jitter is converted to amplitude noise via the slope of the signal around the sampling points. The slope of the signal is filtered by the receiver feed-forward equalizer prior to computation of the corresponding amplitude noise (see page 760, line 53). In 178A.1.10.2, it is stated that the terms defined in 178A.1.9 are to be used for the calculation of the distribution of noise and interference amplitude. Therefore, the impact of the feed-forward filter on the noise due to dual-Dirac jitter is included.
However, it is recognized that the relationships between 178A.1.9, 178A.1.10.2, and 93A.1.7.3 may be difficult to follow.
Slides 22 and 23 of <https://www.ieee802.org/3/dj/public/25_01/ran_3dj_01_2501.pdf> was reviewed.
Implement the changes on slides 22 and 23 of ran_3dj_01_2501 with editorial license.

Cl **178A** *SC* **178A.1.10.2** *P* **761** *L* **51** # 369

Shakiba, Hossein Huawei Technologies Canada

Comment Type **T** *Comment Status* **R** *Quantization noise*

Following first comment, more text should be added to describe the procedure for deriving the probability density function of the quantization noise and its addition to the probability distribution function of the noise and interference.

SuggestedRemedy

Add the suggested text in slides 10-11 of the supporting document before the last sentence of the paragraph.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **178A** *SC* **178A.1.10.2** *P* **762** *L* **11** # 383

Healey, Adam — Broadcom Inc.

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

The editor's note indicates that the content of NOTE 1 was included as a placeholder recommendation for the amplitude step. This placeholder is consistent with a similar recommendation in Annex 93A and no proposals for a different recommendation have been received. The editor's note no longer seems to have a purpose.

SuggestedRemedy

Remove the editor's note.

Response *Response Status* **C**

ACCEPT.

Cl **178A** *SC* **178A.1.11** *P* **762** *L* **39** # 370

Shakiba, Hossein — Huawei Technologies Canada

Comment Type **T** *Comment Status* **R** *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 12 of the supporting document for the proposed change.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **178B** *SC* **178B** *P* **765** *L* **19** # 542

Dawe, Piers — Nvidia

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

This annex needs an introductory diagram, and the terminology needs cleaning up

SuggestedRemedy

Per comment

Response *Response Status* **C**

REJECT.
The suggested remedy does not provide sufficient detail to implement.

Cl **178B** *SC* **178B** *P* **765** *L* **22** # 544

Dawe, Piers — Nvidia

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

Explain the interaction between this annex and Clause 73 AN

SuggestedRemedy

Per comment

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #131

Cl **178B** *SC* **178B.5** *P* **766** *L* **33** # 355

Ran, Adee — Cisco

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

The first two paragraphs of 178B.5 are not about the protocol, but about AUI components and PMDs.
They seem to belong to 178B.4, based on its title.

SuggestedRemedy

Move these paragraphs to 178B.4.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The first paragraph of 178B.5 is related to the section, so it should stay in 178B.5.
Move the second paragraph of 178B.5 to the begining of 178B.4
Implement with editorial license.

Cl **178B** *SC* **178B.5** *P* **767** *L* **1** # 381

Healey, Adam — Broadcom Inc.

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

The "continue training" bit is in the control field. Also the cross-reference to 178B.8.8 does not point to the definition of the "Continue training" bit.

SuggestedRemedy

Change to "The continue training bit in the control field of the training frames (see 178B.7.2) if training is enabled."

Response *Response Status* **C**

ACCEPT.

Cl **178B** *SC* **178B.7** *P* **774** *L* **11** # 515

Dawe, Piers Nvidia

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

At present, the same preset 1, the loudest, is used for a special measurement condition and the default startup. While it makes sense to measure a large signal, it is bad practice to start a lane at maximum crosstalk, which exceeds the 900 mV limit for 50G/lane and 100G/lane AUIs which may be connected.

SuggestedRemedy

Change 1 0 1 from Reserved to Preset 6;
In 178B.11.2, add lines for preset 6;
In 178B.14.3.1, ic_sel, add preset 6.
See other comments for associated changes.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #125.

Cl **178B** *SC* **178B.11.2** *P* **779** *L* **38** # 125

Slavick, Jeff Broadcom

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

Pseudo code should have check for unsupported requests.

SuggestedRemedy

change the else to be "else if CHECK_REQ(ic_req)"

add "else ic_sts = updated coeff_sts = not supported" before the end if

add the following after the end if
CHECK_REQ(ic_req)
Compares the ic_req against the list of specified presets for the AUI component or PMD.
Returns true if the requested preset is specified and false otherwise.

Implement with editorial license

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slides 12-20 in
https://www.ieee802.org/3/dj/public/25_01/ran_3dj_01_2501.pdf, and
https://www.ieee802.org/3/dj/public/25_01/simms_3dj_01a_2501.pdf .

Implement the proposal on slides 17-20 of ran_3dj_01_2501.
Add preset 6 with values as in slide 8 of simms_3dj_01a_2501 for all PMDs and AUIs.

Use preset 1 values for initialize for the PMDs.
Use preset 6 values for initialize for the AUIs.

Implement with editorial license.

Cl **178B** *SC* **178B.11.2** *P* **780** *L* **5** # 512

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **D** *Tx FFE presets*

At present, preset 1 is the loudest. But it is bad practice to start a lane at maximum crosstalk, and the voltage can exceed the 900 mV limit for 50G/lane and 100G/lane AUIs which may be connected.

SuggestedRemedy

Assuming we like the association between 1 and default:
Change the definition of preset 1 and OUT_OF_SYNC from 0 0 0 1 0 to 0 0 0 0.75 0.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #457.

Cl **178B** *SC* **178B.11.4** *P* **781** *L* **33** # 133

Slavick, Jeff — Broadcom

Comment Type **TR** *Comment Status* **D** *ILT (bucket)*

The list of supported coefficients may be different for various components

SuggestedRemedy

Replace the {-3, -2, -1, 0, 1} in the definition of k_list with "is defined by the AUI component or PMD"

Proposed Response *Response Status* **W**

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

Cl **178B** *SC* **178B.11.4** *P* **781** *L* **37** # 136

Slavick, Jeff — Broadcom

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

The steady state measurement technique differs from 136 for 179.

SuggestedRemedy

Remove the "(see `136.9.3.1.2)"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #138.

Cl **178B** *SC* **178B.14.2.1** *P* **783** *L* **10** # 356

Ran, Adee — Cisco

Comment Type **TR** *Comment Status* **D** *State diagram*

The NOTE about SIGNAL_OK seems to apply not just the adjacent_isl_ready but also to adjacent_remote_rts.
Also, "the other interface of the device" is not defined for an endpoint (when client_is_pcs is true).

Also, I am not sure the concept of "other interface" is fully defined for the case of an optical module, where one interface is the PMD and the other interface is a PMA. Neither the NOTE nor the text in 178B.5 address this case.

SuggestedRemedy

Define an additional variable adjacent_signal_ok whose value is taken from the parameter of the appropriate primitive (as the current note explains) and is undefined when client_is_pcs is true.
Redefine adjacent_remote_rts and adjacent_isl_ready based on the new variable.

Add whatever is needed to cover the optical module case.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The case of a PMA adjacent to a PMD is a special case of the retimer defined in 178B.5.2. In section 178B.5.2 there is a definition of the "other interface".

Add a note to 178B.5.2: "NOTE - Interface A (see Figure 178B-2) is an AUI component and Interface B is either an AUI component or a PMD."

Define an additional variable adjacent_signal_ok defined as: "Enumerated variable derived from the value of the SIGNAL_OK parameter. This variable may be assigned one of the following values: PROGRESS, READY, OK, FAIL. If client_is_pcs is true this varable is undefined."

Move the note mentioned in the original comment to be below the new adjacent_signal_ok variable.

Change the definition of the adjacent_isl_ready variable to: "Boolean variable that indicates the value of isl_ready on the other interface of the device. It is set to true if the value of adjacent_signal_ok is OK or READY and to false otherwise."

Change the definition of the adjacent_remote_rts variable to: "Boolean variable that indicates the value of remote_rts on the other interface of the device. It is set to true if the value of adjacent_signal_ok is OK and to false otherwise."

Implement with editorial license.

Cl **178B** *SC* **178B.14.2.1** *P* **783** *L* **13** # 124

Slavick, Jeff Broadcom

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

"other" interface is a bit ambigous and the listed situations are the typical use case but does not cover all use cases. As a remote PCS (after a XS) could do either local or clock forwarding modes.

SuggestedRemedy

Rename client_is_pcs to be "uses_local_clock_only" and update the definition to be "Boolean variable that indicates if the PMA will never swap to a forwarded clock. For example this will be true for the first PMA below the RS."

Replace both uses of client_is_pcs with uses_local_clock_only in Fig 178B-7

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Related slides in the following contribution were reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_01/brown_3dj_03a_2501.pdf

Implement the changes provided on slide 26 of brown_3dj_03a_2501 with editorial license.

Cl **178B** *SC* **178B.14.2.1** *P* **783** *L* **22** # 543

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **D** *AN/ILT time-out*

This says "There is no specified time limit for the ILT protocol", which is misleading because it seems the Clause 73 link_fail_inhibit_timer will override it.

SuggestedRemedy

As it seems the intention is that there should be no time limit, and this is unlike e.g. 50GBASE-CR and 100GBASE-CR1, refer to Table 73-7 in 73.10.2 and say that link_fail_inhibit_timer does not apply at 200G/lane. In Table 73-7 in 73.10.2, set link_fail_inhibit_timer to infinite.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #131.

Cl **178B** *SC* **178B.14.2.1** *P* **783** *L* **31** # 382

Healey, Adam Broadcom Inc.

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

The "Continue training" bit is in the control field.

SuggestedRemedy

Change the last sentence of the definition of local_rts to "The logical-NOT of this variable is encoded as the "continue training" bit in the control field of transmitted training frames."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.
Also in the definition of remote_rts change: "of the status field" to "of the control field".

Cl **178B** *SC* **178B.14.3.5** *P* **789** *L* **41** # 141

Slavick, Jeff Broadcom

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

Ambigous transition if timer_done and tf_lock both occur simultaneously

SuggestedRemedy

Add "!recovery_timer_done *" to the transition back to TRAIN_LOCAL

Response *Response Status* **C**

ACCEPT.

Cl **178B** *SC* **178B.14.3.5** *P* **790** *L* **20** # 142

Slavick, Jeff Broadcom

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

Fig 178B-9 has text box overlapping lines

SuggestedRemedy

tf_offset in GET_NEW_MARKER is covering up lies

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Fix the GET_NEW_MARKER box and text to avoid overlap.

Cl **178B** *SC* **178B.14.3.5** *P* **790** *L* **20** # 143

Slavick, Jeff — Broadcom

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

Fig 178B-9 has an extraneous line

SuggestedRemedy

extran | to th right of the UCT exiting POLARIY_INVERT

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Remove extraneous line from Figure 178B-9.

Cl **178B** *SC* **178B.14.3.5** *P* **790** *L* **27** # 144

Slavick, Jeff — Broadcom

Comment Type **TR** *Comment Status* **A** *State diagram*

Fig 178B-9 needs to clarify the transitions out of TEST_MARKER.

SuggestedRemedy

Change the transition from TEST_MARKER to INVALID_MARKER to be "(!valid_marker * !inverse_valid_marker) + (polarity_correction * inverse_valid_marker)"

Change the transition from TEST_MARKER to POLARITY_INVERT to be "!polarity_correction * inverse_marker_valid"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Related slides in the following contribution were reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_01/brown_3dj_03a_2501.pdf

Implement the changes on either slide 30 or slide 32, at the editor's discretion, of brown_3dj_03a_2501 with editorial license.

Cl **178B** *SC* **178B.15** *P* **792** *L* **6** # 7

Marris, Arthur — Cadence Design Systems

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

MDIO register bit references need to be added to Tables 178B-6 and 178B-7

SuggestedRemedy

Consider a proposal on how to do this during the January 2025 802.3dj task force meeting

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the repsonse to comment #170

Cl **178B** *SC* **178B.15** *P* **792** *L* **13** # 170

Bruckman, Leon — Nvidia

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

The Management tables need to be updated

SuggestedRemedy

Update Tables 178B-6 and 176B-7 variables and references. Refer to lane 0 of the upstream interface and add a footnote for the other interfaces/lanes (similar to Clause 162 Table 162-7).

Proposed Response *Response Status* **W**

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

!! Pulled from bucket

Cl **179** *SC* **179.7.1** *P* **368** *L* **41** # 30

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **D** *Skew (bucket)*

The skew numbers from previous generations should be fine.

SuggestedRemedy

Delete the editor's note.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **179** *SC* **179.7.2** *P* **369** *L* **12** # 31

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **D** *Skew (bucket)*

Skew constraints for 1.6TBASE-R based on 800GBASE-R should be fine.

SuggestedRemedy

Delete the editor's note.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **179** *SC* **179.8.9** *P* **372** *L* **43** # 138

Slavick, Jeff — Broadcom

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

steady state measurement is also needed by ILT

SuggestedRemedy

Add "The steady state voltage specifiction needed in 178B.11.4 is specified in 179.9.4.1.2" to the subclause.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
[Editor's note: changed line from 34 to 43.]

The CRG reviewed slides 7-11 in
https://www.ieee802.org/3/dj/public/25_01/ran_3dj_01_2501.pdf .

Implement the proposal on slide 11 of ran_3dj_01_2501, but add "and coefficient ranges (see 179.9.4.1.5)" after "equalization capability".
Implement with editorial license.

Cl **179** *SC* **179.8.9** *P* **372** *L* **43** # 132

Slavick, Jeff — Broadcom

Comment Type **TR** *Comment Status* **D** *ILT (bucket)*

Listing the coefficients and presets that are supported by the PMD here will lay the groundwork for reuse of the 178B over interfaces with differing support.

SuggestedRemedy

Add the following with editorial license after the first paragraph of 179.8.9
"The coefficients and presets supported by the PMD transmit function are:
-- k_list = {-3, -2 -1, 0, 1}
-- preset 1
-- preset 2
-- preset 3
-- preset 4
-- preset 5"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with considerations of any changes due to other comments about presets.

Cl **179** *SC* **179.9.4** *P* **374** *L* **6** # 185

Brown, Matt — Alphawave Semi

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

Values for R_peak are TBD.

SuggestedRemedy

Expect a contribution with proposals.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #303.

Cl **179** *SC* **179.9.4** *P* **374** *L* **22** # 221

Rysin, Alexander — NVIDIA

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

J3u and JRMS measurements at TP2 are highly affected by the effects of slew rate and noise and do not reflect actual uncorrelated jitter. These effects are exacerbated by the characteristics of practical channels between TP0d and TP2 - loss and reflections, and are highly dependent on the transmitted signal amplitude. Accounting only for the faster edges does not work for practical channels at 106.25 Gbd rate and the currently proposed numbers cannot be met (and sometimes cannot be measured) even with commercial test equipment PPG. The issue was demonstrated in rysin_3dj_01a_2407. A different methodology that will better quantify phase-only uncorrelated jitter has to be explored. Presentation is planned.

SuggestedRemedy

Other method of uncorrelated jitter measurement should be considered.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #219.

Cl **179** *SC* **179.9.4.1** *P* **374** *L* **6** # 303

Ran, Adee Cisco

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

R_peak is TBD for the three host classes.

Since we have a reference model for each host class, the "difference" method can be used for R_peak, as has been done for SNDR (now dSNDR). This would remove dependence of the requirements on the test fixture specifications and on the host models (in case these change in future drafts).

SuggestedRemedy

Define the minimum R_peak requirement to be relative to what the reference transmitter will create with the test fixture used.
A contribution with more details will be provided.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The CRG reviewed ttps://www.ieee802.org/3/dj/public/25_01/ran_3dj_02a_2501.pdf.

There were concerns about the variablity of the MCB that is used for the reference value but not actually used in the measurement.

There is preference that the reference values are based on the reference mated test fixture, which has not been adopted yet, but if adopted, the minimum Rpeak values would be numbers that the CRG can adopt.

Option A:
Adopt the proposal on slides 7-8 of https://www.ieee802.org/3/dj/public/25_01/ran_3dj_02_2501.pdf (use dRpeak methodology).
Add editor's notes soliciting proposals for reference Rpeak for host output (CR and C2M) and module output using the reference transmitter models and the reference mated test fixtures.

Option B:
Keep min Rpeak with values TBD.
Add editor's notes soliciting proposals for minimum Rpeak for host output (CR and C2M) and module output, using the reference transmitter models and reference mated test fixtures.

Straw poll #E-3 (directional)
I would prefer:
A. Adopting the dRpeak methodology
B. Keeping Rpeak (min)
A: 19 B: 18

<parked>

[Editor's note: CC 179, 176D]

Cl **179** *SC* **179.9.4.1.1** *P* **376** *L* **2** # 513

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A** *Tx FFE presets*

At present, the same preset 1, the loudest, is used for a special measurement condition and the default startup. While it makes sense to measure a large signal, it is bad practice to start a lane at maximum crosstalk, which exceeds the 900 mV limit for 50G/lane and 100G/lane AUIs which may be connected to a 200G AUI. C2C, C2M, CR and KR can stay aligned for convenience.

SuggestedRemedy

Assuming we like the association between 1 and default, change this to preset 6, defined in 179.9.4.1.3 as 0 0 0 1 0. Preset 1 becomes 0 0 0 0.75 0.
In 179.9.4.1.2, 179.9.5.3.3, 179.9.5.3.5 and 176D.7.12.4, change 1 to 6.
Similarly in and 176D.7.12.2, but in 176D.7.11, "preset 1" (the default startup) remains correct.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #125.

Cl **179** *SC* **179.9.4.1.3** *P* **377** *L* **19** # 516

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **A** *Tx FFE presets*

This table and Table 176D-8 say that for OUT_OF_SYNC, ic_req is N/A yet Figure 178B-10, Coefficient update state diagram, shows that in the OUT_OF_SYNC state, ic_req is set to preset 1. This seems inconsistent.

SuggestedRemedy

Here, one could make the table easier to understand by deleting the first column and the "N/A" row, and rely on the text just above the table. If so, similar text may be needed in 176D.7.6.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #125.

Cl **179** *SC* **179.9.4.1.3** *P* **377** *L* **19** # 514

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **A** *Tx FFE presets*

At present, the same preset 1, the loudest, is used for a special measurement condition and the default startup. While it makes sense to measure a large signal, it is bad practice to start a lane at maximum crosstalk, which exceeds the 900 mV limit for 50G/lane and 100G/lane AUIs which may be connected to a 200G AUI. C2C, C2M, CR and KR can stay aligned for convenience.

SuggestedRemedy

Change OUT_OF_SYNC and preset 1 from 0 0 0 1 0 to 0 0 0 0.75 0, with the usual tolerances.
Add a row for preset 6, values 0 0 0 1 0, without tolerances. In the table footnote, change 1 to 6, twice, and delete "and OUT_OF_SYNC". Similarly in 176D.7.6.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #125.

Cl **179** *SC* **179.9.4.1.3** *P* **377** *L* **20** # 457

Simms, William NVIDIA

Comment Type **TR** *Comment Status* **A** *Tx FFE presets*

Table 179-8 - Coefficient initial conditions contains a larger jump between preset 1 and 2 where C(0) goes from 1 to 0.5. Preset3 uses C(0) of 0.75 but also adds additional precursor which may not be desirable

SuggestedRemedy

Add or replace a preset with C(0)set to 0.75 and all other taps set to 0 (+/-0.025)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #125.

Cl **179** *SC* **179.9.4.5** *P* **378** *L* **50** # 304

Ran, Adee Cisco

Comment Type **T** *Comment Status* **A** *dSNDR (bucketp)*

The procedure for calculation of dSNDR may be somewhat easier to follow with an illustration.

Compare to the similar calculation of dR_peak and dv_f, defined in Annex 163A, which is illustrated by Figure 163A-1.

SuggestedRemedy

Add a figure in 179.9.4.5 similar to Figure 163A-1 but with "reference SNDR" and "measured SNDR".
Add text referring to the figure with editorial license.

Response *Response Status* **C**

ACCEPT.

Cl **179** *SC* **179.9.4.5.3** *P* **380** *L* **6** # 538

Dawe, Piers Nvidia

Comment Type **TR** *Comment Status* **R** *Reference SNDR*

This complicated recipe for Reference SNDR is far too arcane.

SuggestedRemedy

Provide the table of Reference SNDR values for the host loss categories and presets concerned.

Response *Response Status* **C**

REJECT.
The reference SNDR calculation method is provided for cases where part of the measurement setup is provided by the user of the procedure.
The method is used by clause 178 (KR) and annex 176C (C2C), where there is no specified test fixture, so the reference SNDR is implementation-dependent.
For clause 179 (CR) and annex 176D (C2M), there are specifications for the mated test fixtures (Annex 179B) that could potentially be used to calculate reference values, which may indeed be useful for readers. However, this would require a detailed proposal.
The suggested remedy does not provide sufficient detail to implement.

Cl **179** *SC* **179.9.4.5.3** *P* **380** *L* **22** # 305

Ran, Adee Cisco

Comment Type **TR** *Comment Status* **D** *Reference SNDR (bucket)*

H_t(f) is not fully defined since T_r is not provided.

SuggestedRemedy

Add a reference to T_r in Table 179-18

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Several COM parameters (from Table 179-18) are required for the calculation of the reference SNDR but are currently not mentioned.
- Equation 179-11 has H_t(f) which refers to 178A.1.6.2 which needs T_r.
- Equation 179-15 has S_tn(theta) which refers to Equation 178A-18 which needs SNR_TX and f_b.
Add the following paragraph at the end of 179.9.4.5.3:
"Calculation of the reference SNDR uses values in Table 179-18 for the parameters f_b, T_r, SNR_Tx."
Include any other missing parameters.
Implement with editorial license.

Cl **179** *SC* **179.9.4.6** *P* **381** *L* **21** # 306

Ran, Adee Cisco

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

Jitter measurements refer to 120D.3.1.8.1 for the probability distribution calculation method. As noted in https://www.ieee802.org/3/dj/public/24_11/ran_3dj_06a_2411.pdf, the method of combining measurements from different transitions into a single PDF in 120D.3.1.8.1 is troublesome.

As a specific example, additive noise (which is always present) is translated to timing error in an opposite way for rising/falling transitions. If the additive noise distribution is asymmetric, the distributions created by the noise alone (in the absence of clock phase jitter) are mirror images of each other, and combining them as in the 120D method would amplify the effect of the additive noise. Especially, th4 J4u would not be representative of the true jitter distribution.

It is possible to use information from multiple transitions to improve the accuracy of the measurement in the presence of additive (vertical) noise.

The method of combining the distributions should be improved to mitigate additive noise and slope dependence.

SuggestedRemedy

A contribution with further details is planned.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/calvin_3dj_01b_2501.pdf, which includes a reference to https://www.ieee802.org/3/dj/public/adhoc/optics/0125_OPTX/gines_3dj_optx_01a_250109.pdf, presented in the P802.3dj ad hoc.

Use the method of JHRMS described in slides 9-11 of gines_3dj_optx_01a_250109 (fitting RMS jitter measurements on multiple transitions to a 2nd order polynomial of the squared inverse slope, including transitions other than 03 and 30) as a replacement for J_RMS03.

Use the proposal on the last bullet of slide 5 in calvin_3dj_01b_2501 for calculating J4u03.

Apply these methods in clauses 178 and 179, annexes 176C and 176D, with the existing limit values.

Implement with editorial license.

Cl **179** *SC* **179.9.4.6** *P* **381** *L* **26** # 541

Dawe, Piers — Nvidia

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

As already pointed out, the "jitter measurement" method here doesn't work for the relevant bandwidths, losses and amplitudes. This is particularly obvious for J3u03; J4u03 seems to be beyond the state of the art. EOJ should be part of an eye spec like EECQ, not a separate spec item.

SuggestedRemedy

Delete this method. Use an eye spec to control signal quality, following the evolution of xECQ.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #306.

Cl **179** *SC* **179.9.5** *P* **384** *L* **10** # 307

Ran, Adee — Cisco

Comment Type **TR** *Comment Status* **A** *Amplitude tolerance*

The amplitude tolerance definition in 179.9.5.2 is now stated in terms of steady-state voltage (v_f) rather than peak-to-peak. Therefore, the value 1 Volt is inadequate.

SuggestedRemedy

Change the parameter name from "Amplitude tolerance" to "Amplitude tolerance (v_f at TP2)".
Change the value from 1 to 0.5.
Delete footnote a.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Retain the parameter name.
The referenced 179.9.5.2 is suggested to be defined as v_f at the test transmitter's output (subject of comment #352).

In the "Amplitude tolerance" row of Table 179-10, change the value from 1 to 0.5.
Modify footnote a to state that the required value is defined as v_f at the test transmitter's output.

Implement with editorial license.

Cl **179** *SC* **179.9.5.3** *P* **385** *L* **15** # 386

Noujeim, Leesa — Google

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

The adopted values for test channel insertion loss for use in the interference tolerance test were based on https://www.ieee802.org/3/dj/public/24_11/ran_3dj_03_2411.pdf. Slide 4 of this presentation has an error: the "MCB IL = 3.5 dB" should be 5.95dB so that it includes the connector allocationof 2.45dB. The current 3.5dB results in a double-counting of the host receiver connector; the test channel insertion losses in Table 179-11 are thus insufficient to appropriately stress the receiver under test. The resulting "frequency dependent attenuator" values would be too small.

SuggestedRemedy

Increase test channel insertion losses in Table 179-11 Test Case 2 (high loss) columns from (34.55,29.55,24.55)+/-0.5dB to (37,32,27)+/-0.5 dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The host channel loss of 13.95 dB on slide 3 of https://www.ieee802.org/3/dj/public/24_11/ran_3dj_03_2411.pdf includes the host connector (as shown on Figure 179A-2).
Therefore, the MCB that replaces the host channel should also include the connector.
The MCB loss budget is equal to the mated test fixture minus the HCB; per Figure 179A-1, this is 9.75-3.8 = 5.95 dB , or an additional 2.45 dB.
Applying this correction results in the values in the suggested remedy.

Implement the suggested remedy with editorial license.

Cl **179** *SC* **179.9.5.3** *P* **385** *L* **31** # 308

Ran, Adee Cisco

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

The editor's note says "The internal loss of the test pattern generator may need to be addressed".
The pattern generator in this case is expected to be an instrument-grade equipment (unlike the corresponding KR test, there is no provision for just "a compliant transmitter). The "internal loss" is not externally observable and is possibly compensated for by internal equalization as part of the instrument's calibration.
Deviation from the reference transmitter model is addressed by using the measured T_r in item b of 179.9.5.3.3, instead of the reference T_r (which models the transition time of the signal into the device model). This may be emphasized by separating the transition measurement into a different list item (similar to items c and d that address measurements of other parameters).

SuggestedRemedy

Separate the measurement of the transition time in item b of 179.9.5.3.3 from the calculation of the channel S-parameters (which uses the measurement result).
Reorder the list with editorial license.
Delete the editor's note.

Response *Response Status* **C**

ACCEPT.

Cl **179** *SC* **179.11** *P* **390** *L* **33** # 309

Ran, Adee Cisco

Comment Type **T** *Comment Status* **A** *Nomenclature (bucketp)*

The term "cable assembly class" has been used as a placeholder for several drafts. No comments have been received to use another term.
It is suggested to formally adopt this term.

SuggestedRemedy

Unify the document by changing any other term referring to the cable assembly class with editorial license.
Delete the editor's note.

Response *Response Status* **C**

ACCEPT.

Cl **179** *SC* **179.11** *P* **390** *L* **48** # 258

Ghiasi, Ali Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **R** *AC coupling*

We have increased the low frequency cust off but kept the capacitor value the same, 100 nF has cut off of 33 kHz!

SuggestedRemedy

If we go with 33 nF the cutoff is 96 kHz for 50 Ohms and 104 kHz for 46.5 Ohms, I suggest we go with min of 33 nF otherwise the next value is 36 nF (less common) followed by more common 47 nF.

Response *Response Status* **C**

REJECT.
The AC coupling specification is for a maximum cutoff frequency. It is permitted to go below 100 kHz. Using 100 nF capacitors with 46.5 Ohm impedance would result in 34 kHz, which is ok. Using 33 nF, as in the suggested remedy, would also be ok.
The recommendation for capacitors is made in order "to limit the inrush current", and it essentially creates a minimum cutoff frequency. It has not been claimed or demonstrated that reducing inrush current compared to previous generation is required; hosts likely need to be backward compatible anyway. Adopting the suggested remedy would unnecessarily limit implementation options.
The comment does not provide sufficient justification to support the suggested remedy.

Cl **179** *SC* **179.11** *P* **391** *L* **5** # 310

Ran, Adee Cisco

Comment Type **TR** *Comment Status* **A** *CA reach*

Table 179-13, Cable assembly characteristics summary, includes four cable classes in the first row, but does not state the expected reach of each class, which is the most useful information for the reader.

Note that previous PMD clauses include this information, and there is a NOTE in 179.11 that addresses the indicated length, although it is not indicated.

Comment #100 against D1.2 suggested modifying the table to include this information. There was general support for the idea, but the reach values in the suggested remedy were incorrect.

Based on offline discussion, the expected reach per cable assembly class is:
CA-A: 0.5 m
CA-B: 1 m
CA-C: 1.5 m
CA-D: 2 m

SuggestedRemedy

Implement the changes shown on slide 37 of https://www.ieee802.org/3/dj/public/24_11/ran_3dj_01a_2411.pdf, with the exception that the values in the "Expected Reach" row are as listed in this comment.

Move the NOTE in 179.11 to a NOTE (informative) in Table 179-13.
Delete the second editor's note in 179.11.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license. Make the text informative and implement in accordance with the style guide.

Cl **179** *SC* **179.11.1** *P* **391** *L* **28** # 311

Ran, Adee Cisco

Comment Type **T** *Comment Status* **D** *eference impedance (bucket)*

The reference differential impedance is stated, but there are also common-mode and mode-conversion specifications for cable assemblies.

SuggestedRemedy

Add a specification for common-mode impedance of 25 Ohm, with editorial license.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **179** *SC* **179.11.7** *P* **393** *L* **48** # 312

Ran, Adee Cisco

Comment Type **E** *Comment Status* **D** *COM (bucket)*

The minimum value of COM is included in Table 179-13, and has an exception for some cases. Having one value and referring to it is preferable.

SuggestedRemedy

Replace "3 dB" with a reference to Table 179-13 with editorial license.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **179** *SC* **179.11.7.1** *P* **394** *L* **27** # 466

Kocsis, Sam Amphenol

Comment Type **T** *Comment Status* **D** *Partial channel model*

The partial host channel model parameters unnecessarily degrade COM perofmance. C0 is the same value as the previous specification generation.

SuggestedRemedy

Set to 0, OR remove C0 and C1 parameters

Proposed Response *Response Status* **W**

PROPOSED REJECT.
Resolve using the response to comment #393.

Cl **179** *SC* **179.11.7.1** *P* **395** *L* **27** # 391

Noujeim, Leesa Google

Comment Type **TR** *Comment Status* **D** *Partial channel model*

Capacitance C0 in table 179-16 "Single ended package capacitance at port 1" description is incorrect; C0 represents part of the partial host channel, while Cp is "Single ended package capacitance at the package-to-board interface".

SuggestedRemedy

Change "Single ended package capacitance at port 1" to "Single ended board capacitance at the package-to-board interface (port 1)"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The parameter matches the name "Single-ended package capacitance at port 1" in Table 178A-5. C1 is named similarly.
The names are indeed not representative of what the parameters stand for.
However, the suggested remedy is not accurate either.
Change the names of C0 and C1 in Table 178A-5 to "Single-ended capacitance at port 1/2".
Change the parameter names in the COM parameter tables (Table 179-16 and Table 176D-5) accordingly.

Cl **179** *SC* **179.11.7.1** *P* **395** *L* **33** # 393

Noujeim, Leesa
Google

Comment Type **TR** *Comment Status* **D** *Partial channel model*

The capacitance C1 represents a shunt capacitance at the RF test connector ports of the Cable Assembly Test Fixtures (cl 179B.3). This capacitance C1 may have, in prior generations, been used to compensate fthe discontinuity on the CATF between the RF coax connector and the CATF printed circuit board transmission line. Note that the measurement calibration plane is typically at the coax connector mating interface. However, in the 200Gbps/lane generation the coax connector is multiple UI long and so a lumped element compensation is ineffective. A different method should be developed to remove the reflections due to the 50 ohm RF connector and launch that sits between the partial host channel model transmission line (characteristic impedance 92.5 ohms.) and the CATF transmission line (typ 92.5 ohm board impedance between the RF test connectors and the MDI connector).

SuggestedRemedy

Set C1 to 0 and time-gate the RF coax connector/launch out of the TP1-TP4 cable assembly measurements.

Proposed Response *Response Status* **W**

PROPOSED REJECT.
The (nonzero) values of C0 and C1 were adopted by comment #537 against D1.1. During the discussion of this comment it was noted that these values do not represent real capacitances and thus it was proposed to make them zero.
However, it was claimed that these capacitances actually improve the COM result when attached to measured cable assembly S-parameters - possibly by reducing the inductive effect of the connector.
No data has been provided to support this statement, but the straw poll taken indicated support for the nonzero values:
Straw Poll #E-6 (directional)
I would support C1 value of:
A: as proposed (1e-5 nF)
B: 0 nF
A: 22 B: 14
Note that there are several comments on this topic. Data to support the decision would be welcome.
For CRG discussion.

Cl **179** *SC* **179.11.7.1** *P* **395** *L* **33** # 392

Noujeim, Leesa
Google

Comment Type **TR** *Comment Status* **D** *Partial channel model*

Capacitance C1 in table 179-16 is not associated with the package, so description "Single ended package capacitance at Port 2" is incorrect.

SuggestedRemedy

Change "Single ended package capacitance at port 2" to "Single ended board capacitance at board-model-to-test_connector interface (port 2)"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #391.

Cl **179** *SC* **179.11.7.1** *P* **396** *L* **44** # 456

Simms, William
NVIDIA

Comment Type **T** *Comment Status* **D** *COM (bucket)*

Table 179-18 - COM parameter values uses a value of 0.54 for the minimum allowed versus the preset2 which has 0.50 (-0.025) from table 179-8. Should COM limits match the presets?

SuggestedRemedy

Make COM table entry 0.475 (0.5-0.025)

Proposed Response *Response Status* **W**

PROPOSED REJECT.
The transmitter specifications in Table 179-7 require ability to reduce c(0) to 0.5 or lower, consistent with preset 2. This enables receivers to reduce the input dynamic range.
The COM parameters only specify the search range. There is no evidence that the current range of c(0) is insufficient - in fact, with the current parameters the selected value is always 1.

Cl **179** *SC* **179.11.7.1** *P* **397** *L* **38** # 533

Dawe, Piers Nvidia

Comment Type **E** *Comment Status* **A** *COM*

Put COM parameters in the COM parameter table

SuggestedRemedy

Add a reference receiver method row for COM parameter table, value FFE-DFE or FFE-MLSD in this project, next to the DER_0 row

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add a parameter to the COM parameter tables in Annex 178A, Clauses 178 and 179, and Annexes 176C and 176D to indicate whether or not the MLSD reference receiver is used.
Implement with editorial license.

Straw poll #E-1 (direction)
I would support adding a parameter to the COM parameter table to indicate whether or not the MLSD reference receiver is used.
Y: 22, N: 1, A: 7

Cl **179** *SC* **179.11.7.2.2** *P* **398** *L* **32** # 313

Ran, Adee Cisco

Comment Type **E** *Comment Status* **D** *COM (bucket)*

Some of the parameters are given in Table 179-17 (as in the case of the signal path in 179.11.7.2.1).

SuggestedRemedy

Change "using the parameters in Table 179-16" to "using the parameters in Table 179-16 and Table 179-17.".

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **179** *SC* **179.11.7.2.2** *P* **398** *L* **34** # 314

Ran, Adee Cisco

Comment Type **TR** *Comment Status* **D** *COM (bucket)*

The calculation of the NEXT path includes:
"The parameter z_p^(h) for the transmitter is taken from the aggressor path column"
But there is no such column.
Similarly for the FEXT (line 46).

Comparing to 162.11.7.1.1 and 162.11.7.1.2, the value of z_p was specified separately in each one but the value was the same, 110.3 mm (and it makes sense).

SuggestedRemedy

The reference to the "aggressor path column" should be removed.
The text in 179.11.7.2.2 can refer to the similar text in 179.11.7.2.1, with an exception that S is the measured NEXT/FEXT instead of through S-parameters.
Impalement with editorial license.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Cl **179** *SC* **179.12** *P* **399** *L* **21** # 315

Ran, Adee Cisco

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

The PMD is specified in 179.8 and 179.9. 179.14 contains management variable mapping and is irrelevant here.

SuggestedRemedy

Change the reference per the comment.

Response *Response Status* **C**

ACCEPT.

Cl **179** *SC* **179.14** *P* **400** *L* **10** # 90

Opsasnick, Eugene Broadcom

Comment Type **TR** *Comment Status* **A** *reset variable*

In Table 179-20, the variable PMD_reset has a variable reference to subclause 178B.14.2.1; however, that subclause does not define "PMD_reset".

SuggestedRemedy

Suggest adding a subclause to CL 179 (perhaps 179.8.10) to define the PMD_reset variable similar to 180.5.6, 181.5.6, 182.5.6, 183.5.6, and 185.5.6 and 187.5.6 with title "PMD reset function" and subclause text:
"If the variable PMD_reset is asserted, the PMD shall be reset as defined in 45.2.1.1.1.".

And change the cross-reference in Table 179-20 from 178B.14.2.1 to this new subclause in Clause 179.

A similar subclause should also be added as 178.8.10 titled "PMD reset function" withthe same text as above.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #88.

Cl **179A** *SC* **179A.4** *P* **799** *L* **12** # 267

Ghiasi, Ali Ghiasi Qunatum/Marvell

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

Host channels here is actually package+Host PCB

SuggestedRemedy

Suggest to call it Host package + host PCB, as the channel may implay the connector loss is incldued

Proposed Response *Response Status* **W**

PROPOSED REJECT.
The Host Channel does include the connector loss. The text above Table179A-1 clearly states what losses are included in the Host Channel.

!! Pulled from bucket

Cl **179A** *SC* **179A.4** *P* **799** *L* **16** # 266

Ghiasi, Ali Ghiasi Qunatum/Marvell

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

Recommended channel IL in table 179A-1 don't add up

SuggestedRemedy

Assuming the via is part of channel, with loss of 2.45 dB connector and 3.8 dB HCB sums to 6.25 dB, the Max Host channel loss would be:
Host-Low=12.75-6.25=6.5 dB
Host-Med=17.75-6.25=11.5 dB
Host-High=22.75-6.25=16.5 dB

Proposed Response *Response Status* **W**

PROPOSED REJECT.
Resolve using response to comment #267.

!! Pulled from bucket

Cl **179A** *SC* **179A.4** *P* **800** *L* **22** # 268

Ghiasi, Ali Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **D** *Host Channel IL*

Ildd MTF loss of 9.75 dB is the target loss and not min loss

SuggestedRemedy

Remove minimum from the 179A-3 title and add target for the MTF loss

Proposed Response *Response Status* **W**

PROPOSED REJECT.
The table title and parameter definition are correct as written and consistent with formatting in previous projects.

Cl **179A** *SC* **179A.5** *P* **799** *L* **16** # 458

Kocsis, Sam Amphenol

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

ILddCA,min is greater than ILddCH,min

SuggestedRemedy

Add an Editor's note to provide context and explain that testing the ILddCH,min condition is not possible.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **179A** *SC* **179A.5** *P* **801** *L* **47** # 532

Dawe, Piers
Nvidia

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

17.5

SuggestedRemedy

17.75, twice

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The comment indicates a typo in a label in Figure 179A-2. Replace 17.5 with 17.75 and Implement formating with editorial license.

Cl **179A** *SC* **179A.5** *P* **802** *L* **12** # 560

Heck, Howard
TE Connectivity

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

The first channel min calculation in Figure 179A-3 contains an error. The equation states that 13 dB @ 53.125 GHz = (16+4.45+4.45)-(2*9.75). The correct equationis 13 dB = (16+8.25+8.25)=(2*9.75). The 8.25 dB is taken from Table 179A-3 (Minimum insertion loss budget values at 53.125 GHz)

SuggestedRemedy

Change the equation in Figure 179A-3 to "Channel Min (TP0d-TP5d) = 13 dB @ 53.125 GHz = (16+8.25+8.25)-(2*9.75)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement as proposed in suggested remedy.

Cl **179A** *SC* **179A.5** *P* **802** *L* **13** # 531

Dawe, Piers
Nvidia

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

13 dB ... = (16+4.45+4.45)-(2*9.75)

SuggestedRemedy

13 dB ... = (16+8.25+8.25)-(2*9.75)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #560.

Cl **179B** *SC* **179B.(new)** *P* **811** *L* **54** # 455

Sekel, Steve
Wilder Technologies

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

Reference impedance is 92.5 ohm differential, with test instruments being 100 ohm differential (50 ohm single ended). This introduces a discontunity in the test environment which does not exist in application environment. Lab measurements suggest the location (in time delay) of this discontinunity will change some compliance measurement results. The location within the test fixtures should be specified in a new sub-clause in section 179B.4

SuggestedRemedy

Problem will be presented with proposed location of 92.5 to 100 ohm discontinunity within the compliance test fixtures will be presented in contribuion during 802.3 interim meeting

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **179B** *SC* **179B.1** *P* **803** *L* **23** # 527

Dawe, Piers
Nvidia

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

Now that we have adopted a reference impedance of 92.5 ohm for ERL, we need to address the other specs. All these parameters are measured with a VNA which does the calculations for us, so we can use whatever impedances are suitable.

SuggestedRemedy

Adopt consistent reference impedances for all spec items in this annex.

Proposed Response *Response Status* **W**

PROPOSED REJECT.
The comment is not specific about the scope of "other" specs or propose a specific change.

!! Pulled from bucket

Cl **179B** *SC* **179B.2.1** *P* **803** *L* **39** # 453

Sekel, Steve — Wilder Technologies

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

ILdd is listed as TBD

SuggestedRemedy

Proposed values and equations will be presented with measurement data in contribution during January 802.3 Interim meeting.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **179B** *SC* **179B.2.1** *P* **803** *L* **39** # 210

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *MTF IL*

Value for ILdd_rfref is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using response to comment #357.

Cl **179B** *SC* **179B.2.1** *P* **803** *L* **39** # 357

Ran, Adee — Cisco

Comment Type **TR** *Comment Status* **A** *MTF IL*

The reference insertion loss for TP2/TP3 test fixture (HCB) is TBD.

Assuming that the contributed S-parameters in sekel_3dj_02_2407 represent the reference, Equation 179B-1 should be a polynomial in sqrt(f) fitted to the HCB insertion loss. Figure 179B-1 should be generated accordingly.

Alternatively, the content of 179B.2.1 (TP2 or TP3 test fixture insertion loss) can be replaced by the IL budget at 53.125 GHz.

SuggestedRemedy

A contribution with further details is planned.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/ran_3dj_04_2501.pdf .

Replace equation 179B-1 with the equation shown on slide 4 of ran_3dj_04_2501.
Generate Figure 179B-1 accordingly.

Implement with editorial license.

Cl **179B** *SC* **179B.2.1** *P* **804** *L* **1** # 379

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

Comment Type **ER** *Comment Status* **A** *MTF IL*

There doesn't appear to be a figure - was it deleted? is this an editorial issue?

SuggestedRemedy

Add figure to 179B-1

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using response to comment #357.

Cl **179B** *SC* **179B.3.1** *P* **804** *L* **44** # 211

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *MTF IL*

Value for ILdd_catfref is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using response to comment #358.

Cl **179B** *SC* **179B.3.1** *P* **804** *L* **44** # 358

Ran, Adee — Cisco

Comment Type **TR** *Comment Status* **A** *MTF IL*

The reference insertion loss for the Cable assembly test fixture (MCB) is TBD.

Assuming that the contributed S-parameters in sekel_3dj_02_2407 represent the reference, Equation 179B-2 should be a polynomial in sqrt(f) fitted to the MCB insertion loss.

Alternatively, the content of 179B.3.1 (cable assembly test fixture insertion loss) can be replaced by the IL budget at 53.125 GHz.

SuggestedRemedy

A contribution with further details is planned.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/ran_3dj_04_2501.pdf .

Replace equation 179B-2 with the equation shown on slide 5 of ran_3dj_04_2501, but scale the coefficients as required to obtain 5.95 dB at 53.125 GHz (per slide 6). Generate Figure 179B-1 accordingly.

Change the text in 179B.3.1 from
"The cable assembly test fixture PCB and test point insertion loss values determined using Equation (179B-2) shall be used"
to
"The insertion loss of the cable assembly test fixture PCB, testpoint, connector, and any associated vias, determined using Equation (179B-2), shall be used".

Implement with editorial license.

Cl **179B** *SC* **179B.3.1** *P* **804** *L* **49** # 528

Dawe, Piers — Nvidia

Comment Type **TR** *Comment Status* **A** *MTF IL*

In line with how host loss for products is treated...

SuggestedRemedy

Instead of a test fixture PCB reference insertion loss, define the test fixture reference insertion loss from instrument (coax) connector to the HCB side of the MCB connector, i.e. the whole MCB. Then, MCB reference loss + HCB reference loss = mated CBs reference loss, and things are a little simpler.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Based on the responses to comments #357 and #358, change equation 179B-5 from TBD to the sum of equations 179B-1 and 179B-2, with editorial license.

Cl **179B** *SC* **179B.4** *P* **805** *L* **14** # 48

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **D** *MTF COM*

While 179B.4.1 to179B.4.6 may be necessary, they are not sufficient, to guarantee the instrument quality fidelity required to make repeatable and accurate CR and C2M measurements.

SuggestedRemedy

Add a section.
179B.4.7 Test fixture COM
COM shall be equal to or greater than the specified minimum COM using specification from 179.11.7.1 (COM parameters) with a new table like Table 179-17 (Partial host channel model parameters per Host class)
Test case:1, 2,3
Tx Package class:B,B, B
Rx Package class:A,A,B
MLSE: 0,0,1
Rx FFE pre/post_groups/taps_span(UI):6/14-2/4-50, 6/14-2/4-50, 6/15-2/4-80
Tx Package transmission line 1 length, zp1: 45, 45,45
Rx Package transmission line 1 length, zp1: 4,10,45
Partial Tx host PCB transmission line length, Zp: 0,220,109
Partial Rx host PCB transmission line length, Zp: 0,0,109
tx C0: 0,1.0e-5,1.0e-5
Rx C0: 0,0,1.0e-5
Tx C1: 0,2.9e-5,2.9e-5
Rx C1:0,0,2.9e-5
DER0: 2.0e-5, 2.0e-5,1.0e-4
COM min: 5.3, 4.6, 4
Die-to-die losses for cases 1,2, and 3 are about 20, 32, and 40 dB respectively
Using host PCB transmission defined in Table 176D-5 (Host and module model parameters)
See presentation.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The following related presentation was provided for review:
<URL>/mellitz_3dj_01_2501
The comment suggests there is a better way to qualify mated test fixture performance and proposes a methodology for the TF to consider.
For CRG Discussion..

Cl **179B** *SC* **179B.4.1** *P* **805** *L* **21** # 213

Brown, Matt Alphawave Semi

Comment Type **T** *Comment Status* **D** *MTF ILDD*

Values for ILdd_MTFmax and ILdd_MTFmin are TBD.

SuggestedRemedy

Expect a contribution with proposals.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
This comment points out a TBD that must be addressed.
For task force discussion.

Cl **179B** *SC* **179B.4.1** *P* **805** *L* **48** # 212

Brown, Matt Alphawave Semi

Comment Type **T** *Comment Status* **A** *MTF FOM ILD*

Value for maximum FOM_ILD is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using response to comment #459.

Cl **179B** *SC* **179B.4.1** *P* **805** *L* **48** # 459

Kocsis, Sam Amphenol

Comment Type **T** *Comment Status* **A** *MTF FOM ILD*

The value for the FOM_ILD is TBD

SuggestedRemedy

Replace TBD with value as proposed in kocsis_3dj_01_2501

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/mellitz_3dj_01b_2501.pdf and slide 3 of https://www.ieee802.org/3/dj/public/25_01/kocsis_3dj_02b_2501.pdf .

For FOM_ILD, replace "TBD dB" with "0.15 dB".

Cl **179B** *SC* **179B.4.1** *P* **806** *L* **1** # 380

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

Comment Type **ER** *Comment Status* **R** *(bucket)*

There doesn't appear to be a figure - was it deleted? is this an editorial issue?

SuggestedRemedy

add figure to 179B-2

Response *Response Status* **C**

REJECT.
The issue is not editorial. The suggested remedy does not provide sufficient detail to implement.

Cl **179B** *SC* **179B.4.2** *P* **807** *L* **4** # 214

Brown, Matt — Alphawave Semi

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

Reference to "Table TBD".

SuggestedRemedy

Provide reference to intended table.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slide 4 of
https://www.ieee802.org/3/dj/public/25_01/kocsis_3dj_02b_2501.pdf .

Change "Table TBD" to "Table 179-18".

Cl **179B** *SC* **179B.4.2** *P* **807** *L* **4** # 49

Mellitz, Richard — Samtec

Comment Type **TR** *Comment Status* **A** *MTF ERL*

table is TBD

SuggestedRemedy

Replace Table TBD with Table 93A-4

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using response for comment #214.

Cl **179B** *SC* **179B.4.2** *P* **807** *L* **4** # 460

Kocsis, Sam — Amphenol

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

The table reference for unspecifiied MTF ERL parameters is TBD.

SuggestedRemedy

Replace TBD with "Table 179-18"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using response for comment #214.

Cl **179B** *SC* **179B.4.2** *P* **807** *L* **7** # 530

Dawe, Piers — Nvidia

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

The round trip loss to the MCB connector is 7.6 dB from one side, and more from the other, so an ERL of 10.3 dB is very weak.

SuggestedRemedy

Now that we have a suitable reference differential impedance, choose a suitable ERL limit.

Proposed Response *Response Status* **W**

PROPOSED REJECT.

The suggested remedy does not provide sufficient detail to implement.

!! Pulled from bucket

Cl **179B** *SC* **179B.4.2** *P* **807** *L* **10** # 463

Kocsis, Sam — Amphenol

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

The value for Z_t, the singled-ended source termination resistiance for TDR and ERL reference is not listed

SuggestedRemedy

Add Z_t to Table179B-1, with a proposed value of 46.25ohm, to align with ERL reference impendance of 92.5ohm

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slides 5-6 of https://www.ieee802.org/3/dj/public/25_01/kocsis_3dj_02b_2501.pdf .

The proposed response refers to Z_t, which is a parameter of the COM tool, but is not defined in the standard.

Add an editor's note stating that contributions about calculating ERL with reference impedance of 92.5 Ohm are encouraged.

Cl **179B** *SC* **179B.4.3** *P* **807** *L* **47** # 529

Dawe, Piers — Nvidia

Comment Type **TR** *Comment Status* **D** *MTF Measurement Bandwidth*

The maximum frequencies in this annex are a mix of 67 GHz and 60 GHz. If any are 67, we are committed to the expense and they can all be 67. Test fixtures, like other test equipment, should be specified more stringently than product. High frequencies are as important relative to low frequencies for mixed-mode and common-mode specs as for differential-mode specs.

SuggestedRemedy

Change the 60 GHz to 67 GHz, 3 places. Adjust the graphs accordingly.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Pending review of <URL>/kocsis_3dj_02_2501.
For CRG Discussion.

Cl **179B** *SC* **179B.4.4** *P* **809** *L* **33** # 464

Kocsis, Sam — Amphenol

Comment Type **T** *Comment Status* **A** *MTF RLdc*

The equation 179B-8 is incorrect (for the range 12.89GHz to 35GHz)

SuggestedRemedy

Replace equation with "17.85-0.225*f"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slide 9-10 of https://www.ieee802.org/3/dj/public/25_01/kocsis_3dj_02b_2501.pdf .

Implement the change to equation 179B-8 shown on the left of slide 9.

Cl **179B** *SC* **179B.4.6** *P* **810** *L* **29** # 525

Dawe, Piers — Nvidia

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

Some parameters are in the paragraphs, others are in the tables.

SuggestedRemedy

Move the parameters fMin fMax fStep (max) to the table(s)

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The current text formatting reflects the style of previous projects, but can be confusing to track all of the necessary information. Implement suggested remedy with editorial license.

!! Pulled from bucket

Cl **179B** *SC* **179B.4.6** *P* **810** *L* **30** # 526

Dawe, Piers — Nvidia

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

Don't put unnecessary ambiguity in a definition.

SuggestedRemedy

Change "maximum frequency spacing of 10 MHz" to " frequency spacing of 10 MHz"

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The current text formatting reflects the style of previous projects, but may be unnecessarily ambiguous. Implement suggested remedy as proposed.

!! Pulled from bucket

Cl **179B** *SC* **179B.4.6** *P* **810** *L* **36** # 524

Dawe, Piers Nvidia

Comment Type **E** *Comment Status* **D** *MTF XTALK*

I don't know why the values in the NEXT table should differ from those in the FEXT, NEXT and IXT table. Also, Table 179B, with only one entry, isn't really a table.

SuggestedRemedy

Combine Table 179B-2 and 179B-4, using an additional column if needed. Combine tables 179B-3 and 179B-5.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The current text formatting reflects the style of previous projects, but does not propose values for the TBDs. Resolve with comment #217. Implement suggested remedy with editorial license.

Cl **179B** *SC* **179B.4.6** *P* **810** *L* **44** # 523

Dawe, Piers Nvidia

Comment Type **T** *Comment Status* **D** *MTF XTALK*

Although we can use any value we like for A_nt and A_ft, and keeping them the same across clauses would be desirable, people may expect that they align with the limits of the silicon.

SuggestedRemedy

Change them from 600 mV to 500 mV

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve after review of <URL>/kocsis_3dj_02_2501.
For CRG Discussion.

Cl **179B** *SC* **179B.4.6** *P* **810** *L* **44** # 53

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **D** *MTF XTALK*

A_nt is not aligned with reference transmitter

SuggestedRemedy

Replace 400 mV with 481 mV (table 179B-2)

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using response for comment #217.

Cl **179B** *SC* **179B.4.6** *P* **810** *L* **45** # 52

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **D** *MTF XTALK*

T_nt is not aligned with reference transmitter

SuggestedRemedy

Replace 6 ps with 4 ps (table 179B-2)

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using response for comment #217.

Cl **179B** *SC* **179B.4.6** *P* **810** *L* **45** # 465

Kocsis, Sam Amphenol

Comment Type **T** *Comment Status* **A** *MTF XTALK*

Value for rise/fall time in Table 179B-2 is inconsistent with Table 179B-4.

SuggestedRemedy

Update Tnt to 4.25ps

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed slide 7 of
https://www.ieee802.org/3/dj/public/25_01/kocsis_3dj_02b_2501.pdf.

Change the value of T_nt in Table 179B-2 to 4.25 ps, aligning it with Table 179B-4.

Straw poll #E-2 (decision)
I support changing T_nt in Table 179B-2 (SFP224 mated test fixtures) from 6 ps to 4.25 ps.
Y: 24
N: 14

Cl **179B** *SC* **179B.4.6** *P* **811** *L* **8** # 216

Brown, Matt — Alphawave Semi

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

It is out of convention to specify a value "Less than xxx".
Similar issue in Table 179B-5.

SuggestedRemedy

Change "Integrated near-end crosstalk noise voltage" to "Integrated near-end crosstalk noise voltage (max)"
Change "Less than TBD" to "TBD"
Make similar updates in Table 179B-5.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.
Note that comment #217 proposes a value to use in place of TBD.

Cl **179B** *SC* **179B.4.6** *P* **811** *L* **8** # 461

Kocsis, Sam — Amphenol

Comment Type **T** *Comment Status* **A** *MTF XTALK*

The value for SFP224 MTF ICN is TBD

SuggestedRemedy

Replace TBD with value as proposed in kocsis_3dj_01_2501

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed slide 8 of
https://www.ieee802.org/3/dj/public/25_01/kocsis_3dj_02b_2501.pdf.

In Table 179B-3, change TBD to 1.6.

Cl **179B** *SC* **179B.4.6** *P* **811** *L* **8** # 215

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *MTF XTALK*

Value for maximum "Integrated near-end crosstalk noise voltage" is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using response for comment #461.

Cl **179B** *SC* **179B.4.6** *P* **811** *L* **11** # 56

Mellitz, Richard — Samtec

Comment Type **TR** *Comment Status* **D** *MTF XTALK*

ICN should be adjusted for PAM4

SuggestedRemedy

Adjust ICN results from Equation 92-44 and 92-48 by multiplying by sigma_X (0.7454)

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using response for comment #217.

Cl **179B** *SC* **179B.4.6** *P* **811** *L* **28** # 55

Mellitz, Richard — Samtec

Comment Type **TR** *Comment Status* **D** *MTF XTALK*

A_nt and A_ft is not aligned with reference transmitter

SuggestedRemedy

Replace 400 mV with 481 mV (table 179B-4)

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using response for comment #217.

Cl **179B** *SC* **179B.4.6** *P* **811** *L* **31** # 522

Dawe, Piers — Nvidia

Comment Type **TR** *Comment Status* **D** *MTF XTALK*

The rise time for FOM_ILD, SFP NEXT, and multi-lane NEXT and FEXT, are expected to be the same.

SuggestedRemedy

Change 4.25 ps to 6 ps, twice

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using response for comment #217.

Cl **179B** SC **179B.4.6** P **811** L **31** # 54

Mellitz, Richard — Samtec

Comment Type **TR** *Comment Status* **D** *MTF XTALK*

T_nt and T_ft is not aligned with reference transmitter

SuggestedRemedy

Replace 6 ps with 4 ps (table 179B-4)

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using response for comment #217.

Cl **179B** SC **179B.4.6** P **811** L **43** # 462

Kocsis, Sam — Amphenol

Comment Type **T** *Comment Status* **A** *MTF XTALK*

The value(s) for Multi-lane MTF ICN is TBD.

SuggestedRemedy

Replace TBD with value as proposed in kocsis_3dj_01_2501

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed
https://www.ieee802.org/3/dj/public/25_01/mammenga_3dj_01_2501.pdf, and slide 8 of
https://www.ieee802.org/3/dj/public/25_01/kocsis_3dj_02b_2501.pdf.

Change TBDs on Table 179B-5 to the values provided in slide 8 of kocsis_3dj_02b_2501.

Cl **179B** SC **179B.4.6** P **811** L **43** # 217

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *MTF XTALK*

Values for crosstalk noise are TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to #462.

Cl **179B** SC **179B.4.6** P **811** L **43** # 454

Sekel, Steve — Wilder Technologies

Comment Type **T** *Comment Status* **A** *MTF XTALK*

Values for MDFEXT, MDNEXT and Total ICN are listed as TBD

SuggestedRemedy

Proposed values along with measuremnt data will be presented in contribuion during 802.3 Interim meeting

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to #462.

Cl **179B** SC **179B4.1** P **805** L **48** # 50

Mellitz, Richard — Samtec

Comment Type **TR** *Comment Status* **A** *MTF FOM ILD*

FOM_ILD is TBD

SuggestedRemedy

Based on posted MTF channel , sekel_3dj_02_2407 replace TBD dB with 0.16 dB

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using response to comment #459.

Cl **179B** SC **179B4.1** P **806** L **46** # 51

Mellitz, Richard — Samtec

Comment Type **TR** *Comment Status* **R** *MTF FOM ILD*

T_t is not aligned with reference transmitter

SuggestedRemedy

Replace 6 ps with 4 ps

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **179C** *SC* **179C.1** *P* **814** *L* **12** # 519

Dawe, Piers Nvidia

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

Media Dependent Interface

SuggestedRemedy

Medium Dependent Interface

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Medium Dependent Interface is consistent with the current nomenclature definitions.
Change "Media Dependent Interface" to "Medium Dependent Interface" across the draft with editorial license.

Cl **179D** *SC* **179D.1.1** *P* **828** *L* **34** # 518

Dawe, Piers Nvidia

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

This says "a common set of electrical parameters specified in 179.11, enabling a 1 m length". What length(s) it enables is not relevant to this discussion of connector types and breakout, and it is not accurate.

SuggestedRemedy

Delete "enabling a 1 m length"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The current project scope supports multiple cable types of varying lengths, and so the current text is incorrect.
Implement the suggested remedy with editorial license.

Cl **180** *SC* **180.3** *P* **412** *L* **15** # 227

Ghiasi, Ali Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **A** *signal ok*

Signal_OK as shown in Fig 180-2 is from the Inner sublayer above then goes into ILT box on TX and another ILT box on the RX has Signal_OK out. We talk about Signal_OK then jump into inter-suplayer variables before intorudcing ILT.

SuggestedRemedy

Referencing Fig 180-2 would be helfull here. After the 1st paragraph add sentence: The PMD in this clause support Inter-sublayer Layer Training (ILT) type O1, see Annex 178B.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

A definitive statement as proposed in the suggested remedy is beyond the intent of the service interface clause, which is defining interfaces between sublayers.

However, it would be helpful to the reader to point out references for each of the major functions in the block diagram.

In 180.3, change "training_status of the inter-sublayer training function" to "training_status of the inter-sublayer training (ILT) function (see 180.5.12)". Update 181.3, 182.3, 183.3 in a similar way.

In 180.5.1 add text pointing out reference to subclauses defining these. Update , 181.5.1, 182.5.1, and 183.5.2 in similar way.

Implement with editorial license.

Cl **180** *SC* **180.5.1** *P* **413** *L* **27** # 316

Ran, Adee Cisco

Comment Type **TR** *Comment Status* **A** *PMD block diagram*

The subclause title is "PMD block diagram", and the text refers to Figure 180-2 as the PMD block diagram, but it is not - it is a block diagram of the full link between two PMDs and their adjacent PMAs.
The diagram is good as it is, but the title and the text should be changed. The suggested remedy is one possibility, but variations of it can be used.

Also applies to the similar subclauses 181.5.1, 182.5.1, 183.5.1. Other two subclauses, 185.5.1 and 187.5.1, have a separate PMD block diagram and refer to the link diagram as "A block diagram for the PMD transmit/receive paths" instead, but their titles are still "PMD block diagram"..

SuggestedRemedy

Change the subclause title to "PMD specification points". Change the text to refer to the diagram as a "link block diagram".

Change the figure title to align with the description.

Implement as appropriate in all optical PMD clauses with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The referenced block diagram provides much more than just the PMD. It shows the transmit and receive paths from the PMA at the transmitting end to the PMA at the receiving end and including the PMDs, MDIs, medium, test points, etc. between. It is therefore inaccurate to title the subclause "PMD block diagram". The figure title is okay as it is. The text in similar paragraphs is inconsistent with "The PMD block diagram" in the first paragraph and "The block diagram" in the second, third, and fouther paragraphs.

In 180.5.1.
Change the subclause title to "Block diagram"
On page 413 line 28, change "PMD block diagram" to "block diagram".
In 181.5.1.
Change the subclause title to "Block diagram"
On page 441 line 3, change "PMD block diagram" to "block diagram".
In 182.5.1.
Change the subclause title to "Block diagram"
On page 466 line 34, change "PMD block diagram" to "block diagram".
In 183.5.1.
Change the subclause title to "Block diagram"
On page 495 line 8, change "PMD block diagram" to "block diagram".
In 185.5.1.
Change the subclause title to "Block diagram"
On page 546 line 43, change "for the PMD transmit/receive paths" to "transmit/receive paths"
In 187.5.1.
Change the subclause title to "Block diagram"
On page 619 line 43, change "for the PMD transmit/receive paths" to "transmit/receive paths"

Implement with editorial license.

[Editor's note: CC: 180, 181, 182, 183, 185, 187]

Cl **180** *SC* **180.5.1** *P* **414** *L* **24** # 317

Ran, Adee Cisco

Comment Type **E** *Comment Status* **A** *(bucketp)*

The text boxes in Figure 180-2 are somewhat cluttered.

SuggestedRemedy

Change the service interface labels to "PMD:IS_UNITDATA_i.request" and "PMD:IS_UNITDATA_i.indication" (instead of "0 to 3").

Move the text "For clarity." to the bottom of the diagram, and precede it with "NOTE".

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

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

!! Pulled from bucket #1
!! Reponse updated 2025/1/19

Cl **180** *SC* **180.5.4** *P* **415** *L* **1** # 318

Ran, Adee Cisco

Comment Type **TR** *Comment Status* **A** *(bucketp)*

"The state of the Global_PMD_signal_detect variable is conveyed to PMD client sublayers via the PMD service interface"

This is not true anymore; the service interface conveys the state of the ILT function (as shown in the diagram). The variable has a different semantic and is only accessible through management.

SuggestedRemedy

Delete the quoted sentence.

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT.

Cl **180** *SC* **180.7.1** *P* **418** *L* **12** # 319

Ran, Adee
Cisco

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

The maximum optical return loss tolerance in 200GBASE-DR1 is different than in the other PMDs.
I assume this is due to the transmitter's connector; if that's true, should there be a different specification for a 200GBASE-DR1 with a multi-fiber MDI (breakout)? The receiver in that case can still have a single-lane MDI.
Should the transmitter's RINxxOMA in this case be measured with a reflectance corresponding to a single-lane MDI?

SuggestedRemedy

Not sure what the answer is and where this distinction should be made.

Whatever the solution is, implement similarly in clause 182 as necessary, with editorial license.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **180** *SC* **180.7.1** *P* **463** *L* **26** # 344

Ran, Adee
Cisco

Comment Type **E** *Comment Status* **A** *(bucketp)*

As a result of the resolution of comment #71 against D1.2, almost all rows in Table 180-7 now include the words "each lane". The few rows that do not, are also applicable per lane.

Also, the modified names of the parameters were not consistently applied to references to these parameters outside the table; for example footnote c as "RINxxOMA" without "each lane".

Apparently the whole table is applicable for each lane. The current parameter naming creates unnecessary clutter in the table and elsewhere in the clause, and having "each lane" on some of the parameters and not on others can raise questions.

SuggestedRemedy

Add " on each lane" to the table heading. Delete it from the rows it appears on.
If necessary, add text above the table to clarify.

Delete "each lane" from the names of the parameters elsewhere in this clause (e.g. the text below the table).

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add "each lane" where appropriate. With editorial license

Cl **180** *SC* **180.7.3** *P* **420** *L* **24** # 320

Ran, Adee Cisco

Comment Type **T** *Comment Status* **R** *power budget*

This subclause is in the hierarchy undier 180.7 "PMD to MDI optical specifications".

But the subclause content does not contain any specifications - it only explains the rationale for other specifications. It is informative in nature.

This can be solved by renaming clauses and/or changing the hierarchy. The suggested remedy is one option, but others may be chosen.

SuggestedRemedy

Move this subclause out to a 2nd-level subclause after the 180.8 (that is, a new 180.9) and rename it "Power budget".

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

REJECT.

Even when 180.7.3 is not normative it is very useful to the reader to show the capabilities and limitation of the interface. Separating it from 180.7.1 and 180.7.2 does not improve the quality of the draft.

Cl **180** *SC* **180.7.3** *P* **420** *L* **46** # 231

Ghiasi, Ali Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **R** *power budget*

MPI/DGP penalty of 0.1 dB is too small for this PMD type

SuggestedRemedy

200GBASE-DR MPI penalty is 0.4 dB with 0.18 dB DGD the total penalty for this PMD is 0.58 dB
400GBASE-DR2/800GBASE-DR4/800GBASE-DR8 MPI penalty is 0.12 dB with 0.18 dB DGD the total penalty for this PMD is 0.3 dB. Make the MPI/DGD penalty 0.5 dB for all PMDs and reduce cable plant loss from 3 dB to 2.6 dB. See Ghiasi_3dj_02_2501

Response *Response Status* **C**

REJECT.

Resubmission of comment #66 to D1.1 and #262 D1.2. which were rejected.
Table 140-12 does not show 0.4 dB MPI penalty. If 0.4 dB MPI penalty is needed then a complete revision of the DR1 spec is needed. Therefore the proposed remedy is incomplete. A complete proposal for the revision of the power budget is necessary.

A complete proposal for the revision of the power budget was not provided as requested.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/ghiasi_3dj_02_2501.pdf.

After CRG discussion there was no consensus to make a change at this time.

Cl **180** *SC* **180.7.3** *P* **473** *L* **46** # 233

Ghiasi, Ali Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **R** *power budget*

MPI/DGP penalty of 0.4 dB is too small for 200GBASE-DR and too generaous for 400G/800G/1.6T

SuggestedRemedy

200GBASE-DR-2 MPI penalty is 0.45 dB with 0.18 dB DGD the total penalty for this PMD is 0.63 dB
400GBASE-DR2/800GBASE-DR4/800GBASE-DR8 MPI penalty is 0.1 dB with 0.18 dB DGD the total penalty for this PMD is 0.28 dB. We can either define different link budget, an acceptable alternative is to limit the numbner of connectros to 4 for 200GBASE-DR and stay with current 0.4 dB budget. See Ghiasi_3dj_02_2501

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #231

Cl **180** *SC* **180.8** *P* **421** *L* **41** # 321

Ran, Adee Cisco

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

The words "shall meet the" appear twice in succession.

SuggestedRemedy

Delete once.

Response *Response Status* **C**

ACCEPT.

Cl **180** *SC* **180.8** *P* **421** *L* **42** # 322

Ran, Adee Cisco

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

"per the definitions in 180.9" seems irrelevant. There are not specifications related to Table 180-10 in 180.9.

SuggestedRemedy

Delete "per the definitions in 180.9".

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

Cl **180** *SC* **180.8** *P* **422** *L* **17** # 323

Ran, Adee Cisco

Comment Type **TR** *Comment Status* **R** *channel requirements*

"DGD_max is the maximum differential group delay that the system is required to tolerate"

Within this footnote there are both a definition of an optical parameter, and a requirement of the "system" (but the way it is written makes it implicitly a receiver requirement).

Acknowledging that this footnote appears in many clauses in the base document, it is nevertheless a poor way of specifying things.

It would be preferable to separate the definition to a subclause, and possibly add a corresponding receiver specification.

SuggestedRemedy

If the intent is not to have DGD tolerance as a receiver requirement, change "that the system is required to tolerate" to "that a receiver is expected to tolerate".

If this is a receiver requirement, add a row in Table 180-8 with "DGD tolerance".

Preferably, either way, create a new subclause in 180.9 with a definition of DGD, instead of having it in a footnote.

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

REJECT.

DGD max is a fundamental impairment of the link which produces a penalty of the receiver for the SRS and sensitivity specifications.

DGD_max in Table 180-10 specifies the worst case intended/expected on the optical channel. The impact on the receiver is accounted for by the addition 0.1 dB penalty allocated as noted in Table 180-9, footnote b.

Cl **180** *SC* **180.8.1** *P* **422** *L* **43** # 324

Ran, Adee Cisco

Comment Type **E** *Comment Status* **R** *fiber characteristics*

A range of allowed values is usually indicated by "a to b" (see 14.2 in the style manual).

SuggestedRemedy

Change to

Response *Response Status* **C**

REJECT.

Implementing the proposed remedy inferred by the editorial team, changing the equation style to an "a to b" style does not improve the quality of the draft, which is not broken. This style has been used for quite some time in in-force specifications.

Cl **180** *SC* **180.8.1** *P* **422** *L* **44** # 325

Ran, Adee Cisco

Comment Type **TR** *Comment Status* **A** *(bucketp)*

Dispersion slope unit is ps/(nm^2 km).

IEEE Std 260.1-2004 (4.3) requires parentheses in such cases.
The IEEE SA style guide says a multiplication sign is required, but we often do not follow this rule.

SuggestedRemedy

Add parentheses.
Consider adding a multiplication sign.

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement suggested remedy with editorial license.

Cl **180** *SC* **180.8.3** *P* **423** *L* **45** # 326

Ran, Adee Cisco

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

There are separate MDI definitions for each of the PMDs. These definitions do not appropriately address breakout, as described by Annex 180A (the word "breakout" does not even appear in this clause).

Although 180A is mentioned in NOTE paragraphs (which are informative) of "optical lane assignments" (180.8.3.1), there are normative ("shall") MDI requirements for 200GBASE-DR1 (180.8.3.2) that, as written, do not address the possible use of wider MDIs for this PMD. Similarly, 180.8.3.3 do not address the possible use of a 16-fiber interface for 400G and 800G.

SuggestedRemedy

In 180.8.3.2, add references to the alternative MDIs (180.8.3.3 and 180.8.3.4) and to Annex 180A.
In 180.8.3.3, add a reference to the alternative MDI (180.8.3.4) and to Annex 180A.

Consider adding a statement in the text of 180.8.3 with the word "breakout" and a reference to Annex 180A.

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #57

Cl **180** *SC* **180.8.3.1.1** *P* **423** *L* **52** # 327

Ran, Adee Cisco

Comment Type **ER** *Comment Status* **A** *(bucketp)*

"leftmost" and "rightmost" are standard English words (that appear in dictionaries). The hyphenated compounds are nonstandard and do not help the reader.

Note that 180.8.3.1.3 uses the correct words.

SuggestedRemedy

Change to "leftmost" and "rightmost", here and elsewhere in this clause.

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT.

Cl **180** *SC* **180.8.3.1.1** *P* **424** *L* **1** # 328

Ran, Adee Cisco

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

Table 180-14 is for 800GBASE-DR4.

SuggestedRemedy

Change the reference to Table 180-13.

Response *Response Status* **C**

ACCEPT.

Cl **180** *SC* **180.8.3.2** *P* **426** *L* **33** # 329

Ran, Adee Cisco

Comment Type **ER** *Comment Status* **A** *(bucketp)*

No need for quotes in "fiber optic cabling".

SuggestedRemedy

Delete the quotes.

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT.

Cl **180** *SC* **180.8.3.2** *P* **426** *L* **41** # 330

Ran, Adee Cisco

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

The NOTE about transmitter compliance testing does not appear in any of other MDI requirements subclauses. It is not required.

SuggestedRemedy

Delete this NOTE.

Response *Response Status* **C**

REJECT.

After CRG discussion there was no consensus to make a change.

No change to the draft.

Cl **180** *SC* **180.9** *P* **427** *L* **45** # 236

Ghiasi, Ali Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **A** *measurement methods*

Counter propagating traffic must be active for these tests

SuggestedRemedy

Add the following paragrpah, Counter-propagating asynchronous optical signal (crosstalk) at maximum OMA applied to the module under test TP3. The crosstalk pattern can be PRBS31Q, or a valid 100GBASE-R, 200GBASE-R, or 400GBASE-R, or 800GBASE-R, or 1.6TBASE-R signal. See Ghiasi_3dj_01_2501

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #240.

Cl **180** *SC* **180.9.4** *P* **430** *L* **32** # 186

Brown, Matt — Alphawave Semi

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

Value for minimum "number of equalizer pre-cursor taps" is TBD.

SuggestedRemedy

Either set the the value to 0 allowing the number of pre-cursor taps to vary from 0 to 3 or straddle the minimum/maximum columns with a value of 3, permitting only a value of 3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Based on the results of straw polls TF-1/2/3, in Table 180-18, Table 181-13, Table 182-18, Table 183-14 set the minimum number of pre-cursor taps to 0.

In Table 182-18, delete the row specifying number of post-cursor taps.

Implement with editorial license.

Straw poll #TF-1 (Chicago rules) #TF-2 (choose 1) -- directional
In Table 180-18, Table 181-13, Table 182-18, Table 183-14, I support setting minimum number of pre-cursor taps to:
A: 0
B: 1
C: 2
D: 3
TF-1: A: 41 B: 24 C: 21 D: 30
TF-2: A: 34 B: 7 C: 7 D: 20

Straw poll #TF-3 (choose 1) -- directional
In Table 180-18, Table 181-13, Table 182-18, Table 183-14, I support setting minimum number of pre-cursor taps to:
A: 0
B: 3
A: 43 B: 22

Cl **180** *SC* **180.9.5** *P* **430** *L* **4** # 171

Johnson, John — Broadcom

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

The TDECQ test method points to clause 121.8.5.3, which uses a target SER of 4.8e-4, which is not appropriate for 200G/lane AUIs. As given in Table 174A-1, the appropriate value for 200G/lane AUIs should be 4.56e-4 for uncorrelated bit errors.

SuggestedRemedy

Add a new exception to the list:
"Target PAM4 symbol error ratio of 4.56e-4."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add a new exception to the list:
"The target PAM4 symbol error ratio is 4.56e-4 and the related Q_t value is 3.428."
Implement with editorial license.

Cl **180** *SC* **180.9.5** *P* **430** *L* **22** # 244

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

180.2 require block error measurement but the TDECQ is an average penalty measurment, either we need to develop a Golden hardwre reference receiver or we have to improve TDECQ test method to capture block erros/penalty.

SuggestedRemedy

Instead the recommendation is to measure block TDECQ where block TDECQ is by capturing 10 SSPRQ waveforms which forms 65535 FEC symbols, ~120 KP4 FEC blocks, or 30 interleaved KP4 FEC blocks when 4-with way interleaving. Each of the 30 KP4 blocks are processed as in definition in https://www.ieee802.org/3/dj/public/24_09/healey_3dj_02a_2409.pdf proposal. Use worst 3 blocks from each group of 30 blocks then combine 3 worst blocks from the 4 group to create the PDF. Then calculate block TDECQ, add line item to table 180-7 with limit of 3.6 dB. See Ghiasi_3dj_03_2501

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **180** *SC* **180.9.5** *P* **430** *L* **22** # 240

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

TDECQ masuremnt needs to define test condition when there is an optional AUI

SuggestedRemedy

Add following codition to the list of requiremetns in 180.9.5: Where AUI is exposed, a conforming implementation must meet TDECQ with the exposed AUI configured for applicable module stress input test as in 176C.4.4.5 Receiver jitter tolerance, 120G.3.4.3 Module stressed input tolerance, or 120E.3.4.1 Module stressed input test and the recovered AUI clock driving the TDECQ pattern. See Ghiasi_3dj_01_2501

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The following contribution was reviewed by the CRG:
https://www.ieee802.org/3/dj/public/25_01/ghiasi_3dj_01a_2501.pdf

Add the following TDECQ exceptions to be appropriately reworded:
- Counter-propagating asynchronous optical signals (crosstalk) as specified for the aggressor used in receiver stress tests is applied to all the PMD receive inputs at TP3. For Clause 180/181, the crosstalk test pattern can be pattern 3, 5, or 7. For Clause 182/183, the crosstalk pattern can be pattern 5 or 7.

Note that another comment proposes adding a new pattern: PRBS31 encoded by the xBASE-R Inner FEC, which if adopted may also be used for Clause 182/183.

- Where transmit direction where AUI is exposed, the AUI input recovered clock is the clock source for the SSPRQ test pattern. The AUI pattern may be either PRBS31Q or a valid xBASE-R signal.

Implement with editorial license.

Straw poll TF-4 (choose 1) -- directional
I support adoption of additional criteria for TDECQ where counter-progagating signals with data stream asynchronous with the transmit path are applied to the receive optical inputs as proposed in ghiasi_3dj_01.
Yes: 48
No: 18

Straw poll TF-5 -- directional
I support adoption of additional criteria for TDECQ where PMD transmit clock is synchronized to the clock recovered on the AUI input (with or without jitter stress) as proposed in ghiasi_3dj_01.
Yes: 42
No: 24

Straw poll TF-6 -- decision
I support adopting exception "- Counter-propagating asynchronous optical signals (crosstalk) as specified for the aggressor used in receiver stress tests is applied to all the PMD receive inputs at TP3. For Clause 180/181, the crosstalk test pattern can be pattern 3, 5, or 7. For Clause 182/183, the crosstalk pattern can be pattern 5 or 7."
Yes: 47
No: 20

Straw poll TF-7 -- decision
I support adopting TDECQ exception "- Where transmit direction where AUI is exposed, the AUI input recovered clock is the clock source for the SSPRQ test pattern. The AUI pattern may be either PRBS31Q or a valid xBASE-R signal.
Yes: 38
No: 28

Cl **180** *SC* **180.9.5** *P* **430** *L* **30** # 251

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

Number of pre-cursor is maximum with min TBD

SuggestedRemedy

What was agreed during Sept 2024 meeting to go with fixed 3 pre-cursors and not a floating at least for now, given than agreement merge the TBD and max line and just enter 3 similar to FFE length of 15.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186

Cl **180** *SC* **180.9.5** *P* **430** *L* **32** # 422

Dudek, Mike — Marvell

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

For commonality of implementation and becasue there is no expected reason for needing a different tap allocation for the TDECQ reference equalizer for the different clauses the TDECQ reference equalizer should be made the same for the clauses 180,181,182 and 183. In D1.3 all the clauses have the same 15 FFE length and the same 3 maximum number of pre-cursor taps however the minimum number of equalizer pre-cursor taps for the TDECQ reference equalizer is TBD in table 180-18 (for 200GBASE-DR1 etc.) as it is for 800GBASE-FR4-500 in table 181-13 and 800GBASE-FR4 etc. in table 183- 14 whereas for 200GBASE-DR1-2 etc in table 182-18 the format is different with a maximum number of post cursor taps of 13 implying a minimum number of pre-cursor taps of 2.

SuggestedRemedy

Make the format of the tables the same. Adopt a minimum number of pre-cursor taps of 2 and maximum number of ppre-cursor taps of 3 for all the tables.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186

Cl **180** *SC* **180.9.5** *P* **430** *L* **32** # 172

Johnson, John — Broadcom

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

In Table 180-18, the minimum number of equalizer pre-cursor taps is TBD. In the absence of further proposals, this value should be 0, consistent with the 5-tap FFE defined in 121.8.5.4.

SuggestedRemedy

Change TBD in Table 180-18 to 0.
Delete the associated editors note.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186

Cl **180** *SC* **180.9.5** *P* **430** *L* **35** # 331

Ran, Adee — Cisco

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

Footnote a of Table 180-18 says "Relative to main tap".
"Main tap" is not defined anywhere, though it may be assumed that it is the largest positive value.
Even with that assumption, It is unclear whether this means that the coefficient limits are normalized by the main tap's coefficient or that the coefficient indices are such that the main tap index is 0, or both.

I suspect the answer is "both" but it is not clear from the text.

SuggestedRemedy

Change footnote a to read "The main tap is marked by i=0. The minimum and maximum values are relative to this tap's coefficient."

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy (also in 181, 182, and 183) with editorial license.
[Editor's note: CC: 180, 181, 182, 183]

Cl **180** *SC* **180.9.5** *P* **430** *L* **46** # 15

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *(bucketp)*

Table 180-8. Footnote b redundantly defines the limit of FFE gain. The row for FFE gain specifies the target value 1 so it doesn't need to be repeated in the footnote. However, the footnote is helpful to explain what FFE gain is.

SuggestedRemedy

Change footnote b to "The sum of the all equalizer coefficients."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement suggested remedy throughout the draft with editorial license.

Cl **180** *SC* **180.9.5** *P* **431** *L* **9** # 332

Ran, Adee — Cisco

Comment Type **TR** *Comment Status* **A** *channel requirements*

The last column of Table 180-19 contains the term "mean DGD", and this term also appears in the text (last paragraph of this subclause).

It is unclear what this term means. DGD is defined (in a footnote to Table 180-10) as a difference between two times; based on this definition, it is not a random variable (given a specific channel), so it does not have a mean.

I suspect that the intent is just that the DGD of the channel is below the maximum value, but I may be wrong..

SuggestedRemedy

If the intent is to calculate a mean of some distribution of DGD, clarify what that distribution is. Otherwise, reword as appropriate.

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The inclusion of a value for mean DGD is to make sure that the TDECQ compliance channel is not "spoiled" by excessive DGD so that the major contributior to TDECQ is chromatic dispersion and that the penalty due to DGD is a minor contributor to TDECQ.
Add a new note d to Table 180-19 (and also in 181, 182 and 183):

"The limit for maximum mean DGD in the compliance channel specification is to ensure that the contribution to TDECQ from DGD is substantially less than the primary contribution due to chromatic dispersion."

Implement with editorial license.

Cl **180** *SC* **180.9.10** *P* **432** *L* **35** # 333

Ran, Adee Cisco

Comment Type **TR** *Comment Status* **A** *channel requirements*

Transmitter transition time measurement is defined with good detail, but it is unclear whether the reference equalizer is to be used in the measurement or not (this will likely affect the result).

Note that for RINxxOMA (180.9.11) it is specified explicitly that the noise is measured before the reference equalizer. I assume this should apply to the transition time too.

SuggestedRemedy

Specify whether the reference equalizer is to be used or not.

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/issenhuth_3dj_01a_2501.pdf.

After CRG discussion there was consensus to implement slides 7-11 with editorial license.

Cl **180** *SC* **180.9.11** *P* **433** *L* **12** # 334

Ran, Adee Cisco

Comment Type **ER** *Comment Status* **A** *channel requirements*

The editor's note makes an important observation that the equation is intended to make the result consistent with that of the older method. This is important information for the reader; without this observation, the equation does not make much sense.

SuggestedRemedy

Add an informative note such as
"NOTE--The definition of RINxxOMA in equation 180-1 is intended to make the result consistent with the measurement method defined in 52.9.6.3."

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The note was intended to convey the message to the task force that more work may be required to verify the validity of the new equation. No issues have been raised with the equation.

After CRG discussion there was consensus that equation 180-7 is valid and to remove the editor's note.

Cl **180** *SC* **180.9.13** *P* **433** *L* **37** # 335

Ran, Adee Cisco

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

The transition time and the RINxxOMA of the SRS test transmitter are said to be "no greater than the value specified in Table 180-7".

However, for the extinction ratio it just says "as given", which is unclear; should it be above the minimum of a transmitter, or no higher than the minimum (because the intent is to stress the receiver)?

The suggested remedy assumes that ER is just required to be compliant (rather than be used as stress). If this is not the case, something else should be written.

SuggestedRemedy

Change "are as given in" to "are within the limits specified in".

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

REJECT.

After CRG discussion there was no consensus to make a change.

No change to the draft.

Cl **180** *SC* **180.10.1** *P* **433** *L* **47** # 336

Ran, Adee Cisco

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

Why is "IEC 62368-1" in green? It is not expected to become an active cross-reference.

Similarly for IEC references in 180.10.2.

SuggestedRemedy

Change the format of these references to regular text.

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

Cl **180** *SC* **180.11** *P* **435** *L* **46** # 337

Ran, Adee Cisco

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

"PMD_signal_detect_3, to PMD_signal_detect_2"

SuggestedRemedy

Delete "to".

Implement similarly in other optical PMD clauses as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license

Cl **180A** *SC* **180A** *P* **831** *L* **1** # 57

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

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

This is a resubmission of Comment #188 against D1.2-
The annex is not written in an ethernet standards approach, where it addresses the breakout implementation, and doesn't address the MDI choices of the DRx / DRx-2.
Additionally, Clauses 180 and 182 are making normative statements regarding the MDIs, despite the annex then providing additinoal MDI Connector choices.
WHile the comment was rejected, the CRG noted that "a more detailed proposal is encouraged."

SuggestedRemedy

Implement attached file ("dambrosia_3dj_01_250102.pdf") with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement suggested remedy from <URL>/dambrosia_3dj_01_250102.pdf with editorial license.

Cl **180A** *SC* **180A** *P* **831** *L* **6** # 517

Dawe, Piers Nvidia

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

This says "informative" while line 18 says "This annex defines". It can't be both.
While 802.3 should acknowledge the reality and importance of breakout, it does not have to specify details of connectors, and as there are so many connector module formats, that would be better avoided. Leave it to the MSAs, TIA and IEC.

SuggestedRemedy

Change "defined" to "describes", like 179D.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #57.

Cl **181** *SC* **181.1** *P* **438** *L* **49** # 338

Ran, Adee Cisco

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

169.2 is included in this amendment.

SuggestedRemedy

Make it an active link.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

Cl **181** *SC* **181.3** *P* **440** *L* **2** # 228

Ghiasi, Ali Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **A** *signal ok*

Signal_OK as shown in Fig 180-2 is from the Inner sublayer above then goes into ILT box on TX and another ILT box on the RX has Signal_OK out. We talk about Signal_OK then jump into inter-suplayer variables before intorudcing ILT.

SuggestedRemedy

Referencing Fig 180-2 would be helfull here. After the 1st paragraph add sentence: The PMD in this clause support Inter-sublayer Layer Training (ILT) type O1, see Annex 178B.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #227

Cl **181** *SC* **181.3** *P* **440** *L* **6** # 339

Ran, Adee Cisco

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

"where i = 0 to n-1"
For this PMD, the number of PMD lanes is always 4 (as stated on the subsequent line). Using "n" just makes life harder for the reader, especially since n (with this meaning) only appears a few times in the clause, and in some places (e.g. Figure 181-2, 181.5.2, 181.5.3) explicit numbers are used.

Note that the "n" in 800GAUI-n is a different variable and should be kept as is.

SuggestedRemedy

Change to "where i = 0 to 3".
Delete "The number of parallel streams, n, is 4.".

In 181.5.4 change n to 4.
In 181.5.5, in Table 181-15, and in Table 181-16, change "n-1" to 3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

Cl **181** *SC* **181.4.1** *P* **440** *L* **25** # 340

Ran, Adee Cisco

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

169.4 is included in this amendment.

SuggestedRemedy

Make it an active link.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

Cl **181** *SC* **181.4.2** *P* **440** *L* **28** # 341

Ran, Adee Cisco

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

169.5 is included in this amendment.

SuggestedRemedy

Make it an active link (twice).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

Cl **181** *SC* **181.7.1** *P* **445** *L* **13** # 342

Ran, Adee Cisco

Comment Type **TR** *Comment Status* **R** *Tx optical parameter*

The specification of "Total average launch power" is 6 dB higher (a factor of 4 in power) than the per-lane average launch power.

This makes the "total" specification redundant - if each lane meets its specification then the total will also be met; if the total fails, one of the lanes must also fail.

The same holds for the FR4/LR4 WDM transmitters in Table 183-4.

SuggestedRemedy

Delete the "Total" row. Add a footnote for the "each lane" row stating that the maximum total power is 6 dB above the per-lane maximum or 10.9 dB.

Implement similarly in 183.7.1 with modified values as necessary.

Response *Response Status* **C**

REJECT.

Maintaining total average power is a useful addition to the draft and completely consistent with in-force clauses. The total power is necessary to stay within optical safety limits.

Cl **181** *SC* **181.7.3** *P* **448** *L* **48** # 232

Ghiasi, Ali Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **R** *power budget*

MPI/DGP penalty of 0.5 dB maybe to small for this PMD type

SuggestedRemedy

The MPI penalty is 0.41 dB and DGD penalty is 0.18 the total penalty is 0.59 dB, not considering worst case current 0.5 dB mabe be acceptable. See Ghiasi_3dj_02_2501

Response *Response Status* **C**

REJECT.

No evidence has been provided that the draft is incorrect.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/ghiasi_3dj_02_2501.pdf.

After CRG discussion there was no consensus to make a change at this time.

Cl **181** *SC* **181.9** *P* **451** *L* **51** # 237

Ghiasi, Ali — Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **A** *measurement methods*

Counter propagating traffic must be active for these tests

SuggestedRemedy

Add the following paragrpah, Counter-propagating asynchronous optical signal (crosstalk) at maximum OMA applied to the module under test TP3. The crosstalk pattern can be PRBS31Q, or a valid 100GBASE-R, 200GBASE-R, or 400GBASE-R, or 800GBASE-R, or 1.6TBASE-R signal. See Ghiasi_3dj_01_2501

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #240.

Cl **181** *SC* **181.9.5** *P* **454** *L* **4** # 173

Johnson, John — Broadcom

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

The TDECQ test method points to clause 121.8.5.3, which uses a target SER of 4.8e-4, which is not appropriate for 200G/lane AUIs. As given in Table 174A-1, the appropriate value for 200G/lane AUIs should be 4.56e-4 for uncorrelated bit errors.

SuggestedRemedy

Add a new exception to the list:
"Target PAM4 symbol error ratio of 4.56e-4."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add a new exception to the list:
"The target PAM4 symbol error ratio is 4.56e-4 and the related Q_t value is 3.428."
Implement with editorial license.

Cl **181** *SC* **181.9.5** *P* **454** *L* **22** # 245

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

181.2 require block error measurement but the TDECQ is an average penalty measurment, either we need to develop a Golden hardwre reference receiver or we have to improve TDECQ test method to capture block erros/penalty.

SuggestedRemedy

Instead the recommendation is to measure block TDECQ where block TDECQ is by capturing 10 SSPRQ waveforms which forms 65535 FEC symbols, ~120 KP4 FEC blocks, or 30 interleaved KP4 FEC blocks when 4-with way interleaving. Each of the 30 KP4 blocks are processed as in definition in https://www.ieee802.org/3/dj/public/24_09/healey_3dj_02a_2409.pdf proposal. Use worst 3 blocks from each group of 30 blocks then combine 3 worst blocks from the 4 group to create the PDF. Then calculate block TDECQ, add line item to table 181-7 with limit of 3.6 dB. See Ghiasi_3dj_03_2501

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **181** *SC* **181.9.5** *P* **454** *L* **22** # 241

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

TDECQ masuremnt needs to define test condition when there is an optional AUI

SuggestedRemedy

Add following codition to the list of requiremetns in 180.9.5: Where AUI is exposed, a conforming implementation must meet TDECQ with the exposed AUI configured for applicable module stress input test as in 176C.4.4.5 Receiver jitter tolerance, 120G.3.4.3 Module stressed input tolerance, or 120E.3.4.1 Module stressed input test and the recovered AUI clock driving the TDECQ pattern. See Ghiasi_3dj_01_2501

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #240

Cl **181** *SC* **181.9.5** *P* **454** *L* **30** # 250

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

Number of pre-cursor is maximum with min TBD

SuggestedRemedy

What was agreed during Sept 2024 meeting to go with fixed 3 pre-cursors and not a floating at least for now, given than agreement merge the TBD and max line and just enter 3 similar to FFE length of 15.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186

Cl **181** *SC* **181.9.5** *P* **454** *L* **30** # 187

Brown, Matt — Alphawave Semi

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

Value for minimum "number of equalizer pre-cursor taps" is TBD.

SuggestedRemedy

Either set the the value to 0 allowing the number of pre-cursor taps to vary from 0 to 3 or straddle the minimum/maximum columns with a value of 3, permitting only a value of 3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186

Cl **181** *SC* **181.9.5** *P* **454** *L* **31** # 174

Johnson, John — Broadcom

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

In Table 181-13, the minimum number of equalizer pre-cursor taps is TBD. In the absence of further proposals, this value should be 0, consistent with the 5-tap FFE defined in 121.8.5.4.

SuggestedRemedy

Change TBD in Table 181-13 to 0.
Delete the associated editors note.
For the editor's consideration: If the specs are identical, delete Table 181-13 completely and refer to Table 180-18.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186

Cl **181** *SC* **181.9.11** *P* **456** *L* **39** # 343

Ran, Adee — Cisco

Comment Type **E** *Comment Status* **A** *(bucketp)*

The subclause title includes a specific value of xx, 17.1, but the text still has "xx".

SuggestedRemedy

Reword the subclause text to use the specific value.
In the reference to 180.9l.11 add "with xx equal to 17.1".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

RINxx is a generic parameter defined in 180.9.11 and referenced from this subclause.

In 181 change all instances to "RIN17.1" to "RINxx".

In 181.9.11 change "with "xx" referring to the value for optical return loss tolerance in Table 181-5"
to
"with "xx" referring to 17.1 which is the value for optical return loss tolerance in Table 181-5"

In Table 180-5 remove footnote c, in Table 182-7 remove footnote c and in Table 183-6 remove footnote d. These footnotes are redundant to the RIN subclause 180.9.11 which defines this parameter.

With editorial license.

Cl **181** *SC* **181.9.13** *P* **457** *L* **7** # 263

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

Reference 121.8.10 doesn't exist

SuggestedRemedy

The correct reference is 121.8.9

Proposed Response *Response Status* **W**

PROPOSED REJECT.
The comment refers to 121.8.10, while 181.9.13 refers to 122.8.10.
122.8.10 is the correct reference.

Cl **182** *SC* **182.3** *P* **465** *L* **6** # 229

Ghiasi, Ali — Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **A** *signal ok*

Signal_OK as shown in Fig 180-2 is from the Inner sublayer above then goes into ILT box on TX and another ILT box on the RX has Signal_OK out. We talk about Signal_OK then jump into inter-suplayer variables before intorudcing ILT.

SuggestedRemedy

Referencing Fig 180-2 would be helfull here. After the 1st paragraph add sentence: The PMD in this clause support Inter-sublayer Layer Training (ILT) type O1, see Annex 178B.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See resolution to comment #227

Cl **182** *SC* **182.7.1** *P* **471** *L* **27** # 33

Landry, Gary — Texas Instruments

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

OMAouter vs max(TECQ, TDECQ) figure was not updated when the OMAouter (min) values were changed in D1.3.

SuggestedRemedy

Update the figure to match D1.3 data. To be specific, OMAouter (min) line should be -0.3 dBm for max(TECQ, TDECQ) < 0.9 dB and 1.2+max(TECQ, TDECQ) dBm for > 0.9 dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

Cl **182** *SC* **182.9** *P* **480** *L* **45** # 238

Ghiasi, Ali — Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **A** *measurement methods*

Counter propagating traffic must be active for these tests

SuggestedRemedy

Add the following paragrpah, Counter-propagating asynchronous optical signal (crosstalk) at maximum OMA applied to the module under test TP3. The crosstalk pattern can be PRBS31Q, or a valid 100GBASE-R, 200GBASE-R, or 400GBASE-R, or 800GBASE-R, or 1.6TBASE-R signal. See Ghiasi_3dj_01_2501

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #240.

Cl **182** *SC* **182.9.1** *P* **481** *L* **9** # 345

Ran, Adee — Cisco

Comment Type **TR** *Comment Status* **A** *test pattern*

Pattern 3 as defined in 177.4.9.2 is PRBS31Q without the inner FEC encoding. In contrast, Pattern 5 us defined to include the Inner FEC encoding.

Table 182-17 says RS and SRS can be tested with either pattern 3 or pattern 5.

To measure the block error ratio in either of these tests, the Inner FEC encoding is required. This cannot be achieved for per-lane testing with the current test pattern definition.

Note that measuring the pre-FEC BER with PRBS31Q (without inner FEC encoding) may seem like a desirable test, but this cannot be the normative requirement, since it does not account for correlated errors that the PMD's receiver can cause.

SuggestedRemedy

Either redefine pattern 3 in 177.4.9.2 to include the inner FEC encoding, or change the reference to the PMA's PRBS31Q and specify that the Inner FEC has to be able to add inner FEC encoding to this signal.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #10.

Cl **182** *SC* **182.9.1** *P* **507** *L* **8** # 111

Mi, Guangcan — Huawei Technologies Co., Ltd

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

Table 182-12 lists the pattern that will be used by the PMDs in CL182 and its last column gives references of the definition of these test pattern. This table can be found in all PMD clauses. Table 182-12 uses the subclauses in CL177 Inner FEC as reference sources for all test pattern, because the PMD interfaces with inner FEC sublayer. This is good for test pattern 5 and 7 where the test pattern is encoded by the 800GBASE-R Inner FEC. However, for other test patterns that are generic to all PMDs, referencing to the original source would be a better choice.

Take square wave as an example, CL 177.4.9.4 says "The Inner FEC may optionally support a square wave (quaternary) test-pattern generator, as specified in 120.5.11.2.4, on each transmit output lane towards the PMD service interface." This subclause is not defining the pattern of square wave, rather stating a function of the Inner FEC sublayer. For readers who want to know the definition of squarewave, one will have to jump again to 120.5.11.2.4. Therefore it is better to just reference directly to 120.5.11.2.4 in Table 182-12.

SuggestedRemedy

change the defined in reference to 120.5.11.2.4

Response *Response Status* **C**

REJECT.

Pointing directly to 120.5.11.2.x is incomplete would be out of context and incomplete for this case.

The reference here points to test pattern function defined for the Inner FEC. This subclause in turn leverages specifications in another subclause.

Cl **182** *SC* **182.9.1** *P* **507** *L* **9** # 112

Mi, Guangcan — Huawei Technologies Co., Ltd

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

Table 182-12 lists the pattern that will be used by the PMDs in CL182 and its last column gives references of the definition of these test pattern. This table can be found in all PMD clauses. Table 182-12 uses the subclauses in CL177 Inner FEC as reference sources for all test pattern, because the PMD interfaces with inner FEC sublayer. This is good for test pattern 5 and 7 where the test pattern is encoded by the 800GBASE-R Inner FEC. However, for other test patterns that are generic to all PMDs, referencing to the original source would be a better choice.

Take square wave as an example, CL 177.4.9.4 says "The Inner FEC may optionally support a square wave (quaternary) test-pattern generator, as specified in 120.5.11.2.4, on each transmit output lane towards the PMD service interface." This subclause is not defining the pattern of square wave, rather stating a function of the Inner FEC sublayer. For readers who want to know the definition of squarewave, one will have to jump again to 120.5.11.2.4. Therefore it is better to just reference directly to 120.5.11.2.4 in Table 182-12.

SuggestedRemedy

change the defined in reference to in 120.5.11.2.2

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #111

Cl **182** *SC* **182.9.1** *P* **507** *L* **11** # 113

Mi, Guangcan — Huawei Technologies Co., Ltd

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

Table 182-12 lists the pattern that will be used by the PMDs in CL182 and its last column gives references of the definition of these test pattern. This table can be found in all PMD clauses. Table 182-12 uses the subclauses in CL177 Inner FEC as reference sources for all test pattern, because the PMD interfaces with inner FEC sublayer. This is good for test pattern 5 and 7 where the test pattern is encoded by the 800GBASE-R Inner FEC. However, for other test patterns that are generic to all PMDs, referencing to the original source would be a better choice.

Take square wave as an example, CL 177.4.9.4 says "The Inner FEC may optionally support a square wave (quaternary) test-pattern generator, as specified in 120.5.11.2.4, on each transmit output lane towards the PMD service interface." This subclause is not defining the pattern of square wave, rather stating a function of the Inner FEC sublayer. For readers who want to know the definition of squarewave, one will have to jump again to 120.5.11.2.4. Therefore it is better to just reference directly to 120.5.11.2.4 in Table 182-12.

SuggestedRemedy

change the defined in reference to in 120.5.11.2.1

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #111

Cl **182** *SC* **182.9.1** *P* **507** *L* **16** # 98

Mi, Guangcan — Huawei Technologies Co., Ltd

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

Table 182-12 lists the pattern that will be used by the PMDs in CL182 and its last column gives references of the definition of these test pattern. This table can be found in all PMD clauses. Table 182-12 uses the subclauses in CL177 Inner FEC as reference sources for all test pattern, because the PMD interfaces with inner FEC sublayer. This is good for test pattern 5 and 7 where the test pattern is encoded by the 800GBASE-R Inner FEC. However, for other test patterns that are generic to all PMDs, referencing to the original source would be a better choice.

Take square wave as an example, CL 177.4.9.4 says "The Inner FEC may optionally support a square wave (quaternary) test-pattern generator, as specified in 120.5.11.2.4, on each transmit output lane towards the PMD service interface." This subclause is not defining the pattern of square wave, rather stating a function of the Inner FEC sublayer. For readers who want to know the definition of squarewave, one will have to jump again to 120.5.11.2.4. Therefore it is better to just reference directly to 120.5.11.2.4 in Table 182-12.

SuggestedRemedy

change the defined in reference to in 120.5.11.2.3

Response *Response Status* **C**

REJECT.

Resolve using the response to comment #111

Cl **182** *SC* **182.9.5** *P* **483** *L* **1** # 346

Ran, Adee Cisco

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

"Target PAM4 symbol error ratio of 9.6 × 10^-3"
If this value is used instead of 4.8e-4 as TDECQ was originally defined, then TDECQ of an ideal transmitter would be negative, because the normalization factor Q_t is "consistent with the BER and target symbol error ratio for Gray coded PAM4" (which is 4.8e-4).

This makes TDECQ something other than a "penalty" as it is typically understood.

In addition, as demonstrated by several presentations, TDECQ with such high SER is not feasible, as test signal achieving the maximum TDECQ cannot be measured..

It would make more sense to keep the target PAM4 SER as 4.8e-4 (with the same Q_t) and instead relax the maximum TDECQ value in this clause by a factor corresponding to the lower Q function of the higher SER, to allow a more closed eye:

- For SER=4.8e-4: Q(SER*2/3)=-3.414 (as in 121.8.5.3)
- For SER=9.6e-3: Q(SER*2/3)=-2.489
- 10*log10(3.414/2.489)=1.37 dB
Thus the relaxation should be 1.37 dB.

SuggestedRemedy

Change the target PAM4 SER to 4.8e-4.
Change the maximum TDECQ and TECQ from 3.2 dB to 3.2+1.37=4.57 dB.
Make corresponding changes to the receiver specifications (SECQ) in Table 181-6.

Implement similarly in clause 183 with modified values as necessary, with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Similar as comment #146 to D1.2. A strawpoll was held and it was agreed to maintain the SER value 9.6x10-3. The comment does not contain sufficient evidence that this value not sufficient.
However, the Q_t value should be adjusted to align with the SER value.
In 182.9.5.
Change: "Target PAM4 symbol error ratio of 9.6×10-3."
To: "The target PAM4 symbol error ratio is 9.6×10-3 and the related Q_t value is 2.489."
In 183.9.5.
Change: "Target PAM4 symbol error ratio of 9.6×10-3 for 800GBASE-FR4 and 800GBASE-LR4"
To: "The target PAM4 symbol error ratio is 9.6×10-3 and the related Q_t value is 2.489."
Implement with editorial license.

Cl **182** *SC* **182.9.5** *P* **483** *L* **17** # 246

Ghiasi, Ali Ghiasi Qunatum/Marvell

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

182.2 require block error measurement but the TDECQ is an average penalty measurment, either we need to develop a Golden hardwre reference receiver or we have to improve TDECQ test method to capture block erros/penalty.

SuggestedRemedy

Instead the recommendation is to measure block TDECQ where block TDECQ is by capturing 10 SSPRQ waveforms which forms 65535 FEC symbols, ~120 KP4 FEC blocks, or 30 interleaved KP4 FEC blocks when 4-with way interleaving. Each of the 30 KP4 blocks are processed as in definition in https://www.ieee802.org/3/dj/public/24_09/healey_3dj_02a_2409.pdf proposal. Use worst 3 blocks from each group of 30 blocks then combine 3 worst blocks from the 4 group to create the PDF. Then calculate block TDECQ, add line item to table 182-7 with limit of 3.6 dB. See Ghiasi_3dj_03_2501

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **182** *SC* **182.9.5** *P* **483** *L* **17** # 242

Ghiasi, Ali Ghiasi Qunatum/Marvell

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

TDECQ masuremnt needs to define test condition when there is an optional AUI

SuggestedRemedy

Add following codition to the list of requiremetns in 180.9.5: Where AUI is exposed, a conforming implementation must meet TDECQ with the exposed AUI configured for applicable module stress input test as in 176C.4.4.5 Receiver jitter tolerance, 120G.3.4.3 Module stressed input tolerance, or 120E.3.4.1 Module stressed input test and the recovered AUI clock driving the TDECQ pattern. See Ghiasi_3dj_01_2501

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #240

Cl **182** *SC* **182.9.5** *P* **483** *L* **25** # 189

Brown, Matt — Alphawave Semi

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

Value for minimum "number of equalizer pre-cursor taps" is not specified.

SuggestedRemedy

Either set the the value to 0 allowing the number of pre-cursor taps to vary from 0 to 3 or straddle the minimum/maximum columns with a value of 3, permitting only a value of 3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186

Cl **182** *SC* **182.9.5** *P* **483** *L* **25** # 249

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

Number of pre-cursor is not maximum but rather just 3

SuggestedRemedy

What was agreed during Sept 2024 meeting to go with fixed 3 pre-cursors and not a floating at least for now, given than agreement merge the cell with max cell and just enter 3 similar to FFE length of 15.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186

Cl **182** *SC* **182.9.5** *P* **483** *L* **25** # 175

Johnson, John — Broadcom

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

In Table 182-18, the minimum number of equalizer pre-cursor and post-cursor taps is left blank. In the absence of further proposals, this FFE definition should be the same as given in Table 180-18, and the value for minimum pre-cursor taps should be 0, consistent with the 5-tap FFE defined in 121.8.5.4.

SuggestedRemedy

Format Table 182-18 to be the same as Table 180-18 (delete the row for number of post-cursor taps), and change the minimum number of pre-cursor taps to 0.
Delete the associated editors note.
For the editor's consideration: If the specs are identical, delete Table 182-18 completely and refer to Table 180-18.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186

Cl **182** *SC* **182.12** *P* **490** *L* **3** # 109

Mi, Guangcan — Huawei Technologies Co., Ltd

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

type 400GBASE-DR4 is not the PMD type of clause 182

SuggestedRemedy

change to type" 200GBASE-DR1-2, 400GBASE-DR2-2, 800GBASE-DR4-2, and 1.6TBASE-DR8-2"

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **182** *SC* **182.12** *P* **490** *L* **8** # 110

Mi, Guangcan — Huawei Technologies Co., Ltd

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

PMD types should be updated in the text.

SuggestedRemedy

change "type 400GBASE-DR4" to " type 200GBASE-DR1-2, 400GBASE-DR2-2, 800GBASE-DR4-2, and 1.6TBASE-DR8-2"

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **183** *SC* **183.3** *P* **494** *L* **6** # 230

Ghiasi, Ali — Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **A** *signal ok*

Signal_OK as shown in Fig 180-2 is from the Inner sublayer above then goes into ILT box on TX and another ILT box on the RX has Signal_OK out. We talk about Signal_OK then jump into inter-suplayer variables before intorudcing ILT.

SuggestedRemedy

Referencing Fig 180-2 would be helfull here. After the 1st paragraph add sentence: The PMD in this clause support Inter-sublayer Layer Training (ILT) type O1, see Annex 178B.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #227

Cl **183** *SC* **183.7.3** *P* **502** *L* **46** # 235

Ghiasi, Ali — Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **R** *power budget*

MPI/DGP penalty of 0.5 dB is larger than needed for 800GBASE-LR4

SuggestedRemedy

MPI/DGD can be reduced to 0.3 dB then link budget increased by 0.1 dB or allocated to DGD. See Ghiasi_3dj_02_2501

Response *Response Status* **C**

REJECT.

Pending review of the following presentation and CRG discussion.
Ghiasi_3dj_02_2501
A complete proposal for the revision of the power budget is necessary.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/ghiasi_3dj_02_2501.pdf.

After CRG discussion there was no consensus to make a change at this time.

Cl **183** *SC* **183.7.3** *P* **502** *L* **46** # 234

Ghiasi, Ali — Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **R** *power budget*

MPI/DGP penalty of 0.5 dB is larger than needed for 800GBASE-FR4

SuggestedRemedy

MPI/DGD can be reduced to 0.4 dB then link budget increased by 0.1 dB. See Ghiasi_3dj_02_2501

Response *Response Status* **C**

REJECT.

Pending review of the following presentation and CRG discussion. Ghiasi_3dj_02_2501
A complete proposal for the revision of the power budget is necessary.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/ghiasi_3dj_02_2501.pdf.

After CRG discussion there was no consensus to make a change at this time.

Cl **183** *SC* **183.9** *P* **506** *L* **38** # 239

Ghiasi, Ali — Ghiasi Qunatum/Marvell

Comment Type **TR** *Comment Status* **A** *measurement methods*

Counter propagating traffic must be active for these tests

SuggestedRemedy

Add the following paragrpah, Counter-propagating asynchronous optical signal (crosstalk) at maximum OMA applied to the module under test TP3. The crosstalk pattern can be PRBS31Q, or a valid 100GBASE-R, 200GBASE-R, or 400GBASE-R, or 800GBASE-R, or 1.6TBASE-R signal. See Ghiasi_3dj_01_2501

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #240.

Cl **183** *SC* **183.9.5** *P* **509** *L* **4** # 243

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

TDECQ masuremnt needs to define test condition when there is an optional AUI

SuggestedRemedy

Add following codition to the list of requiremetns in 180.9.5: Where AUI is exposed, a conforming implementation must meet TDECQ with the exposed AUI configured for applicable module stress input test as in 176C.4.4.5 Receiver jitter tolerance, 120G.3.4.3 Module stressed input tolerance, or 120E.3.4.1 Module stressed input test and the recovered AUI clock driving the TDECQ pattern. See Ghiasi_3dj_01_2501

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #240

Cl **183** *SC* **183.9.5** *P* **509** *L* **4** # 247

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

183.2 require block error measurement but the TDECQ is an average penalty measurment, either we need to develop a Golden hardwre reference receiver or we have to improve TDECQ test method to capture block erros/penalty.

SuggestedRemedy

Instead the recommendation is to measure block TDECQ where block TDECQ is by capturing 10 SSPRQ waveforms which forms 65535 FEC symbols, ~120 KP4 FEC blocks, or 30 interleaved KP4 FEC blocks when 4-with way interleaving. Each of the 30 KP4 blocks are processed as in definition in https://www.ieee802.org/3/dj/public/24_09/healey_3dj_02a_2409.pdf proposal. Use worst 3 blocks from each group of 30 blocks then combine 3 worst blocks from the 4 group to create the PDF. Then calculate block TDECQ, add line item to table 183-7 with limit of 3.6 dB for 800GBASE-FR4 and 4.0 dB for 800GBASE-LR4. See Ghiasi_3dj_03_2501

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **183** *SC* **183.9.5** *P* **509** *L* **14** # 176

Johnson, John — Broadcom

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

In Table 183-14, the minimum number of equalizer pre-cursor taps is TBD. In the absence of further proposals, this value should be 0, consistent with the 5-tap FFE defined in 121.8.5.4.

SuggestedRemedy

Change TBD in Table 183-14 to 0.
Delete the associated editors note.
For the editor's consideration: If the specs are identical, delete Table 183-14 completely and refer to Table 180-18.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186.

Cl **183** *SC* **183.9.5** *P* **509** *L* **14** # 188

Brown, Matt — Alphawave Semi

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

Value for minimum "number of equalizer pre-cursor taps" is TBD.

SuggestedRemedy

Either set the the value to 0 allowing the number of pre-cursor taps to vary from 0 to 3 or straddle the minimum/maximum columns with a value of 3, permitting only a value of 3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186.

Cl **183** *SC* **183.9.5** *P* **509** *L* **14** # 248

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

Number of pre-cursor is maximum with min TBD

SuggestedRemedy

What was agreed during Sept 2024 meeting to go with fixed 3 pre-cursors and not a floating at least for now, given than agreement merge the TBD and max line and just enter 3 similar to FFE length of 15.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186.

Cl **183** *SC* **183.9.13** *P* **512** *L* **12** # 264

Ghiasi, Ali — Ghiasi Qunatum/Marvell

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

Reference 121.8.10 doesn't exist

SuggestedRemedy

The correct reference is 121.8.9

Proposed Response *Response Status* **W**

PROPOSED REJECT.
The comment refers to 121.8.10, while 183.9.13 refers to 122.8.10.
122.8.10 is the correct reference.

Cl **184** *SC* **184.1.2** *P* **515** *L* **35** # 375

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

Comment Type **TR** *Comment Status* **A** *(bucketp)*

Fig 184-1 does not show the correct boundaries of a PHY. It ends at the PMD sublayer, not the MEDIUM.

SuggestedRemedy

Change lower boundary of PHY to the bottom of the PMD sublayer box.

Response *Response Status* **C**

ACCEPT.

Cl **184** *SC* **184.2** *P* **517** *L* **34** # 149

He, Xiang — Huawei

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

Clause 814 Inner FEC for 800GBASE-LR1 did not include any test patterns.

SuggestedRemedy

It is recommed to add at least one test pattern for this clause. Add "Test patter generate" to the DP-16QAM mapper box. Also insert a subclause in 184.4.11 describing the test pattern(s).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Test patterns should be added as defined in comment #10 and shown in the presentation at: https://www.ieee802.org/3/dj/public/25_01/he_3dj_01_2501.pdf

Add a test mode that distributes a PRBS31 pattern distributed 10-bits at a time into each of the the 32 data lanes at the input of TX permutation function.

Add a corresponding test pattern checker in the Rx path.

Some test patterns are defined in 185.8.1, but the references there are wrong. In Table 185-10 for test pattern 5 change the reference from "184.4" to "172.2.4.11" and for test pattern 7 change the reference from "184.4" to "172.2.4". Add the new test pattern as pattern number 8 in the table.

This comment is realted with comment #128.

Implement with editorial license.

[Editor's note: CC 185]

Cl **184** *SC* **184.4.1** *P* **519** *L* **5** # 409

Maniloff, Eric — Ciena

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

Reference is made to clause 172.2.5.1 for alignment lock, which requires a fuil deskew. The PCS for 800GBASE-LR1 only requires deskew to 20 bit boundaries, covering two RS symbols.

SuggestedRemedy

Update the text to define the requirement as a 20-bit deskew

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using response to comment #472

Cl **184** *SC* **184.4.1** *P* **519** *L* **5** # 472

Kota, Kishore — Marvell Semiconductor

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

Lane deskew has been changed from the adopted baseline requirement of RS(544,514) symbol alignment to a full RS(544,514) codeword alignment without any supporting data. Symbol alignment (instead of codeword alignment) for 800GBASE-LR1 has been studied in the past and determined to have a burst tolerance which exceeds the 400ZR burst tolerance of 1024b which is considered acceptable for this interface. Specifically, lane alignment lock in D1.3 refers to 172.2.5.1 for deskew. However, 172.2.5.1 specifies a complete de-skew of all the PCS lanes. The permutation function only requires a partial deskew of 20-bits (i.e. dual 10-bit RS symbol boundaries). A full deskew places an unreasonable burden on implementations which are targeted at low-power applications

SuggestedRemedy

Change the text to reflect the intention from the baseline adopted at Berlin meeting and ensure consistency with the 20-bit alignment adopted in the OIF 800LR IA. Supporting presentation to be provided.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed the presentation at:
https://www.ieee802.org/3/dj/public/25_01/kota_3dj_01_2501.pdf

The CL 184 inner fec contains 32 convolutional interleavers, one per modified PCS lane, which is different from the CL 177 inner fec which operates on a 200Gb/s physical lane with 8 PCS lanes within that physical lane. The CL 177 inner fec decoder does require deskew between PCS lanes, but the CL 184 inner fec decoder does not.

Implement the suggested remedy on slide 6 of kota_3dj_01_2501 with editorial license.

Cl **184** *SC* **184.4.3** *P* **520** *L* **2** # 156

Bruckman, Leon — Nvidia

Comment Type **TR** *Comment Status* **A** *Lane grouping*

The figure seems to imply that the even PCS lanes are assigned to even pcsla flows, and the odd to odd. Also it may imply that the PCS lanes 0-15 are mapped to pcsla flows 0-15, and the PCS lanes 16-31 to pcsla flows 16-31. This contradicts the text in the last paragraph of section 184.4.2.

SuggestedRemedy

A contribution will be provided with a detailed proposal to either remove Figure 184-3 and related text, or to show a more generic example and change text to indicate that the figure is an example

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed the following presentation:
https://www.ieee802.org/3/dj/public/25_01/bruckman_3dj_01_2501.pdf

Update text as shown on slide 3 of bruckman_3dj_01_2501, and use the updated Figure 184-3. In addition, change figure 184-3 title to: "Example of lane permutation function".

Implement with editorial license.

Cl **184** *SC* **184.4.5** *P* **522** *L* **5** # 35

Huber, Thomas — Nokia

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

The description of the parity polynomial says "A partity polynomial p(x) of degree 15 is efind as the remainder from the division (modulo 2) of m(x) x x^16 by the generator polynomial showni in Equation (184-2)". The intent of this is that the resulting parity polynomial p(x) is in equation 184-2 (with the generator polynomial in (184-1), but that isn't what the text says.

SuggestedRemedy

Change the text to read: "A parity polynomial p(x) of degree 15 is defined as the remainder from the division (modulo 2) of m(x) x x^16 by the generator polymomial, as shown in Equation (184-2)."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change: "A parity polynomial p(x) of degree 15 is defined as the remainder from the division (modulo 2) of m(x) x x16 by the generator polynomial shown in Equation (184-2)"
to: "A parity polynomial p(x) of degree 15 (shown in Equation 184-2) is defined as the remainder from the division (modulo 2) of m(x) x x16 by the generator polynomial shown in Equation (184-1)"
Implement with editorial license.

Cl **184** *SC* **184.5.7** *P* **528** *L* **8** # 347

Ran, Adee — Cisco

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

The assumed correction capability of the decoder is not stated.
Also, it is not stated what happens when a codeword is uncorrectable. I assume the decoder does not mark the data as error in any way (since it is an inner code) but it is not stated. The error patterns that appear in this case are not described.

Compare to the RS-FEC decoder specification in 91.5.3.3 (where there are normative specifications for correction capability and uncorrectable error marking).

This is important information for testing, monitoring and analyzing the performance of an implementation.

The suggested remedy is based on slide 9 of https://www.ieee802.org/3/df/public/22_05/22_0517/bliss_3df_01a_220517.pdf, modified to account for having 16 parity bits and thus d_min=8..

SuggestedRemedy

Add some test e.g.
"The decoder is expected to correct all codewords in which hard decision would result in up to five bit errors and most codewords with up to seven bit errors. Codewords that are not decoded correctly will contain at least eight bit errors"
Or modifications of the above if necessary.

If there is no consensus for additional text (either the one above or otherwise), add an editor's note inviting contributions in this area.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

A statement should be added to indicate what is done when the inner FEC decoder is not able to correct a codeword, for example, "parity is stripped and the payload bits are passed on without correction".

Add a statement in 184.5.7 as above with editorial license.

The soft decision inner FEC decoder correction capability is implementation specific.

Cl **184** *SC* **184.5.7** *P* **528** *L* **36** # 32

Brown, Matt — Alphawave Semi

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

Bin counters are not provided for the BCH codewords.

SuggestedRemedy

Add bin counters defined in the same way as for the 800GBASE-R Inner FEC in 177.5.4.1.5, except change the index "i" to "k", set the range of k to 0 to 4, and bin 4 counts codewords with 4 or more bits corrected.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license considering the response to comment #347 which may change the number of counters needed.

Cl **184** *SC* **184.5.7.1** *P* **535** *L* **9** # 348

Ran, Adee — Cisco

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

This inner FEC does not have bin counters defined (binning codewords by the number of errors corrected), as in 177.5.4.1.5.

SuggestedRemedy

Add bin counters as in 177.5.4.1.5, but possibly with a larger number of bins (assuming the decoder is expected to correct more bit errors).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using response to comment #32

Cl **184** *SC* **184.5.7.2** *P* **528** *L* **20** # 473

Kota, Kishore — Marvell Semiconductor

Comment Type **TR** *Comment Status* **A** *(bucketp)*

This section defines an uncorrected codeword as "An uncorrected FEC codeword is a codeword that contains errors that were not corrected, including FEC codewords that may have been miscorrected or not completely corrected". However, codewords which are miscorrected are not detectable as uncorrected codewords.

SuggestedRemedy

Update the definition to something similar to: "An uncorrected FEC codeword is a codeword with errors which are detectable at the decoder, but the decoder is unable to correct."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The defintions of what is a corrected and uncorrected codeword needs to be fixed.

Align the definitions of correctable and uncorrectable codewords to the definitions in 177.5.4.1.

Cl **184** *SC* **184.5.7.2** *P* **535** *L* **19** # 349

Ran, Adee — Cisco

Comment Type **TR** *Comment Status* **A** *(bucketp)*

The definition of the "uncorrected CW counter" seems to assume that the inner FEC is capable of detecting codewords that are uncorrectable, or that may have been miscorrected.
This capability exists in the RS-FEC (and there is a "shall" statement for ability to detect uncorrectable errors). Is it assumed that a soft-decision BCH decoder can also detect a miscorrected codeword or a "not completely corrected" one?

Note that there is no information about the assumed correction capability of the decoder.

Also note that the definition of the corresponding counters in 177.5.4.1.1. and 177.5.4.1.2 is different; a miscorrected codeword is counted in the "corrected" codeword, suggesting that the decoder cannot detect an uncorrectable codeword.

SuggestedRemedy

Possibly, add some test about the ability to detect uncorrected codewords (and how it can be done) somewhere in this clause.
Or change the definition of this counter to account for not being able of such detection.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #473.

Cl **184** *SC* **184.6.2.2** *P* **530** *L* **47** # 89

Opsasnick, Eugene Broadcom

Comment Type **T** *Comment Status* **A** *reset variable*

FEC_reset is referred to in the definition of the "reset" variable, but FEC_reset is not defined except through a cross-reference to 45.2.1.1.1. The MDIO control variables table (Table 184-4) already has a cross reference to 184.6.2.2 as well as CL 45 and the MDIO register bit number,

SuggestedRemedy

Remove the cross-reference text "(see 45.2.1.1.1)" from the definition of reset in 184.6.2.2.

Add the definition of "FEC_reset" to the list of variables in 184.6.2.2 as: "Boolean variable that is true when set by a management entity and is false otherwise".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #88.

Cl **184** *SC* **184.9** *P* **535** *L* **15** # 2

Marris, Arthur Cadence Design Systems

Comment Type **TR** *Comment Status* **A** *reset variable*

Make FEC_reset reference Inner FEC control register 1.2400

SuggestedRemedy

In Table 184-4 make the MDIO bit 1.2400.0 and reference 45.2.1.213a
Change variable name from "FEC_reset" to "Inner_FEC_reset" and also on page 530 line 47
In Table 45-177a delete rows "Inner FEC enable lane 1" to "Inner FEC enable lane 7" and in the row for "1.2400.0" change "enable" to "reset"
On page 530 line 47 for the reset variable change the cross reference from "45.2.1.1.1" to "45.2.1.213a"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #88.

Cl **185** *SC* **185.2** *P* **542** *L* **36** # 71

Sluyski, Mike Cisco

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

Does IEEE style allow embedded parameter values as part of the text (e.g. BERadded equal to 3.2 x 10-5 and BERadded equal to 6.4 x 10-5)

SuggestedRemedy

A small table might be clearer than values buried In text.

Response *Response Status* **C**

REJECT.
Stating parameter values as text is supported by IEEE and widely used in IEEE Std 802.3-2022.
No changes to the draft.
[Editor's note: changed subclause from 185.5.2 Error ratio allocation to 185.2]

Cl **185** *SC* **185.3.1.1** *P* **545** *L* **13** # 72

Sluyski, Mike Cisco

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

This clause include a reference (184.4.11.1) and later to (185.5.2).

SuggestedRemedy

Would it be better and clearer to reference Figure 185-2 instead of text 184.4.11.1 (Picture is clearer than words). Likewise Reference to Figure 185-5 than text in 185.5.2.

Response *Response Status* **C**

REJECT.
Subclause 185.3.1.1 specifies the receipt of the PMD:IS_UNITDATA.request primitive.
The noted referece to 184.4.11.1 specifies how the primitive is created and contains relevent information not included in the Figure 185-2 or 185-3.
No change to the draft
[Editor's note: changed subclause from 185.3.1.1 800GBASE-L to 185.3.1.1]

Cl **185** *SC* **185.5.3** *P* **548** *L* **29** # 99

Mi, Guangcan — Huawei Technologies Co., Ltd

Comment Type **ER** *Comment Status* **R** *primitive*

"The four analog streams carry a combination of the transmitting Inner FEC Tx_XI, Tx_XQ, Tx_YI, and
Tx_YQ signals used by the transmitting PMD to generate the DP-16QAM symbols.", it is not clear what is the meaning of Inner FEC in this sentence. In other places in this clause, when referring to Tx_XI et. al, they are referred to as four analog signals.

SuggestedRemedy

change "the transmitting Inner FEC Tx_XI, Tx_XQ,.." to "the analog Tx_XI, Tx_XQ, .."

Response *Response Status* **C**

REJECT.

Refer to figure 185-5 that shows Tx_XI, Tx_XQ, Tx_YI and Tx_YQ originating in the Inner FEC. The intention of the statement is to clarify that while the figure shows Tx_XI, Tx_XQ, Tx_YI and Tx_YQ for both transmit and receive directions, for the receive directon the analog streams contain mixture of the Tx_XI, Tx_XQ, Tx_YI and Tx_YQ components sent from the transmiting Inner FEC and are therefor different even the labels are the same.

No change to draft.

Cl **185** *SC* **185.6.1** *P* **550** *L* **42** # 397

Maniloff, Eric — Ciena

Comment Type **T** *Comment Status* **A** *Tx optical parameter*

The Transmitter OSNR specification of 35dB is lower than required for an unamplified Transmitter, and requires allocating additional penalty due to the additional noise.

SuggestedRemedy

Change the value of Transmitter OSNR from 35 dB to 40 dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/maniloff_3dj_02_2501.pdf.

Implement the suggested remedy with editorial license.

Cl **185** *SC* **185.6.1** *P* **550** *L* **52** # 190

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *Tx optical parameter*

The value for "Tx laser frequency slew rate: post acquisition (max)" is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #398.

Cl **185** *SC* **185.6.1** *P* **550** *L* **52** # 398

Maniloff, Eric — Ciena

Comment Type **T** *Comment Status* **A** *Tx optical parameter*

Tx laser frequency slew rate: post acquisition (max) is currently listed as TBD. The slew rate post acquisition should be slower than the pre-acquisition rate.

SuggestedRemedy

Replace the TBD for Tx laser frequency slew rate: post acquisition (max) with 1 GHz/s.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/maniloff_3dj_02_2501.pdf.

Implement the suggested remedy with editorial license.

Cl **185** *SC* **185.6.1** *P* **551** *L* **5** # 474

Kota, Kishore — Marvell Semiconductor

Comment Type **TR** *Comment Status* **A** *Tx optical parameter*

"Tx clock phase noise: phase noise mask frequency (max)" is an ill-defined spec in table 185.5. Unlike previous coherent interfaces 800GBASE-LR1 clocking on the line interface is derived from the upper layers. Without a clear spec on the phase noise of those layers, it is not possible to design to the specified phase noise mask at the 800GBASE-LR1 interface. Section 185.5.13 is also related to this spec.

SuggestedRemedy

No equivalent transmit clock phase noise mask specification is present in any of the prior IMDD clauses such as Clause 124. Recommendation is to delete this spec. Presentation to be provided.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/kota_3dj_02_2501.pdf.

In Table 185-5 delete Tx clock phase noise: phase noise mask frequency (max) and associated values.

With editorial license.

Cl **185** *SC* **185.6.2** *P* **551** *L* **34** # 399

Maniloff, Eric — Ciena

Comment Type **T** *Comment Status* **A** *Rx optical parameter*

In order to ensure interop with OIF 800LR, a higher damage threshold should be specified.

SuggestedRemedy

Increase specification for Receiver Damage threshold to -2 dBm.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/maniloff_3dj_02_2501.pdf.

Implement the suggested remedy with editorial license.

Cl **185** *SC* **185.6.2** *P* **551** *L* **46** # 400

Maniloff, Eric — Ciena

Comment Type **E** *Comment Status* **A** *Rx optical parameter*

State of polarization (max) is not the correct entry, this refers to the rate of change in SOP. The term used in 802.3ct is Polarization rotation speed (max)

SuggestedRemedy

Change this entry to "Polarization rotation speed (max)"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 185-6 change "State of polarization (max)"
to
"Polarization rotation speed (max)"

Make the same change in Table 187-6.

Cl **185** *SC* **185.6.3** *P* **552** *L* **14** # 178

Sheffi, Nir — Alphawave

Comment Type **T** *Comment Status* **R** *Link budget*

Per Table 185-7, the link power budget is 6.8 dB if allocation for penalties of 0.5 dB is included. But difference between TX power specified in Table 185-5 and RX power specified in Table 185-5 is 6.3 dB.

SuggestedRemedy

Either increase TX power by 0.5 dB in Table 185-5 or set the allocation for penalties in Table 185-7 to 0.

Response *Response Status* **C**

REJECT.

In CRG discussion it was agreed that the values in the draft are correct but the wording could be improved to add clarity.

The commentor is invited to submit a more detailed presentation in the future.

No changes to the draft.

Cl **185** *SC* **185.7** *P* **552** *L* **45** # 101

Mi, Guangcan — Huawei Technologies Co., Ltd

Comment Type **TR** *Comment Status* **A** *(bucketp)*

It is unclear what is "a simplex fiber optic link segment". For 800GBASE-LR1, the fiber optical link use a pair of SMF, which would be a duplex optic link.It is also unclear what purpose this sentence serve.

SuggestedRemedy

clarify the prupose of this sentence. Or delerte it.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In second to last sentence in 185.7 change "The fiber optic cabling model (channel) defined here is the same as a simplex fiber optic link segment"
to
"The fiber optic cabling model (channel) defined here applies to each simplex fiber that makes up the duplex fiber link segment".

Make the same wording change in 180.8, 182.8 and 187.7.

Implement with editorial license.

Cl **185** *SC* **185.8.3** *P* **555** *L* **34** # 157

Bruckman, Leon — Nvidia

Comment Type **TR** *Comment Status* **A** *(bucketp)*

There is no Lane wavelength (range) in Table 185-5

SuggestedRemedy

If this is called "Carrier frequency (range)" in Table 185-5, then make naming consistent.
Update also Table 185-11 row 2.
If not, add Lane wavelength (range) to Table 185-5.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The adopted baselines use "carrier frequency (range)".

The was consensus to retain this term.

In Table 185-11 and 185.8.3 change "Lane wavelength (range)"
to
"Carrier frequency (range)".

Implement with editorial license.

Cl **185** *SC* **185.9.1** *P* **557** *L* **21** # 102

Mi, Guangcan — Huawei Technologies Co., Ltd

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

LO linewidth (max) was limited to 100kHz. While the Tx laser line width max. is limited to 1MHz.

It is very common for coherent modules to use a signle laser as both Tx laser source and Rx LO. The Rx signal processing thus should be able to work with a LO of upto 1MHz linewidth.

Similar to the reference receiver in TECQ/TDECQ, the coherent detector frontend of ETCC should be based on the bare minimum capability of any LR1 coherent Rx, so that a Tx signal passing the ETCC measurement provde enough confidence that it can work with any compliant LR1 Rx and form a cohernet optic link with sufficient FLR performance.

SuggestedRemedy

Re-examine the necessity of requiring LO linewidth of 100kHz in E-TCC measurement. Align to the laser linewidth requirement.

Response *Response Status* **C**

REJECT.

The tighter 100kHz specification is for the test equipment to measure ETCC with better accuracy than an operational receiver.

No change to the draft.

Cl **185** *SC* **185.12.4.1** *P* **562** *L* **10** # 401

Maniloff, Eric — Ciena

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

Transmitter nominal center frequency is not applicable to this PMD.

SuggestedRemedy

Delete this entry.

Response *Response Status* **C**

ACCEPT.

Cl **185** *SC* **185.12.4.1** *P* **562** *L* **13** # 402

Maniloff, Eric Ciena

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

Receiver nominal center frequency is not applicable to this PMD

SuggestedRemedy

Delete this entry.

Response *Response Status* **C**

ACCEPT.

Cl **185** *SC* **185.12.4.4** *P* **563** *L* **19** # 404

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **A** *(bucketp)*

SMSR is not defined as a parameter in clause 185

SuggestedRemedy

Delete this entry.

Response *Response Status* **C**

ACCEPT.

Cl **185** *SC* **185.12.4.4** *P* **563** *L* **34** # 405

Maniloff, Eric Ciena

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

Adjustable range of transmit
optical power is not defined for clause 185

SuggestedRemedy

Delete this entry.

Response *Response Status* **C**

ACCEPT.

Cl **185** *SC* **185.12.4.4** *P* **563** *L* **36** # 406

Maniloff, Eric Ciena

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

Minimum average channel power at maximum adjustable power setting is not applicable to clause 185 PMDs

SuggestedRemedy

Delete this entry.

Response *Response Status* **C**

ACCEPT.

Cl **185** *SC* **185.12.4.4** *P* **563** *L* **41** # 407

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **A** *(bucketp)*

800GBASE-LR1 is an unamplified PMD, ROSNR is not defined

SuggestedRemedy

Delete entries OM11 and OM13

Response *Response Status* **C**

ACCEPT.

Cl **185** *SC* **185.12.4.24** *P* **562** *L* **40** # 403

Maniloff, Eric Ciena

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

PMD receive center frequency ability is not applicable to this PMD

SuggestedRemedy

Delete this entry.

Response *Response Status* **C**

ACCEPT.

Cl **185A** *SC* **185A** *P* **839** *L* **6** # 520

Dawe, Piers Nvidia

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

ETCC is normative, like TDECQ or COM.

SuggestedRemedy

Change "informative" to "normative.

Response *Response Status* **C**

ACCEPT.

Cl **185A** *SC* **185A** *P* **839** *L* **15** # 521

Dawe, Piers
Nvidia

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

802.3 is not a test spec. There was an 802.3 test spec once, but it was withdrawn.

SuggestedRemedy

Write this as a definition of what we mean by ETCC, rather than "defines test methodologies".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

It is common to specify measurement methods, e.g., "180.9 Definition of optical parameters and measurement methods".
However, ETCC is a parameter, not a measurement method.
Replace the paragraph in 185A.2 with the following:
"ETCC is a parameter representing the quality of the tranmitter output signal used for 800GBASE-LR1, 800GBASE-ER1, and 800GBASE-ER1-20 PMDs. The ETCC parameter is defined in this annex."

In the annex title change "Test methods" to "Measurement methods".

In 185A.1 change "test methodologies" to "measurement methods".

The subclauses 185.9/187.9 title should be the parameter name, not test method; to be consistent with other sister subclauses.

Change title of 185.9/187.9 to "Extended transmitter constellation closure (ETCC)"

Implement in 185, 187, and 185A with editorial license.

Cl **185A** *SC* **185A.2.3** *P* **842** *L* **22** # 475

Kota, Kishore
Marvell Semiconductor

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

The offline digital signal processing described in this section is missing a post-equalizer after the "carrier phase recovery" block which is required to allow relaxation of the TX I-Q skew to the 0.75ps spec in Table 185-5.

SuggestedRemedy

Add post-equalizer stage to the digital signal processing. Presentation to be provided.

Response *Response Status* **C**

REJECT.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/kota_3dj_02_2501.pdf

After CRG discussion while there was support for the change it was agreed the proposal was not complete for inclusion in the specification.

The commentor is invited to submit a more detailed presentation in the future.

No changes to the draft.

Cl **185A** *SC* **185A.2.3** *P* **842** *L* **38** # 359

Ran, Adee
Cisco

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

Figure 185A-4 includes the word "decisioning". This word also appears in 185A.2.3.7. It is not defined anywhere, and I think it is not part of the English language, although there are a few instances in Google search.

The act of deciding what symbol is generated by a receiver is commonly called "slicing". The suggested remedy is based on that. An alternative term is "estimation".

SuggestedRemedy

Change to "symbol slicing", all instances.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 185A.2.3 change all instances of "symbol decisioning and demodulation"
to
"symbol estimation and detection"

With editorial license.

Cl **185A** *SC* **185A.2.3.2** *P* **843** *L* **4** # 177

Johnson, John — Broadcom

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

A constant value for the lowpass filter bandwidth is specified, which detracts from the generality of the ETCC test method. The value of 65 GHz is suitable for 800GBASE-LR1 and -ER1 (52.6% and 55% of signaling rate, respectively), but may not be suitable for future PMDs that refer to 185A.2.

SuggestedRemedy

Change "with a 3 dB bandwidth equal to 65 ± 1 GHz" to "with a 3 dB bandwidth equal to 0.5 times the signaling rate, ± 1 GHz."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 185A.2.3.2 change "with a 3 dB bandwidth equal to 65 +/- 1 GHz"
to
"with a 3 dB bandwidth equal to 0.55 times the signaling rate, +/- 1 GHz"

With editorial license.

Cl **185A** *SC* **185A.2.4** *P* **843** *L* **35** # 408

Maniloff, Eric — Ciena

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

Text is needed to fill in entries for 185A.2.4.1, 185A.2.4.2, 185A.2.4.3, 185A.2.4.4, 185A.2.4.7, 185A.2.4.9, and 185A.2.4.10

SuggestedRemedy

A contribution with the definitions for these parameters will be provided.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The CRG reviewed https://www.ieee802.org/3/dj/public/25_01/maniloff_3dj_01a_2501.pdf.

After CRG discussion implement slides 5-10 and slide 12 with editorial license.

Cl **185A** *SC* **185A.2.4** *P* **843** *L* **36** # 82

Issenhuth, Tom — Huawei

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

There are 7 missing parameter defintions which are currently TBD in this subclause.

SuggestedRemedy

Replace the TBDs with parameter definitions as proposed in the supporting presentation to be provided.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #408.

Cl **186** *SC* **186** *P* **565** *L* **1** # 36

Huber, Thomas — Nokia

Comment Type **T** *Comment Status* **A** *ER1 architecture*

In the work to define the alignment marker location transparency (AMLT) feature that is needed for the 800GBASE-ER1 PHY, it has become evident that the model of this PHY as a separate PCS creates some difficulties, largely because that model does not match the OIF 800ZR specification with which we are trying to align. The introduction of the AMLT feature exacerbates the misalignment and requires PHY-specific behaviors to be introduced to the 800GXS, which is not really consistent with the concept of the XS as being PHY-agnostic.

SuggestedRemedy

Two broad options: modify clause 171 to include specification of a separate 800GBASE-ER1 PHY_XS to avoid introducing PHY-specific behavior to the 800GXS, or revise clause 186 to define an ER1 FEC sublayer rather than a PCS sublayer to avoid the need for an XS that is specific to the ER1 PHY. A more detailed presentation will be provided.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed the presetation at
https://www.ieee802.org/3/dj/public/25_01/huber_3dj_01_2501.pdf

There is consensus to modify the 800GBASE-ER1 architecture by modifing the ER1 PCS to be a FEC sublayer and keeping the ER1 PMA as described in CL 186.

Implement the changes proposed in huber_3dj_01_2501.pdf, slides 7 to 29.
Implement with editorial license.

Cl **186** *SC* **186** *P* **576** *L* **6** # 182

Brown, Matt — Alphawave Semi

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

The acronym AMs is used but never defined. Better to just spell it out. Exception is if it is used specifically for a field name of "AM".

SuggestedRemedy

Change "AMs" to "alignment markers".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Make suggested change throughout clause 186. Implement with editorial license.

Cl **186** *SC* **186.2.2** *P* **568** *L* **23** # 37

Huber, Thomas — Nokia

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

The AM field was renamed FAM to clarify that it is not the 800GBASE-R AMs.

SuggestedRemedy

Change OH/AM to OH/FAM

Response *Response Status* **C**

ACCEPT.

Cl **186** *SC* **186.2.3.6** *P* **572** *L* **51** # 38

Huber, Thomas — Nokia

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

With the addition of the AML field, the overhead is no longer a subset of what is in the OIF IA. Also, the reference to ITU-T G.709.6 should be to ITU-T G.709.1

SuggestedRemedy

Revise the text to read: "The frame overhead is based on the frame defined in subclause 4.3.3 of OIF-800ZR-01.0, which is a subset of what is defined in Recommendation ITU-T G.709.1."

Response *Response Status* **C**

ACCEPT.

Cl **186** *SC* **186.2.3.6.10** *P* **575** *L* **34** # 218

Slavick, Jeff — Broadcom

Comment Type **TR** *Comment Status* **A** *ER1 architecture*

The definition of what values is sent in the AML, how the TAML and RAML are generated and passed between layers, and how monitoring of the RAML location in the data stream needs improvement.

SuggestedRemedy

Presentation will be provided.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve with the response to comment #36.

Cl **186** *SC* **186.2.4.1** *P* **580** *L* **20** # 127

Slavick, Jeff — Broadcom

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

Don't have the counters be their own sub-headings, just be inline functionality that is part of the decoder.

SuggestedRemedy

Add this sentence prior to the 186.2.4.1.1 heading "The following counters shall be implemented to aid a network operator in determining the link quality."

Remove the sub-headings of 186.2.4.1.1-4 and make them inline definitions like is done in 175.2.5.3

Update the references in Table 186-8
Implement with editorial license.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license

Cl **186** *SC* **186.2.4.4** *P* **581** *L* **34** # 191

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *ER1 errors*

The value for "number of bit errors detected is increased" is TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

After extensive task force discussion, it was decided that the FEC_degraded_SER feature itself needs to be updated as part pf the new 800G-ER1 architecture. This feature and the TBD value should be updated in the next draft based on comment #36.

Resolve with the response to comment #36.

Cl **186** *SC* **186.3.3** *P* **587** *L* **34** # 39

Huber, Thomas — Nokia

Comment Type **E** *Comment Status* **A** *ER1 architecture*

There is an extra layer of hierarchy in the PMA clause compared to the PCS clause that seems unnecessary. PCS has Transmit and Recdeive functions as level 3 clauses, PMA has level 3 as "functions within the PMA", with the transmit and receive as level 4 headings below that. This seems to have been inherited from other PMAs that don't distinguish Tx and Rx directions as clearly as this PMA does.

SuggestedRemedy

Remove the extra layer of hierarchy. Make 186.3.3 the transmit functions, and 186.3.4 the receive functions.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve with the response to commnet #36.

Cl **186** *SC* **186.3.3.1.2** *P* **589** *L* **17** # 40

Huber, Thomas — Nokia

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

In figure 186-13, 'mfas' should be 'faw' to align with the text in 186.3.3.1.5 (faw is used here to avoid conflict with the MFAS field in the PCS frame structure in clasue 186.2)

SuggestedRemedy

Change mfas to faw

Response *Response Status* **C**

ACCEPT.

Cl **186** *SC* **186.3.3.2.2** *P* **594** *L* **19** # 158

Bruckman, Leon — Nvidia

Comment Type **TR** *Comment Status* **A** *ER1 frame alignment*

Although TS and PS are different for X and Y only the FAW is used to lock and identify the polarity (see Figure 186-16). No indication as how to use the TS and PS to identify polarity or I/Q is defined. Users can choose to use TS and PS in their proprietary way.

SuggestedRemedy

Delete: "using the multi-frame alignment signal, training sequence, and pilot sequence"

Response *Response Status* **C**

ACCEPT.

Cl **186** *SC* **186.4.2.1** *P* **597** *L* **6** # 41

Huber, Thomas — Nokia

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

As is tersely explained in 186.2.3.5.1 (with reference to G.709.6, where there is additional detail), the FAM field contains 32 bytes that are providing the frame alignment pattern, and 28 bytes that are reserved (0x00). The alignment process should only be looking at the 32 bytes; the 28 bytes that are transmitted as 0x00 are not required to match.

SuggestedRemedy

Revise the definition of fam_valid to consider only the 32 bytes that have the frame alignment pattern rather than the entire FAM field:
"A Boolean variable that is set to true if the first 256 bits of the FAM field are a valid PCS frame alignment mechanism sequence..."

Response *Response Status* **C**

ACCEPT.

Cl **186** *SC* **186.5** *P* **605** *L* **39** # 23

Brown, Matt — Alphawave Semi

Comment Type **T** *Comment Status* **A** *ER1 delay*

Delay limits for 800GBASE-ER1 PC1 are TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #73

Cl **186** *SC* **186.5** *P* **605** *L* **40** # 192

Brown, Matt — Alphawave Semi

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

Delay constraints are TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **186** *SC* **186.5** *P* **605** *L* **40** # 73

Sluyski, Mike — Cisco

Comment Type **TR** *Comment Status* **A** *ER1 delay*

The maximum delay contributed by the 800GBASE-ER1 PCS and 800GBASE-ER1 PMA (sum of transmit
and receive delays at one end of the link) shall be no more than TBD bit times (TBD pause_quanta or
TBD ns)

SuggestedRemedy

I might be able to provide delay measurement results for an 800ER1 PHY in January timeframe. Early mesurementd is 3.3uSec for PCS + PMS TX/RX.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The CRG reviewed a late contribution from Mike Sluyski which will be posted at:
https://www.ieee802.org/3/dj/public/25_01/sluyski_3dj_01_2501.pdf

After discussion a delay value of 5 us was decided upon.

Update 186.5, Delay constraints, with a maximum delay value of 5 us and converted to bit times and pause quanta.

Cl **187** *SC* **187.1** *P* **614** *L* **8** # 74

Sluyski, Mike — Cisco

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

The optical signal generated by these PMD types are modulated using a dual polarization 16-state quadrature amplitude modulation

SuggestedRemedy

either signal is plural as in signals or the are should be is if singular.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change "The optical signal generated by these PMD types are modulated" to "The optical signals generated by these PMD types are modulated".

Cl **187** *SC* **187.2** *P* **615** *L* **34** # 75

Sluyski, Mike — Cisco

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

Reference 174A.4 is not linked.

SuggestedRemedy

Link reference to 174A.4

Response *Response Status* **C**

ACCEPT.

Cl **187** *SC* **187.3.1.1** *P* **618** *L* **13** # 76

Sluyski, Mike — Cisco

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

This clause include a reference (186.3.3.1.6) and later to (187.5.2).

SuggestedRemedy

Would it be better and clearer to reference Figure 187-2 instead of text 186.3.3.1.6 (Picture is clearer than words). Likewise Reference to Figure 187-5 than text in 187.5.2.

Response *Response Status* **C**

REJECT.
Subclause 187.3.1.1 specifies the receipt of the PMD:IS_UNITDATA.request primitive.
The noted referece to 186.3.3.1.6 specifies how the primitive is created and contains relevent information not included in the Figure 187-2 or 187-3.
No change to the draft
[Editor's note: changed subclause from "187.3.1.1 800GBASE-E" to 187.3.1.1]

Cl **187** *SC* **187.5.3** *P* **621** *L* **29** # 100

Mi, Guangcan — Huawei Technologies Co., Ltd

Comment Type **ER** *Comment Status* **A** *primitive*

"The four analog streams carry a combination of the transmitting Inner FEC Tx_XI, Tx_XQ, Tx_YI, and
Tx_YQ signals used by the transmitting PMD to generate the DP-16QAM symbols".
800GBASE-ER1-20 and 800GBASE-ER1 do not use inner FEC. This sentence has the same issue as the sentence in CL185.5.3.

SuggestedRemedy

change "the transmitting Inner FEC Tx_XI, Tx_XQ,.." to "the analog Tx_XI, Tx_XQ, .."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change "The four analog streams carry a combination of the transmitting Inner FEC Tx_XI, Tx_XQ, Tx_YI, and Tx_YQ signals"
to
"The four analog streams carry a combination of the transmitting PMA Tx_XI, Tx_XQ, Tx_YI, and Tx_YQ signals".

With editorial license.

Cl **187** *SC* **187.5.5** *P* **622** *L* **8** # 103

Mi, Guangcan — Huawei Technologies Co., Ltd

Comment Type **TR** *Comment Status* **A** *Signal detect*

the average optical power limit of -18dBm for signal detection is not correct. The average receiver power min value defined in Table 187-6 is -18dBm. For PMD_signal_detect to be 0, the power should be below average receive power min.

SuggestedRemedy

in LR1, there is a 1.5dB margin between power level at which PMD_signal_detect=0 (-19dBm) and the average receive power min (-17.5dBm). Change the average optical power at TP3 max limit to be -19.5dBm or -20dBm for PMD_signal_detect=0

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 187-3 change the Average optical power at TP3 from <= -18 dBm to <= -19.5 dBm

Cl **187** *SC* **187.6.1** *P* **623** *L* # 66

Sluyski, Mike — Cisco

Comment Type **T** *Comment Status* **R** *Tx optical parameter*

Tx laser frequency stability: post-acquistion.

SuggestedRemedy

Not required (see line 19)

Response *Response Status* **C**

REJECT.

The suggested remedy does not provide sufficient detail to implement.

[Editor's note: changed subclause from Table 187.5 to 187.6.1]

Cl **187** *SC* **187.6.1** *P* **623** *L* # 67

Sluyski, Mike — Cisco

Comment Type **TR** *Comment Status* **A** *Tx optical parameter*

Tx clock phase noise: phase noise mask frequency (max). Specified in 185-5 is it required in Table 187-5?

SuggestedRemedy

Add values common with Table 185-5 pg. 551 lines 5-11

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 187-5 for ER1-20 and ER1 add a line with description "Tx clock phase noise: phase noise mask frequency (max)".
As part of the new parameter there are 4 associated points and values with all units "dBc/Hz"
1 x 10e4 with a value of -100
4 x 10e5 with a value of -132
1 x 10e6 with a value of -136
<=1 x 10e7 with a value of -146

With editorial license.
[Editor's note: changed subclause from Table 187.5 to 187.6.1]

Cl **187** *SC* **187.6.1** *P* **623** *L* # 69

Sluyski, Mike Cisco

Comment Type **TR** *Comment Status* **A** *Tx optical parameter*

Tx clock phase noise: total periodic jitter (max) - specified in Table 185-5

SuggestedRemedy

Add values common with Table 185-5 pg. 551 lines 13

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 187-5 for ER1-20 and ER1 add a line with description "Tx clock phase noise: total periodic jitter (max)", value of "0.03" and Unit of "UIpp".

With editorial license.
[Editor's note: changed subclause from Table 187.5 to 187.6.1]

Cl **187** *SC* **187.6.1** *P* **623** *L* # 68

Sluyski, Mike Cisco

Comment Type **TR** *Comment Status* **A** *Tx optical parameter*

Tx clock phase noise: total integrated random jitter (max) - specified in Table 185-5

SuggestedRemedy

Add values common with Table 185-5 pg. 551 lines 12

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 187-5 for ER1-20 and ER1 add a line with description "Tx clock phase noise: total integrated random jitter (max)", value of "0.015" and Unit of "UIrms".

With editorial license.
[Editor's note: changed subclause from Table 187.5 to 187.6.1]

Cl **187** *SC* **187.6.1** *P* **623** *L* **21** # 58

Sluyski, Mike Cisco

Comment Type **TR** *Comment Status* **A** *Tx optical parameter*

Signaling rate 118.2 +/- 20ppm GBd is rounded.
118.200000000 is below allowed min.

SuggestedRemedy

The exact rate is 118.203350603 GBd.
118.200986536 min.
118.203350603 nom.
118.205714670 max.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change "118.2 +/- 20ppm Gbd" to "118.203351 +/- 20 ppm Gbd".

[Editor's note: changed subclause from Table 187.5 to 187.6.1]

Cl **187** *SC* **187.6.1** *P* **623** *L* **32** # 193

Brown, Matt Alphawave Semi

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

ETCC limits are TBD.

SuggestedRemedy

Expect a contribution with proposals.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

This comment was submitted on behalf of the leadership team and a supporting presentation was not provided.

After CRG discussion it was decided in Table 187-5 for both ER1 and ER1-20 to change "TBD" to "2.5 dB" which is consistent with the implementation noise assumptions that lead to a value of 3.4 dB that is used in clause 185.

With editorial license.

Cl **187** *SC* **187.6.1** *P* **623** *L* **51** # 64

Sluyski, Mike Cisco

Comment Type **T** *Comment Status* **R** *Tx optical parameter*

Tx laser frequency slew rate: pre-acquistion (max). Specified in table 185-5 is it required for 187-5?

SuggestedRemedy

Not required. ER1 and ER1-20 does not include DWDM use cases. Consider turn-up time specification which covers laser tuning and convergence. Recommend 180(max).

Response *Response Status* **C**

REJECT.

The suggested remedy does not provide sufficient detail to implement.

[Editor's note: changed subclause from Table 187.5 to 187.6.1]

Cl **187** *SC* **187.6.1** *P* **623** *L* **52** # 65

Sluyski, Mike Cisco

Comment Type **T** *Comment Status* **R** *Tx optical parameter*

Tx laser frequency slew rate: post-acquistion (max). Specified in table 185-5 is it required for 187-5?

SuggestedRemedy

Not required. (see line 19)

Response *Response Status* **C**

REJECT.

The suggested remedy does not provide sufficient detail to implement.

[Editor's note: changed subclause from Table 187.5 to 187.6.1]

Cl **187** *SC* **187.6.2** *P* **624** *L* # 70

Sluyski, Mike Cisco

Comment Type **TR** *Comment Status* **R** *Rx optical parameter*

RX acquisition time - time to acquire and lock to valid signal.

SuggestedRemedy

Time to fully acquire signal in the presence of a valid input signal. Recommend 10 (max) Sec.

Response *Response Status* **C**

REJECT.

In CRG discussion it was agreed that the suggested parameter was implementation specific and not relevant for link interoperation.

No change to the draft.

[Editor's note: changed subclause from Table 187.7 to 187.6.2]

Cl **187** *SC* **187.6.2** *P* **624** *L* **10** # 59

Sluyski, Mike Cisco

Comment Type **TR** *Comment Status* **A** *Tx optical parameter*

Signaling rate 118.2 +/- 20ppm GBd is rounded.
118.200000000 is below allowed min.

SuggestedRemedy

The exact rate is 118.203350603 GBd.
118.200986536 min.
118.203350603 nom.
118.205714670 max.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change "118.2 +/- 20ppm Gbd" to "118.203351 +/- 20 ppm Gbd".

[Editor's note: changed subclause from Table 187.6 to 187.6.2]

Cl **187** *SC* **187.6.2** *P* **624** *L* **14** # 104

Mi, Guangcan — Huawei Technologies Co., Ltd

Comment Type **TR** *Comment Status* **A** *Rx optical parameter*

The damage threshold of 800GBASE-ER1-20 and 800GBASE-ER1 was set to 10dBm. The max. average launch power of 800GBASE-ER1 was -1dBm. There was no optical amplifier defined in the optical channel characteristic.

SuggestedRemedy

change to -1dBm, as assuming max. Transmit output power of 800GBASE-ER1, and 0dB link loss.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 187-6 change Damage threshold from 10 dBm to 2 dBm.

In CRG discussion it was noted that Average receive power max of 3 dBm was incorrect and should be changed to -1 dBm.

With editorial license.

Cl **187** *SC* **187.6.2** *P* **624** *L* **16** # 60

Sluyski, Mike — Cisco

Comment Type **TR** *Comment Status* **R** *Rx optical parameter*

Average Receive power (max) and Average receive power (min)? Is this average signal power or average total power?

SuggestedRemedy

Coherent recievers can distinguish signal power. Clarify by adding "Average receive signal power".

Response *Response Status* **C**

REJECT.

After CRG discussion there was no consensus to make a change.

Cl **187** *SC* **187.6.2** *P* **624** *L* **16** # 79

Sluyski, Mike — Cisco

Comment Type **TR** *Comment Status* **R** *Rx optical parameter*

Average Receive power (max) and Average receive power (min)? Is this average signal power or average total power?

SuggestedRemedy

Coherent recievers can distinguish signal power. Clarify by adding "Average receive signal power".

Response *Response Status* **C**

REJECT.

After CRG discussion there was no consensus to make a change.

[Editor's note: changed page from 603 to 624]

Cl **187** *SC* **187.6.2** *P* **624** *L* **17** # 179

Sheffi, Nir — Alphawave

Comment Type **T** *Comment Status* **R** *Tx/Rx optical parameter*

The ETCC has no effect on the transmit launch power (min) and average receive launch power (min.), as opposed to Clause 185.

SuggestedRemedy

Change the specification for the transmitter "Average launch power (min)" (Table 187-5) and the receiver "Average receive power (min)" (Table 187-7) to be a function of ETCC similar to Clause 185 (Table 185-5 and Table 185-6).

Response *Response Status* **C**

REJECT.

In CRG discussion there was agreement that aligning the methodology between 185 and 187 would be beneficial to the industry however the suggested remedy does not provide suggested values to use as well as additional factors such as transmit dependence on ETCC and associated power parameters so there were insufficient details to implement.

The commentor is invited to submit a more detailed presentation in the future.

No changes to the draft.

Cl **187** *SC* **187.7** *P* **625** *L* **40** # 62

Sluyski, Mike Cisco

Comment Type **TR** *Comment Status* **R** *channel requirements*

Differential group delay (max)^c should be defined as a statistical value.

SuggestedRemedy

Add to subnote C. "Due to the statistical nature of polarization mode dispersion (PMD), the relationship between maximum DGD (DGDmax) and mean DGD (DGDmean) can only be defined probabilistically. The probability of the instantaneous DGD exceeding any given value of DGDmax can be inferred from its Maxwellian statistics.

For purposes of this specification the ratio of DGDmax to DGDmean is defined as 3.3, corresponding to a 4.1 × 10-6 probability of the instantaneous DGD exceeding DGDmax.

Response *Response Status* **C**

REJECT.

After CRG discussion there was no consensus to make a change.

[Editor's note: changed subclause from Table 187.8 to 187.7]

Cl **187** *SC* **187.7** *P* **625** *L* **40** # 80

Sluyski, Mike Cisco

Comment Type **TR** *Comment Status* **R** *channel requirements*

Differential group delay (max)^c should be defined as a statistical value.

SuggestedRemedy

Add to subnote C. "Due to the statistical nature of polarization mode dispersion (PMD), the relationship between maximum DGD (DGDmax) and mean DGD (DGDmean) can only be defined probabilistically. The probability of the instantaneous DGD exceeding any given value of DGDmax can be inferred from its Maxwellian statistics.

For purposes of this specification the ratio of DGDmax to DGDmean is defined as 3.3, corresponding to a 4.1 × 10-6 probability of the instantaneous DGD exceeding DGDmax.

Response *Response Status* **C**

REJECT.

After CRG discussion there was no consensus to make a change.

[Editor's note: changed page from 604 to 625]

Cl **187** *SC* **187.7.1** *P* **626** *L* **11** # 61

Sluyski, Mike Cisco

Comment Type **TR** *Comment Status* **R** *Fiber characteristics*

Zero Dispersion waelength

SuggestedRemedy

Is this spec required for ER1 application over C-band 1550nm?

Response *Response Status* **C**

REJECT.

The zero dispersion wavelength is a fundmental characteristic of the fiber that must be used.

No changes to the draft.

[Editor's note: changed subclause from Table 187.8 to 187.7.1]

Cl **187** *SC* **187.8.1** *P* **627** *L* **9** # 105

Mi, Guangcan Huawei Technologies Co., Ltd

Comment Type **ER** *Comment Status* **A** *Test pattern*

PRBS31 can be encoded by PCS or FEC, not PMD

SuggestedRemedy

change to PRBS31 encoded by the 800GBASE-ER1 PCS and PMA.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 187-10 change "PRBS31 encoded by the 800GBASE-ER1"
to
"PRBS31 encoded by the 800GBASE-ER1 FEC sublayer" based on the resolution of comment #36.

Cl **187** *SC* **187.8.1** *P* **627** *L* **12** # 81

Sluyski, Mike Cisco

Comment Type **TR** *Comment Status* **R** *Test pattern*

Is PRBS raw or framed in payload?

SuggestedRemedy

Assumed to be framed but make it clear

Response *Response Status* **C**

REJECT.

The details of the PRBS31 signal are documented in the defined cross reference of 186.2.3.13

[Editor's note: changed page from 606 to 627]

Cl **187** *SC* **187.8.3** *P* **627** *L* **42** # 159

Bruckman, Leon Nvidia

Comment Type **TR** *Comment Status* **A** *(bucketp)*

There is no Lane wavelength (range) in Table 187-5

SuggestedRemedy

If this is called "Carrier frequency (range)" in Table 187-5, then make naming consistent.
Update also Table 187-11 row 2.
If not, add Lane wavelength (range) to Table 187-5.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The adopted baselines use "carrier frequency (range)".

The was consensus to retain this term.

In Table 187-11 and 187.8.3 change "Lane wavelength (range)"
to
"Carrier frequency (range)".

Implement with editorial license.

Cl **187** *SC* **187.8.6** *P* **628** *L* **8** # 160

Bruckman, Leon Nvidia

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

Redundant "is".

SuggestedRemedy

Change: "ETCC is the quality metric is used to define"
To: "ETCC is the quality metric used to define"

Response *Response Status* **C**

ACCEPT.

Cl **187** *SC* **187.9** *P* **629** *L* **1** # 63

Sluyski, Mike Cisco

Comment Type **E** *Comment Status* **R** *ETCC*

ETCC test setup and calculation is not limited to ER1 and ER1-20. Should the test setup and calculation be relocated to it's own or a different clause?

SuggestedRemedy

If yes. Also move 187.8.6 Extened transmsitter constellation closure - definition.

Response *Response Status* **C**

REJECT.

The ETCC test setup and calculation details are in Annex 185A. This annex is titled Test methods for coherent optical Physical Layer devices and contains a subclause detailing ETCC testing. 187.9 references this annex and Tables 187-12 and 187-13 contain the specific parameters values needed for the ETCC calculation.

No change to the draft.

Cl **187** *SC* **187.12.4.1** *P* **634** *L* **10** # 410

Maniloff, Eric Ciena

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

Transmitter nominal center frequency is not applicable to this PMD.

SuggestedRemedy

Delete this entry.

Response *Response Status* **C**

ACCEPT.

Cl **187** *SC* **187.12.4.1** *P* **634** *L* **13** # 411

Maniloff, Eric Ciena

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

Receiver nominal center frequency is not applicable to this PMD

SuggestedRemedy

Delete this entry.

Response *Response Status* **C**

ACCEPT.

Cl **187** *SC* **187.12.4.2** *P* **634** *L* **40** # 412

Maniloff, Eric Ciena

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

PMD receive center frequency ability is not applicable to this PMD

SuggestedRemedy

Delete this entry.

Response *Response Status* **C**

ACCEPT.

Cl **187** *SC* **187.12.4.4** *P* **635** *L* **34** # 413

Maniloff, Eric Ciena

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

Adjustable range of transmit
optical power is not defined for clause 187

SuggestedRemedy

Delete this entry.

Response *Response Status* **C**

ACCEPT.

Cl **187** *SC* **187.12.4.4** *P* **635** *L* **36** # 414

Maniloff, Eric Ciena

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

Minimum average channel power at maximum adjustable power setting is not applicable to clause 187 PMDs

SuggestedRemedy

Delete this entry.

Response *Response Status* **C**

ACCEPT.

Cl **187** *SC* **187.12.4.4** *P* **635** *L* **41** # 415

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **A** *(bucketp)*

Clause 187 PMDs are not amplified, receiever OSNR and tolerance are not applicable or defined.

SuggestedRemedy

Delete entries OM11 and OM13

Response *Response Status* **C**

ACCEPT.

Cl **187** *SC* **187.12.4.6** *P* **636** *L* **21** # 416

Maniloff, Eric Ciena

Comment Type **T** *Comment Status* **A** *(bucketp)*

Clause 187 is not a DWDM PMD

SuggestedRemedy

Delete entry for DWDM black link

Response *Response Status* **C**

ACCEPT.