In the past, we have included all previously defined AUI for each new PHY type defined. Given that the PMA multiplexing methods were consistent this was simple to support. Now that we have switched to a different PMA multiplexing method (RS-FEC symbol) things are getting more complicated.

**Suggested Remedy**

For each PHY new 200 Gb/s per lane or higher PHY type, include only one or two previous generations of AUI. Specifically, the new PHY types defined in 802.3dj indicate only 100 Gb/s per lane and 200 Gb/s per lane AUIs as being optional within a PHY. Perhaps, also include 50 Gb/s per lane AUIs as well.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

For the new 200GBASE-R and 400GBASE-R PMDs defined in 802.3dj, only specify support only 50 Gb/s, 100 Gb/s, and 200 Gb/s per lane AUIs. Pending CRG discussion.

**Comment Type**: T

**Comment Status**: D

**Comment**: Many state diagrams in this draft as well as in the base standard use the operator "++" to indicate that the variable be incremented by 1. However, this operator is never defined.

**Suggested Remedy**

Import Clause 21 and amend 21.5 to include definition of "++".

Delete the following from state diagram conventions in multiple clauses. "The notation used in the state diagrams follows the conventions of 21.5. The notation ++ after a counter or integer variable indicates that its value is to be incremented."

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Import Clause 21 and amend 21.5 to include definition of "++".

Delete the following from state diagram conventions in 175.2.6.1, 176.5.1.6, 177.6.1, 184.6.1, 176A.10.1.

"The notation ++ after a counter or integer variable indicates that its value is to be incremented."

Implement with editorial license.

**Comment Type**: TR

**Comment Status**: D

**Comment**: Add and update connector references as necessary. This is what is in 1.3:


**Suggested Remedy**

Use these for now (most will be updated before this project is done):

- OSFP Octal Small Form Factor Pluggable Module, Rev 5.0, October 2, 2022
- QSFP-DD/QSFP-DD800/QSFP-DD1600 Hardware Specification for QSFP Double Density Bx Pluggable Transceivers, Rev 7.0, September 29, 2023
- SFF-8665 Rev 1.9.4, 2022-04-01, QSFP+ 4X Pluggable Transceiver Solutions
- SFF-TA-1011 Rev 1.1, 2024-04-19, Cross Reference to Select SFF Connectors and Modules
- SFF-TA-1027, Rev 1.0, 2024-04-16, QSFP2 Connector, Cage, & Module Specification
- SFF-TA-1031, Rev 1.0, 2023-06-11, SFP2 Cage, Connector, & Module Specification

Refer to these documents from 179C.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement suggested remedy with editorial license.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

Comment Type: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general

Comment Status: D/dispatched  A/accepted  R/rejected  O/open  W/written  C/closed  Z/withdrawn

Cl 1  SC 1.4.184da  P49  L43  # 309
D'Ambrosia, John  Futurewei, U.S. Subsidiary of Huawei

Comment Type: TR  Comment Status: D  ER1 PHY (bucket)
800GBASE-ER1 is defined as using 800GBASE-R encoding, but per 802.3df-2024, 1.4.184a - “The term 800GBASE-R represents a family of Physical Layer devices using the Physical Coding Sublayer (PCS) defined in Clause 172 for 800 Gb/s operation.” This PHY as noted in Table 169-3a, uses PCS encoding as defined in Clause 186.

SuggestedRemedy
Define new name for family / encoding based on Clause 186 encoding. Modify definition of entry for 800GBASE-ER1 to reflect new family name.

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
The comment correctly points out that the definition is not correct. However, it is not necessary to define a new family. Change the definition of 800GBASE-ER1 and 800GBASE-ER1-20 to the following: 1.4.184da 800GBASE-ER1: IEEE 802.3 Physical Layer specification for 800 Gb/s PHY using 800GBASE-ER1 PCS and PMA encoding, dual polarization 16-state quadrature amplitude modulation (DP-16QAM) modulation, and coherent detection with reach up to at least 40 km. (See IEEE Std 802.3, Clause 186 and Clause 187).

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #309.

Cl 1  SC 1.4.184da  P49  L44  # 111
Huber, Thomas  Nokia

Comment Type: T  Comment Status: D  ER1 PHY (bucket)
Since 800GBASE-ER1 and -ER1-20 have a separate PCS, the definition for 800GBASE-ER1 and ER1-20 should refer to 800GBASE-ER1 encoding rather than 800GBASE-R encoding.

SuggestedRemedy
Change 800GBASE-R to 800GBASE-ER1 for both the ER1 and ER1-20 definitions.

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #309.

Cl 1  SC 1.4.184da  P51  L11  # 74
Lusted, Kent  Intel Corporation

Comment Type: TR  Comment Status: D  (bucket)
The abbreviation “MLSD” is used numerous times in Annex 178A to reference Maximum Likelihood Sequence Detection and should be added to the abbreviations list.

SuggestedRemedy
Add MLSD | Maximum Likelihood Sequence Detection

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

**Comment Type:** TR  **Comment Status:** D  **timesync (bucket)**

Add TimeSync entity managed object classes for Inner FEC sublayers defined in Clause 177 and 184.

**Suggested Remedy:**
Add register set for Inner FEC sublayers in subclauses of 30.13.1: (30.13.1.1 - 30.13.1.14) (Presentation will be prepared for this comment.)

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

PROPOSED REJECT.

The following related presentation was reviewed by the 802.3dj task force during the May Interim meeting: https://www.ieee802.org/3/dj/public/24_05/he_3dj_01_2405.pdf

This presentation does not provide sufficient detail to describe the requested change in Clause 30.

**Comment Type:** T  **Comment Status:** D  **timesync (bucket)**

There should also be an entry for 800GBASE-ER1 since it is a different PCS

**Suggested Remedy:**
Add a new editing instruction to insert 800GBASE-ER1 after 400GBASE-R (or before the entry for 800GBASE-R).

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

PROPOSED ACCEPT.

**Comment Type:** T  **Comment Status:** D  **timesync (bucket)**

Inner FEC (Clause 177 or Clause 184) needs MDIO registers for TimeSync. They should look like the PMA/PMD clause registers.

**Suggested Remedy:**
Add the following MDIO registers for the Inner FEC, in the same style as the equivalent PMA/PMD MDIO registers - TimeSync capability - TimeSync transmit path data delay register - TimeSync receive path data delay register

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

PROPOSED ACCEPT IN PRINCIPLE.

The following related presentation was reviewed by the 802.3dj task force during the May Interim meeting: https://www.ieee802.org/3/dj/public/24_05/he_3dj_01_2405.pdf

The register bits and names described on page 8 of the presentation will be used with the exception that the ability bits will be added to example register "TimeSync PMA/PMD capability (Register 1.1800)" and the new delay registers will be added to MMD 1 from location 1.1820 onwards.

Implement the register bits and names described on page 8 of the presentation and with the exception that the ability bits will be added to example register "TimeSync PMA/PMD capability (Register 1.1800)" and the new delay registers will be added to MMD 1 from location 1.1820 onwards.

Implement with editorial licence.
Add MDIO interface registers for Inner FEC sublayers defined in Clause 177 and 184.

Suggested Remedy:
Add definitions for the new register set defined for the Inner FEC sublayers in 30.3.1.1 - 30.1.1.14.

(Presentation will be prepared for this comment.)

Proposed Response  Response Status  W
PROPOSED REJECT.
The following related presentation was reviewed by the 802.3dj task force at the May Interim meeting:
https://www.ieee802.org/3/dj/public/24_05/he_3dj_01_2405.pdf
This presentation concerns TimeSync management and refers to the register set "30.13.1.1 – 30.13.1.14" rather than "30.3.1.1 – 30.1.1.14".
A different comment (#603) addresses adding registers for inner FEC TimeSync.
Another comment (#183) concerns adding additional status counters for the inner FEC which will require new registers.
There is insufficient detail given in this comment (#370) and comment #183 to make a change to Clause 45 for inner FEC register definitions at this time.

Proposed Response  Response Status  W
PROPOSED ACCEPT.

Proposed Response  Response Status  W
PROPOSED ACCEPT IN PRINCIPLE.
The following presentation was reviewed by the 802.3dj task force at the May Interim meeting.
Implement the changes proposed in slavick_3dj_01_2405 with editorial licence and using appropriate editing instructions.

Proposed Response  Response Status  W
PROPOSED REJECT.
Table 73-5 is missing the indication of higherst priority.

Proposed Response  Response Status  W
PROPOSED REJECT.
Table 73-5 already indicates "lowest priority" and 73.7.6 contains this text "priority as defined in Table 73–5 (listed from highest priority to lowest priority)". So adding "highest priority" in the Table 73-5 is redundant.
### IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

#### Comment Type: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general

#### Comment Status: D/dispatched  A/accepted  R/rejected  C/closed  Z/withdrawn

#### Response Status: O/open  W/written  C/closed  Z/withdrawn

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**Ran, Adee, Cisco**

**Comment Type: TR**  **Comment Status: D**  **ILT RTS SI**

The existing semantics of the link_status parameter of AN_LINK.indication enables only two values, OK and FAIL. This imposes a need to bring up a link within a specified time (link_fail_inhibit_timer), otherwise AN will restart (per the Arbitration state diagram, Figure 73-11). This can cause numerous problems in a segmented link.

The AN should be tolerant to a link in which one or more of the devices is still in the process of training. This can be achieved by adding a third possible value to link_status, indicating that the negotiated PHY is still training.

**Suggested Remedy**

A presentation with proposed content is planned.

**Proposed Response**

**Response Status: W**

PROPOSED REJECT.

This proposal might cause AN to be stuck in the AN GOOD CHECK state as shown in "Figure 73–11—Arbitration state diagram". It also requires each PCS to exercise control over a new "IN_PROGRESS" parameter value. The proposed change needs careful consideration before being accepted by the CRG.

Pending CRG review of the following contribution which was reviewed by the Task Force during the May Interim meeting: [https://www.ieee802.org/3/dj/public/24_05/ran_3dj_05_2405.pdf](https://www.ieee802.org/3/dj/public/24_05/ran_3dj_05_2405.pdf)

Resolve along with comment #195

[Editor's note: CC]

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**Opsasnick, Eugene, Broadcom**

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

In table 90A-1, the column titled "Alignment marker/ codeword marker insertion/removal" has a value of 2.56ns for 1.6T in the last row. This value should be the xMII time (at MAC data rate) of one Alignment marker block. The 1.6TE PCS lanes are now running at 100G vs 25G for slower speeds, so this number does not scale directly from the other entries.

The value for the 1.6T row should be 1.28ns (a full AM group = 8 256b/257b blocks, so the MII time = 8 * 256 / 1600 = 1.28ns). Note that this column has correct values for 25G, 40G, 50G, and 100G. However, the value listed for 200G, 400G and 800G of 2.56ns should be 5.12ns and should also be fixed in maintenance.

**Suggested Remedy**

Change the accuracy impairment value of 2.56 ns to 1.28 ns for the 1.6T Ethernet rate in Table 90A-1.

**Proposed Response**

**Response Status: W**

PROPOSED ACCEPT.

<table>
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**de Koos, Andras, Microchip Technology**

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

For the added row in Table 90A-1, the potential timestamp accuracy impairment due to alignment marker insertion/removal for 1.6T is incorrect. It should be 1.28ns, not 2.56ns. The values for 200G, 400G, and 800G are also erroneous (should all be 5.12ns). I've filed a maintenance request to correct these, too.

**Suggested Remedy**

Change 2.56 to 1.28ns in the added row for Table 90A-1

**Proposed Response**

**Response Status: W**

PROPOSED ACCEPT.
We have been talking about "die-to-die" loss for a while now. Add a test point reference to this and reference to section Annex 93B. One reference to this is in diminishc_3dj_01_2307 slide 6 and 7.

**Suggested Remedy**
Add TP0d and TP5d to figure 93B-1 and table 93B-1

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

Annex 93B is not referenced anywhere in the draft, nor in previous backplane PMD clauses 163 and 137. There is no benefit in updating an annex that is not referenced. Figure 178-2 is used in this project instead.

**Suggested Remedy**

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

In Table 116-9, there should be no applicable SP1 and SP6 for 113.4375GBd PMD lane

**Suggested Remedy**

In Table 116-3, the last two column, missusage of PMD names.

**Proposed Remedy**

200GBASE-R SM PMA delay constraint is missing

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

In Table 116-3a, the last two column, missusage of PMD names.

**Suggested Remedy**

change PHY type of CL 178 and 179 in the table to the correct nomenclature, i.e., 400GBASE-KR2 and 400GBASE-CR2

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

**Proposed Accept in Principle.**
Implement with editorial license and discretion.

**Suggested Remedy**

200GBASE-R SM PMA delay constraint is missing

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

**Proposed Accept in Principle.**
Implement with editorial license and discretion.

**Suggested Remedy**

change PHY type of CL 178 and 179 in the table to the correct nomenclature, i.e., 200GBASE-KR1 and 200GBASE-CR1

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

**Proposed Accept.**
With the adoption of the objective to do 500m over 4 WDM lanes on a single mode fiber and its nomenclature 800GBASE-FR4-500, "FR" is no longer limited to just represent 2km (e.g. FR-500). This introduces an inconsistency for 200GBASE-FR1 and 200GBASE-DR1 (DR1 is not FR1-500). In addition, when looking at 2km for 1,2,4,8 fibers - a confusing "family" of PHYs emerges (200GBASE-FR1, 400GBASE-DR2-2, 800GBASE-DR4-2, and 1.6TBASE-DR8-2).

Suggested Remedy

Rename 200GBASE-FR1 to 200GBASE-DR1-2

PROPOSED ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the 802.3dj task force at the May Interim meeting.
https://www.ieee802.org/3/dj/public/24_05/dambrosia_3dj_02a_2405.pdf

Implement the suggested remedy with editorial license.

Pending CRG discussion.

For 100Gb/s based PHYs the 200GBASE-R BM-PMA is mandatory, all AUIs are optional, and 200GBASE-R SM PMA is "C" / conditional if either 200GAUI-1 is implemented. For 200Gb/s based PHYs the 400GBASE-R SM-PMA is mandatory, all AUIs are optional, and 400GBASE-R BM PMA is "C" / conditional if either 400GAUI-2 is implemented.

For 100Gb/s based PHYs the 400GBASE-R BM-PMA is mandatory, all AUIs are optional, and 400GBASE-R SM PMA is "C" / conditional if either 400GAUI-2 is implemented. For 200Gb/s based PHYs the 400GBASE-R BM-PMA is mandatory, all AUIs are optional, and 400GBASE-R BM PMA is "C" / conditional if either 400GAUI-4 is implemented.

Change entries as described above in Tables 116-3, 116-4, and 116-4a for 800GBASE-R BM-PMA and 800GBASE-R SM-PMA to C / with notes as stated above.

Modify entry in Table 178-1 to 200GBASE-R BM PMA to Conditional. Add note "c" A 200GBASE-R BM PMA must be implemented if a 200GAUI-2 C2C is implemented. Modify entry in Table 179-1 to 200GBASE-R SM PMA to Conditional. Add note "c" A 200GBASE-R SM PMA must be implemented if a 200GAUI-1 C2C is implemented. Modify entry in Table 180-2 to 400GBASE-R BM PMA to Conditional. Add note "c" A 400GBASE-R BM PMA must be implemented if a 400GAUI-4 C2C is implemented. Modify entry in Table 181-1 to 200GBASE-R BM PMA to Conditional. Add note "c" A 200GBASE-R BM PMA must be implemented if a 200GAUI-2 C2C is implemented. Modify entry in Table 182-1 to 200GBASE-R SM PMA to Conditional. Add note "c" A 200GBASE-R SM PMA must be implemented if a 200GAUI-1 C2C is implemented. Modify entry in Table 182-2 to 400GBASE-R BM PMA to Conditional. Add note "c" A 400GBASE-R BM PMA must be implemented if a 400GAUI-4 C2C is implemented. Modify entry in Table 181-1 to 200GBASE-R BM PMA to Conditional. Add note "c" A 200GBASE-R BM PMA must be implemented if a 200GAUI-2 C2C is implemented. Modify entry in Table 182-1 to 200GBASE-R SM PMA to Conditional. Add note "c" A 200GBASE-R BM PMA must be implemented if a 200GAUI-1 C2C is implemented. Modify entry in Table 182-2 to 400GBASE-R BM PMA to Conditional. Add note "c" A 400GBASE-R BM PMA must be implemented if a 400GAUI-4 C2C is implemented.

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #317.
The comment refers to Table 116d3.
It will be beneficial to add a note about the conditions which allow/require implementation of BM_PMA and SM_PMA.
Same apply to Table 116d3a, Table 116d4, Table 169d2

Suggested Remedy
Add a footnote labeled æOEÆ next to the æOÆ marking for 200GBASE-R SM-PMA in the entries for 200GBASE-KR2, 200GBASE-KR4, 200GBASE-CR2, and 200GBASE-CR4. The footnote æOEÆ should state: æApplicable only when 200GAUI-1 C2C interface is used within the PHY

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #312.

Comment Type: TR/technical required
Comment Status: D/dispatched

In support of 200 Gb/s per lane signaling - 200GBASE-R BM-PMA and 400GBASE-R PMA, Clause 176 was developed. No addition was made to Clause 166.2 Summary of 200GbE and 400 GbE sublayers was made.

Suggested Remedy
Modify last sentence of 116.2.4 and add additional text
The 200GBASE-R and 400GBASE-R PMAs, which supports bit multiplexing, is specified in Clause 120.
The 200GBASE-R and 400GBASE-R PMAs, which supports symbol multiplexing, is specified in Clause 176.
Note that "PMA" is used as a general term to represent both types of PMAs for each speed.

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
The comment appropriately proposes to add the new PMA types defined in Clause 176 and to differentiate the two based on multiplexing type. It is not necessary to point out that they may both be referred to as PMA and in fact this could be considered incorrect, since any PMA in the 802.3 standard might be called a PMA.
Implement the following with editorial license:
Replace the second sentence in 116.2.4 with appropriate editorial instructions to the following:
200GBASE-R and 400GBASE-R PMAs that use bit multiplexing (BM-PMA) are specified in Clause 120.
200GBASE-R and 400GBASE-R PMAs that use symbol multiplexing (SM-PMA) are specified in Clause 176.
Implement with editorial license.
segment-by-segment training requires passing the RTS status of each device/sublayer in both directions. When there is a physical interface with a training protocol, RTS is communicated using the protocol. But when two sublayers are attached, e.g. PMD and PMA, the status has to be communicated through the service interface.

This can be achieved if the inter-sublayer service interface includes both IS_SIGNAL.indication and IS_SIGNAL.request.

The values of the parameter SIGNAL_OK should be extended to allow communicating that a sublayer is in the process of training. A new value IN_PROGRESS would enable that.

Similar changes should be applied in clauses 169 and 174. The mapping of RTS to SIGNAL_OK should be defined in annex 176A.

Suggested Remedy
A presentation with proposed content is planned.

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.

The comment refers to Table 116û8. There is an additional logical skew present in the 200GBASE-R and 400GBASE-R2 BM_PMA of 2 RS-FEC CWs. These skew values should not be included in the skew budget calculations for this table. To prevent misinterpretations, an explicit note is required.

Suggested Remedy
Insert a note in Table 116û8 that states: æThe additional 2 RS-FEC CWs logical skew in clause 176 BM_PMA for 200GBASE-R and 400GBASE-R should not to be factored in the skew budget calculations for this table

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.

Table 116-8 is a summary of skews specified normatively in the referenced subclauses. Details of the delay would be better specified in each sublayer clause. Comment #181 deals with Skew specifications in a broader context. Resolve using the response to comment #181.

[Editor's note: CC 116, 176]

A new footnote has appeared "At the PCS receive input, 1 UI is equivalent to 1 bit.” attached to an unchanged number. There is no equivalent footnote for Table 116-8. In 802.3, "bit" means MAC bit. I don't know what point the footnote is making - that PCS lanes use binary signalling not PAM4? Nor why it is here. If it was kept, it should say "1 bit on a PCS lane" or similar.

Suggested Remedy
Delete footnote f

Proposed Response
PROPOSED REJECT.

The interface between the PMA and the PCS is an abstract interface. UI interval is the time span of a symbol. Since there is no physical signal here, only bits are exchanged. The note clarifies that for this interface 1 UI is equivalent to 1 bit being transferred.
I understand why the use of the stateless encoder decoder is restricted to 200GBASE-R, and 400GBASE-R over 200Gbps lanes. Allowing it on other PMDs/AUIs would be out-of-scope for the 802.3dj project.

HOWEVER, shouldn't common sense prevail here? The stateless encoder/decoder was designed such that it is all-but-identical to the stateful encoder, only differing in their treatment of /E/ blocks. Since the 200GBASE-R and 400GBASE-R links are always protected by FEC, it is not as if /E/ blocks can occur at random causing divergent behaviour of the two encoder/decoder types. There is absolutely no danger of causing backward-compatibility issues, because the stateful encoder/decoder are still allowed for all PMDs. The stateless encoder/decoder was added to the standard to allow greater implementation flexibility (removing long timing paths). But any new PCS implementation that may attach to either 100Gbps/lane or 200Gbps/lane PMDs would have to implement the stateful encoder/decoder! With the stateless encoder, the standard is offering more implementation flexibility that implementors cannot actually use.

Suggested Remedy
Consider removing the restriction on PMD type when using the stateless encoder and decoder in subclauses 119.2.4.1 and 119.2.5.8, respectively.

PROPOSED REJECT.
As stated in the comment itself, adding an option to support stateless encoding/decoding for PHYs that are not part of the 802.3dj project is out-of-scope.

Suggested Remedy
Remove the word "either" from the referenced paragraph. Indeed, the PMA defined in Clause 120 can support only PMDs with per-lane signaling rates of 100 Gb/s or less. The referenced paragraph should therefore be corrected.

In Clause 116...
Remove 200GBASE-KR1/CR1 from Table 116-3 and change table title to: "PHY type and clause correlation (200GBASE copper with 2 or 4 lanes)"
Remove 400GBASE-KR2/CR2 from Table 116-3a and change table title to: "PHY type and clause correlation (400GBASE copper with 4 lanes)"
Create new Table 116-3c with title "PHY type and clause correlation (200GBASE copper with 1 lanes)"
Include 200GBASE-KR1/CR1 in this table.
Create new Table 116-3d with title "PHY type and clause correlation (400GBASE copper with 2 lanes)"
Include 400GBASE-KR2/CR2 in this table.
In Clause 120...
Change the referenced sentence to:
"The 200GBASE-R PMA(s) can support any of the 200Gb/s PMDs in Table 116-3 and Table 116-4, and the 400GBASE-R PMA(s) can support any of the four, or 8 lane 400Gb/s PMDs in Table 116-3a and Table 116-5."
Implement with editorial license.

[Editor's note: CC 116, 120]
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

Comment on Clause 176

Comment Type: T
Comment Status: D
Precoding (bucket)

Clause 176 is for the symbol mux PMA it should not be used for Annex 120F

SuggestedRemedy

Remove the reference to 176.9.1.2

PROPOSED REJECT.

Annex 120F is amended to include 1.6TAUI-16.

176.8.4 defines the 1.6TBASE-R 16:16 PMA, which has a 16-lane interface that can use 1.6TAUI-16 as a physical interface.

176.9.1.2 describes the precoding function for all symbol-muxing PMAs, which can also be used in the aforementioned PMA.

Comment on Table 169-1

Comment Type: TR
Comment Status: D
PHY descriptions (bucket)

same as the previous comment on 800GBASE-CR4

SuggestedRemedy

make the description consistent

PROPOSED REJECT.

It is assumed that the referenced "previous comment" is Comment #154.

The language used here is consistent with other similar PHY types in this table. There is similar differences between the PHYs described in this table and the definitions in 1.4.

Comment on Table 169-3

Comment Type: TR
Comment Status: D
PHY descriptions (bucket)

In Table 169-3, Phy type and clause correlation was marked incorrectly for the columns of 8000GBASE-DR8 PMD and 8000GBASE-DR8-2 PMD

SuggestedRemedy

remove the unnecessary M in the following rows for 8000BASE-DR8 PMD: 8000BASE-DR4, 8000BASE-FR4-500. remove the unnecessary M in the following rows for 8000BASE-DR8-2 PMD: 8000BASE-DR4-2, 8000BASE-FR4, and 8000BASE-LR4.

PROPOSED ACCEPT.

Comment on Table 169-4

Comment Type: TR
Comment Status: D
PHY descriptions (bucket)

In Table 169-4, the delay constraints on 8000BASE-R BM-PMA and 8000BASE-R SM-PMA are missing

SuggestedRemedy

add appropriate rows with TBD if no consensus has been built.

PROPOSED REJECT.

8000BASE-R 32:4, 4:32, and 4;4, all SM-PMA types are listed in Table 169-4. Note that the term SM-PMA is used to reference any symbol multiplexing PMA, where it would otherwise be ambiguous. In the referenced text the multiplex ratio is unambiguous and the reference to Clause 176 in the notes column backs that up.

Comment on Table 169-6

Comment Type: TR
Comment Status: D
PHY descriptions (bucket)

In Table 169-6, there should be no applicable SP1 and SP6 for 113.4375GBd PMD lane

SuggestedRemedy

change the content of row SP1 and SP6 in the column of 113.4375GBd PMD lane to N/A

PROPOSED ACCEPT IN PRINCIPLE.

It is assumed that the comment is referring to Table 169-6 rather than the referenced Table 116-6.

Implement the suggested remedy with editorial license.
Comment Type: TR
Comment Status: D

800BASE-ER1-20 and 800BASE-ER1 are both defined as using 800BASE-R encoding, but per 802.3df-2024, 1.4.184e - "The term 800BASE-R represents a family of Physical Layer devices using the Physical Coding Sublayer (PCS) defined in Clause 172 for 800 Gb/s operation." These two PHYs as noted in Table 169-3a, they use PCS encoding as defined in Clause 186.

Suggested Remedy
Define new name for family / encoding based on Clause 186 encoding.
Eliminate table entries for ER1-20 and ER1 from Table 169-3a.
Create new table for PHY type and clause correlation for new family based on Clause 186 encoding.
Modify description of entry for 800BASE-ER1-20 in Table 169-1 to reflect new family name.
Modify description of entry for 800BASE-ER1 in Table 169-1 to reflect new family name.

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

This table lists ALL 800 Gb/s Ethernet PHY types (i.e., 800BASE), not specifically 800BASE-R PHY types. The description for 800BASE-ER1 and 800BASE-ER1-20 is deceiving and should be updated in line with the definitions in Clause 1. Table 169-3a, lists 800BASE optical coherent PHY types (not specifically 800BASE-R), so a separate nomenclature table is not required for 800BASE-ER1/ER1-20.

Note that comments 111, 310, and 311 propose changes to the definitions in Clause 1. In Table 169-1, change the definitions as follows:
800BASE-ER1-20 | 800 Gb/s PHY using 800BASE-ER1 PCS and PMA encoding, dual polarization 16-state quadrature amplitude modulation (DP-16QAM) modulation, and coherent detection with reach up to at least 20 km (see Clause 187)
800BASE-ER1 | 800 Gb/s PHY using 800BASE-ER1 PCS and PMA encoding, dual polarization 16-state quadrature amplitude modulation (DP-16QAM) modulation, and coherent detection with reach up to at least 40 km (see Clause 187)

Implement with editorial license.

Suggested Remedy
The descriptions of 800BASE-ER1-20 and 800BASE-ER1 should refer to 800BASE-ER1 encoding rather than 800BASE-R encoding since the ER1[-20] PCS is distinct from the 800BASE-R PCS

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #315.

Suggested Remedy
Move definitions of 800BASE-R BM-PMA and 800BASE-R-SM-PMA from 176.2 to 169.1.3 Nomenclature

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

The terms BM-PMA and SM-PMA are defined in 120.1.1 and 176.1.1. The same terms are listed in 176.2, but the items in this larger list are terms for use only within Clause 176. The definition of BM-PMA and SM-PMA should remain in the subclauses listed above. But they should also be introduced Clause 169.

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

The terms BM-PMA and SM-PMA are defined in 120.1.1 and 176.1.1. The same terms are listed in 176.2, but the items in this larger list are terms for use only within Clause 176. The definition of BM-PMA and SM-PMA should remain in the subclauses listed above. But they should also be introduced Clause 169.

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

800GBASE-R BM-PMA and 800GBASE-R-SM-PMA are noted as optional in Tables 169-2, 169-3, and Table 169-3a, but that is not quite correct. They are conditional dependent on the PHY type and on whether specific AUIs are implemented or not.

Suggested Remedy

For 100Gb/s based PHYs the 800GBASE-R BM-PMA is mandatory, all AUIs are optional, and 800GBASE-R SM-PMA is "C" / conditional if either 800GAUI-4 is implemented. For 200Gb/s based PHYs the 800GBASE-R SM-PMA is mandatory, all AUIs are optional, and 800GBASE-R BM-PMA is "C" / conditional if either 800GAUI-8 is implemented.

Change entries as described above in Tables 169-2, 169-3 and 169-3a for 800GBASE-R BM-PMA and 800GBASE-R-SM-PMA to C / with notes as stated above.

Modify entry in Table 178-3 to 800BASE-R BM PMA to Conditional. Add note "c" A 800BASE-R BM-PMA must be implemented if a 800GAUI-8 C2C is implemented. Modify entry in Table 179-3 to 800BASE-R SM PMA to Conditional. Add note "c" A 800BASE-R SM-PMA must be implemented if a 800GAUI-4 C2C is implemented. Modify entry in Table 180-3 to 800BASE-R BM-PMA to Conditional. Add note "c" A 800BASE-R BM-PMA must be implemented if a 800GAUI-8 C2C/2CM is implemented. Modify entry in Table 181-3 to 800BASE-R BM-PMA to Conditional. Add note "c" A 800BASE-R BM-PMA must be implemented if a 800GAUI-8 C2C/2CM is implemented. Modify entry in Table 182-3 to 800BASE-R BM-PMA to Conditional. Add note "c" A 800BASE-R BM-PMA must be implemented if a 800GAUI-8 C2C/2CM is implemented. Modify entry in Table 183-1 to 800BASE-R BM-PMA to Conditional. Add note "c" A 800BASE-R BM-PMA must be implemented if a 800GAUI-8 C2C/2CM is implemented.

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

Some guidance as to when the two PMA types are used would be helpful. However, it is not as simple as proposed in the suggested remedy. Guidance is required for all PMAs used within the various xAUIs. Annex 176B provides all of the necessary guidance.

Each of the tables listing physical layer clauses associated with PMD types (e.g., Table 180-3 for 800GBASE-DR4) already include a reference to Annex 176B for the AUIs, but not for the two PMA types. Additional guidance in these tables would be helpful.

In the nomenclature tables in Clause 169 it is not necessary to repeat all of these details nor is there any space in these already crowded tables; instead it would be sufficient, efficient, and future-proof to point back to the PMD clauses for guidance.

For each new PMD (Clauses 178, 179, 180 to 183, 185, 186), update the PMD tables in the PMD clause and the associated nomenclature table in Clause 116, 169, and 174, similar to the following for the 800GBASE-DR4 defined in Clause 180.

In Table 180-1, for the 800BASE-R BM-PMA row, change "Optional" to "Conditional" with the following footnote:
"If one or two 800GAUI-n is implemented in a PHY, additional 800GBASE-R BM-PMA or SM-PMA sublayers are required according to the guidelines in Annex 176B.6.1."

Attach the same footnote to "Required" in the row for 800GBASE-R SM-PMA.

In Table 169-3:
In the cell (800BASE-DR4 row, 800GBASE-R BM-PMA column), change "O" to "C".
In footnote "a" add ". C = Conditional (refer to PMD clause for details)."

Implement with editorial license.

Proposed Response

PROPOSED ACCEPT.
### Comment 169 SC 169.1.4 P119 L19 #320

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

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

For **800GBASE-LR1 in Table 169-3a**

- 800GBASE-R BM-PMA is conditional, pending implementation of 800GAUI-8 C2C/C2M
- 800GBASE-R SM PMA is conditional, pending implementation of 800GAUI-4 C2C/C2M

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

**SuggestedRemedy**

- Change entries for 800GBASE-LR1 to C for 800GBASE-R BM-PMA and 800GBASE-R SM-PMA
- Add note "C= Conditional, 800GBASE-R BM-PMA is conditional, pending implementation of 800GAUI-8 C2C/C2M  
800GBASE-R SM PMA is conditional, pending implementation of 800GAUI-4 C2C/C2M"

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

**PROPOSED ACCEPT IN PRINCIPLE.**

Resolve using the response to comment #317.  
[Editor's note: Changed subclause from 169.1.3 to 169.1.4]

### Comment 169 SC 169.1.4 P119 L20 #77

**Huber, Thomas**  
Nokia

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

The 800GXS can contain AUIs - so the C2C and C2M clauses should be marked as optional for the ER1 and ER1-20 PHYs, as should the associated PMAs.

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

**Proposed Reject.**

The table references the optional 800GMII Extender which specifies the optional/condition AUIs and PMAs.

---

### Comment 169 SC 169.2 P119 L28 #E1B

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

**Comment Type** TR  
**Comment Status** D  
**Suggested Remedy**

In support of 200 Gb/s per lane signaling - 800GBASE-R BM-PMA, Clause 176 was developed. No addition was made to Clause 176 of the 800 GbE architecture.

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

**PROPOSED ACCEPT IN PRINCIPLE.**

The comment appropriately proposes to add the new PMA types defined in Clause 176 and to differentiate the two based on multiplexing type. It is not necessary to point out that they may both be referred to as PMA and in fact this could be considered incorrect, since any PMA in the 802.3 standard might be called a PMA.

Implement the following with editorial license:

Replace the second sentence in Clause 169.2.4 with appropriate editorial instructions to the following:

- The 800GBASE-R PMA that uses bit multiplexing (BM-PMA) is specified in Clause 173.
- The 800GBASE-R PMA, which uses symbol multiplexing (SM-PMA) is specified in Clause 176.

Implement with editorial license.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

Comment Type TR  Comment Status D  ER1 PHY (bucket)

800GBASE-ER1 and 800GBASE-ER1-20 use the Clause 186 800GBASE-ER1 PCS/PMA. This layer is not described as part of 169.2.

SuggestedRemedy
Create 169.2.4c 800GBASE-ER1 PCS/PMA
The 800GBASE-ER1 PCS performs encoding of data from the 800GMII, performs GMP mapping, applies FEC, and transfers the encoded data to the PMA. The 800GBASE-ER1 PMA sublayer performs the mapping of transmit and receive data streams between the PCS and PMA via the PMA service interface, and the mapping and multiplexing of transmit and receive data streams between the PMA and PMD via the PMD service interface. The 800GBASE-ER1 PCS is specified in Clause xxx.

PROPOSED ACCEPT IN PRINCIPLE.
Amend subclause 169.2.3 (from 802.3df) to the following with appropriate editorial instructions and mark-ups.
The PCS performs encoding of data from the 800GMII data into a form compatible with the PMA and PMD.
The 800GBASE-R PCS is specified in Clause 172.
The 800GBASE-ER1 PCS is specified in Clause 186.
Implement with editorial license.

Comment Status D  Response Status W

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

Proposed Response  Response Status W

PROPOSED ACCEPT IN PRINCIPLE.
Amend subclause 169.2.3 (from 802.3df) to the following with appropriate editorial instructions and mark-ups.
The PCS performs encoding of data from the 800GMII data into a form compatible with the PMA and PMD.
The 800GBASE-R PCS is specified in Clause 172.
The 800GBASE-ER1 PCS is specified in Clause 186.
Implement with editorial license.

Comment Type TR  Comment Status D  ER1 PHY (bucket)

A new 800GBASE-ER1 PCS is defined in clause 186. It should be mentioned in the introduction clause, 169.2.3 ("Physical Coding Sublayer (PCS)" in 802.3df) which currently only refers to the 800GBASE-R PCS.

SuggestedRemedy
Bring 169.2.3 into the draft and amend it to include the clause 186 PCS.

Proposed Response  Response Status W

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #319.

Comment Status D  Response Status W

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

Proposed Response  Response Status W

PROPOSED ACCEPT IN PRINCIPLE.
Figure 169-2b is correct as drawn, except that the PMA definition in the legend should be deleted.
However, this same figure is repeated in the 800GBASE-LR1 PMD clause. We should not be repeating figures. Since this form is unique to a single PHY type, not a family, it makes more sense to include the figure in the PMD clause.
Delete Figure 169-2b and instead include a reference to Figure 185-2 and Figure 185-3 in 169.3.2.
Also, in Figure 184-1 delete the PMA definition from the legend.
Implement with editorial license.

Comment Status D  Response Status W

Huber, Thomas  Nokia

Proposed Response  Response Status W

PROPOSED REJECT.
A similar diagram for 800GBASE-ER1 and 800GBASE-ER1-20 is provided in Clause 185 which specifies both of these PMD types. No other PMD is of this form so it is not necessary to show a common diagram in Clause 169.

SuggestedRemedy
Use figure 169-2b as a basis. Replace 800GBASE-R PCS with 800GBASE-ER1 PCS, 800GBASE-LR1 Inner FEC with 800GBASE-ER1 PMD, and 800GBASE-R PMD with 800GBASE-ER1 PMD (and of course renams all the service interfaces to align with that).

Proposed Response  Response Status W

PROPOSED REJECT.
A similar diagram for 800GBASE-ER1 and 800GBASE-ER1-20 is provided in Clause 185 which specifies both of these PMD types. No other PMD is of this form so it is not necessary to show a common diagram in Clause 169.

Comment Status D  Response Status W

Ran, Adee  Cisco

Proposed Response  Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Type: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
Comment Status: D/dispatched  A/accepted  R/rejected  RESPONSE STATUS: O/open  W/written  C/closed  Z/withdrawn
Sort Order: Clause, Subclause, page, line
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

**Comment Type: TR, Comment Status: D**

There is no figure describing 800GBASE-ER1/20 describing inter-sublayer service interfaces including 800GBASE-ER1 PCS/PMA.

**Suggested Remedy**

Add placeholder text for future text.

**Proposed Response**

PROPOSED REJECT.

Resolve using the response to comment #78.

---

**Comment Type: TR, Comment Status: D**

The comment refers to Table 169-4.

The Inner-FEC delay appears to be missing from the table.

**Suggested Remedy**

Add 800GBASE-R inner FEC (values are TBDs)

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

---

**Comment Type: T, Comment Status: D**

This sentence below the editor’s note is a repeat of what is captured in 171.3.2. It is also not related to “link fault signaling” as defined in 81.3.4, which is the topic of this subclause.

**Suggested Remedy**

Delete the sentence below the editor’s note.

**Proposed Response**

PROPOSED ACCEPT.
In tables 171-3 and 171-5, it is not clear what has changed in the rows that are shown.

**Suggested Remedy**
Indicate the changes with revision marks

**Proposed Response**  
PROPOSED REJECT.

Although it may be hard to see, the draft is following 802.3 editing guidelines. The thing that changed in tables 171-3 and 171-5 is that an "_" was added between "FEC_symbol_error_counter" and "<0:31>" in the status variable column. Being added text, the "_" is underlined in keeping with 802.3 editing convention. The missing underscore was missed in the 802.3df draft, including during the final publication review.

**Comment Status**  
D

**Response Status**  
W

---

The MDIO mapping table is different from Clause 175, it should use the new form that Clause 175 is using.

**Suggested Remedy**
Have Tables 171-5a through 171-5d use the same format as Clause 175

**Proposed Response**  
PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.

---

Although it may be hard to see, the draft is following 802.3 editing guidelines. The thing that changed in tables 171-3 and 171-5 is that an "_" was added between "FEC_symbol_error_counter" and "<0:31>" in the status variable column. Being added text, the "_" is underlined in keeping with 802.3 editing convention. The missing underscore was missed in the 802.3df draft, including during the final publication review.

---

The MDIO mapping table is different from Clause 175, it should use the new form that Clause 175 is using.

**Suggested Remedy**
Have Tables 171-5a through 171-5d use the same format as Clause 175

**Proposed Response**  
PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.

---

This list of interface widths has been traditionally included in "new ethernet rate introduction" clauses since 10 Gb/s Ethernet. It seems unnecessary and present an extra burden to amend with each new interface added. The number of lanes is abundantly clear in each clause that defines and interface. The original intent was to point out that the structural detail of the specified interfaces are to be as specified while others that are not are not specified.

**Suggested Remedy**
Delete the paragraph and lists from page 155 line 47 to page 156 line 12.

**Proposed Response**  
PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.
Pending discussion by the CRG.
The first subclause of Annex 174 is currently a mini "table of contents" of the clause. This isn't required.

Instead, an introduction to the annex would be helpful for readers. It should provide the relationship between bit error ratio as defined in the project's objective and the frame loss ratio, as well as the purpose of defining error requirements for internal interfaces within the physical layer.

**Suggested Remedy**

A presentation with proposed content is planned.

**Proposed Response**

Proposed ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the IEEE 802.3dj task force as the May Interim meeting.


Implement as follows with editorial license.

Updated Annex 174A as proposed on slides 8 to 13 of ran_3dj_04_2405 excluding option A in slides 11, 12, and 13.

Update clauses/annexes 120F, 120G, 171, 178, 179, 179D, 179E, 180 to 183, 185, 187 appropriately.

[Editor's note: CC many]

**Comment Status**

D

**Response Status**

W

**BER/FLR**

Ran, Adee
Cisco

**Proposed Response**

Delete 174A.3.

Proposed ACCEPT IN PRINCIPLE.

Resolve using the response to comment #205.

---

Since this annex defines several performance metrics, the titles of specific subclauses should be based on the sub-link in question, while the specific requirement (FLR, BER, etc.) should preferably be in the subclause text.

**Suggested Remedy**

A presentation with proposed content is planned.

**Proposed Response**

Proposed ACCEPT IN PRINCIPLE.

Resolve using the response to comment #205.
<table>
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<th>L</th>
<th>#</th>
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<td>539</td>
<td>36</td>
<td>192</td>
</tr>
<tr>
<td>Ran, Adee</td>
<td>Cisco</td>
<td></td>
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</tr>
<tr>
<td>Comment Type TR</td>
<td>Comment Status D</td>
<td>BER/FLR</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comment:** 174A.5 “Frame loss ratio for PHY” is empty.

Since this annex defines several performance metrics, the titles of specific subclauses should be based on the sub-link in question, while the specific requirement (FLR, BER, etc.) should preferably be in the subclause text.

**Suggested Remedy:**
A presentation with proposed content is planned.

**Proposed Response:** PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #205.

<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
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<td>169</td>
<td>1</td>
<td>332</td>
</tr>
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<td>de Koos, Andras</td>
<td>Microchip Technology</td>
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<td>Comment Type T</td>
<td>Comment Status D</td>
<td>timesync (bucket)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Has any thought been given to how to calculate the latency through the 1.6TBASE-R PCS, i.e., the path data delay values for the purposes of TimeSync?

I do not see anything within the 1.6TBASE-R PCS that would prevent proper calculation of the path data delay values.

Clause 90.7.1 is instructive here, explaining that the path data delays should be "reported as if the DDMP is at the start of the FEC codeword". However, the existing language in 90.7.1 is awkward for PCSs with more than one FEC engine like the 1.6TBASE-R PCS, which has four FEC codewords in parallel.

**Suggested Remedy:**
No proposed change to Clause 175.
Clause 90.7.1 could be cleaned up to account for when there are multiple FEC codewords in parallel, but I assume that is out-of-scope for the 802.3dj project? I'll submit a maintenance request.

**Proposed Response:** PROPOSED REJECT.
The suggested remedy does not propose an actionable (within the draft) remedy.
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Comment Type: T  Comment Status: D  (bucket)

Slavick, Jeff  Broadcom

The last sentence is giving the transcoded blocks sent to each flow a name. So it's not really make a flow of blocks. If anything it's making a series or stream of blocks.

Suggested Remedy:

Change the last sentence to read: "The transcoded blocks sent to flow 0 are referred to as tx_xcoded_f0<256:0> and the ones sent to flow 1 as tx_xcoded_f1<256:0>.

Proposed Response  Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Implement the following with editorial license.

Change:

"This creates two flows of transcoded blocks, tx_xcoded_f0<256:0> to flow 0, and tx_xcoded_f1<256:0> to flow 1."

to:

"This creates two streams of transcoded blocks, tx_xcoded_f0<256:0> to flow 0, and tx_xcoded_f1<256:0> to flow 1."

de Koos, Andras  Microchip Technology

Different scrambler seeds for the two flows are NOT strictly necessary for the 1.6TBASE-R PCS. The output PCSLs are never bit muxed, so having identical outputs from FEC A and FEC C, for example, should never have any adverse effect on "clock content" of the SerDes output.

It doesn't hurt to have the scramblers be seeded differently, however.

Suggested Remedy:

Consider changing the last sentence on page 173 from:

When reset is asserted, the two scramblers shall be initialized to a value other than zero and different from each other.

To:

When reset is asserted, the two scramblers shall be initialized to values other than zero.

(snuck in an editorial correction there, too!)

Proposed Response  Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #454.

Ofelt, David  Juniper Networks

The Editor's note at the end of subclause 175.2.4.5 "Scrambler" states that there are no requirements or restrictions in the 1.6TE PCS baselines for the scrambler seeds for each flow. The note also mentions that the corresponding sub-clause in 802.3df for 800GE PCS states that the two flows would have identical outputs if the seeds are identical and the data input is identical (such as after reset). The 1.6TE PCS does not have two separate sets of PCSLs like 800GE PCS, but the PCSL formation could have back-to-back repeating RS-symbol values if identical seeds are used. Suggest to require different seeds after reset in the scramblers of each flow as written in the paragraph above the editor's note.

Suggested Remedy:

Remove the editor's note at the top of page 174, and leave the wording in 175.2.4.5 as-is with the requirement that the two scramblers are initialized with different seeds.

Proposed Response  Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Delete the editor's note near top of page 174.

Opsasnick, Eugene  Broadcom

The Editor's note at the end of subclause 175.2.4.5 "Scrambler" states that there are no requirements or restrictions in the 1.6TE PCS baselines for the scrambler seeds for each flow. The note also mentions that the corresponding sub-clause in 802.3df for 800GE PCS states that the two flows would have identical outputs if the seeds are identical and the data input is identical (such as after reset). The 1.6TE PCS does not have two separate sets of PCSLs like 800GE PCS, but the PCSL formation could have back-to-back repeating RS-symbol values if identical seeds are used. Suggest to require different seeds after reset in the scramblers of each flow as written in the paragraph above the editor's note.

Suggested Remedy:

Remove the editor's note at the top of page 174, and leave the wording in 175.2.4.5 as-is with the requirement that the two scramblers are initialized with different seeds.

Proposed Response  Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Delete the editor's note near top of page 174.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

Cl 175 SC 175.2.4.6 P 174 L 42 # 864
Slavick, Jeff Broadcom
Comment Type T Comment Status D (bucket)
tx_am_sf doesn't allow but provides a way to communicate the mandatory degrade status.

Suggested Remedy
Change "allows the local PCS to communicate the status of the FEC degraded feature to the remote PCS" to "communicates the local PCS FEC degraded status to the remote PCS".

Proposed Response Response Status W
PROPOSED REJECT.
The draft is correct as written, and the proposed change does not improve clarity.

Cl 175 SC 175.2.4.6 P 175 L 22 # 853
Opsasnick, Eugene Broadcom
Comment Type T Comment Status D (bucket)
Sub-clause 172.2.4.6 has a reference to a text file containing the 800GBASE-R alignment marker values. CL 175 should add a similar note with a corresponding text file for the 1.6TBASE-R alignment markers.

Suggested Remedy
Add text near line 22: "NOTE A text file containing the alignment marker patterns, as shown in Table 175/1 is available at https://standards.ieee.org/downloads/802.3/.

A presentation will be submited with a corresponding text file containing the 1.6TBASE-R AM values.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.

Cl 175 SC 175.2.4.6 P 176 L 5 # 865
Slavick, Jeff Broadcom
Comment Type T Comment Status D (bucket)
am_mapped_f0 and am_mapped_f1 aren't solely based on the 10b-distribution and we never talk about how this two variables are us splitting the alingment marker group up.

Suggested Remedy
Change:
- The variables am_mapped_f0 and am_mapped_f1 are then derived from 10-bit interleaving the group of 16 alignment markers, am_x, using the following procedure:
- The alignment marker group is mapped into variables am_mapped_f0 and am_mapped_f1 as follows. First a 10-bit interleaving the group of 16 alignment markers, am_x, is done using the following procedure:

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.

Cl 175 SC 175.2.4.6 P 176 L 25 # 866
Slavick, Jeff Broadcom
Comment Type T Comment Status D (bucket)
am_mapped_f0 and am_mapped_f1 contain data that is sent into flow 0/1 and through codewords AB and CD.

Suggested Remedy
Change:
- Note that am_mapped_f0 contains the 10-bit symbols of FEC codewords A and B, and am_mapped_f1 contains the 10-bit symbols of FEC codewords C and D.
- Note that am_mapped_f0 is sent to flow 0 which produces FEC codewords A and B, and am_mapped_f1 is sent to flow 1 which produces FEC codewords C and D.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.
Add a intro to what tx_scrambled is.

**Suggested Remedy**

Change:

"The variables tx_scrambled_am_f0<10279:0> and tx_scrambled_am_f1<10279:0> are constructed in one of two ways."

To:

"In each flow a 10280-bit block of data is formed with two FEC codewords worth of message data, tx_scrambled_am_f0<10279:0> in flow 0 and tx_scrambled_am_f1<10279:0> in flow 1 and they are constructed in one of two ways."

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

---

The counters for correctd, uncorrected and error have always been mandatory, while the cw counter and bin counters have been optional. So Should is not appropriate.

**Suggested Remedy**

Change:

"The following counters should be implemented to aid a network operator in determining the link quality."

To:

"The PCS provides the following counters that track FEC decoder statistics."

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

There is a list of 5 FEC counters in 175.2.5.3.

The first three are definitely required (as they were also required in CL 91, 108, 119, 134, and 172) which makes the "should" wording incorrect.

(FEC_corrected_cw_counter, FEC_uncorrected_cw_counter, and FEC_symbol_error_counter_i)

The 4th and 5th counters (FEC_cw_counter and FEC_codeword_error_bin_i) are explicitly "optional" in 161.6.21, 172.3.5 and 172.3.6.

The importance of these counters is well recognized in the industry so should be mandatory for the 1.6TBASE-R PCS

Make all 5 counters required for the 1.6TBASE-R PCS.

Implement with editorial license.

Pending CRG discussion.

---

The Note about tracking statistics across all 4 decoders is missing from the bin counter.

**Suggested Remedy**

Add this to the definition of the FEC_codeword_error_bin_i

"Note that this counter tracks codewords with errors across all four codewords."

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

---

Annex 175A contains tabular data for an example created by the 1.6TBASE-R PCS TX functions, including the scrambler output, RS-FEC codeword generation, and PCS lane interleaving. The editor's note on page 539 has a placeholder for a link to a text file that has the machine readable text data. That data file needs to be created.

**Suggested Remedy**

A presentation is planned to submit a data file which corresponds to the Annex 176A example and can be referenced in the editor's note

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.


Implement with editorial license.
Has any thought been put into how to calculate the path data delay values (MII-MDI latencies for timestamping) for the SM-PMAs? For bit-mux PMAs, it is very simple - i.e. it is all implementation delay, since the intrinsic delay from bit muxing/demultiplexing is negligible. But at first glance, determining the latency across the Clause 176 PMA looks like more of a challenge.

a. I don't believe that the intrinsic (i.e. non-implementation) delay is deterministic, due to the partial deskew.

b. But apart from the partial deskew, the latency across the SM-PMA should be deterministic using the principles in Annex 90A.7 (max latency value used for Tx path data delay, min latency value used for Rx path data delay).

c. Traditionally, how to calculate the delays through the PHY layers has been an implementation concern, but this is because the calculation was straightforward at lower rates. At 200Gbps lanes, the standard does not have the luxury of being able to ignore this. If it is overly complicated or ambiguous, and opposite ends of a link do not implement it in the same fashion, the system Time Synchronization will be impaired.

**Suggested Remedy**

Consider a note in Clause 176 (or next to the PMA path data delay MDIO registers - 45.2.1.176, 45.2.1.177) that the path data delay values for the SM-PMA should be calculated via the method in Annex 90A.7.

I don't think it is necessary, but if a more detailed explanation is deemed useful, then a subclause could be added to Clause 90.7 spelling out explicitly how the path data delay values should be calculated for the SM-PMA.

**Proposed Response**

PROPOSED REJECT.

It is not helpful to sprinkle notes related to time synchronization throughout the various sublayer clauses; this was not done in previous clauses/projects. Rather it would be preferable to add the necessary text into Clause 90/Annex 90A. A consensus presentation with a complete proposal is encouraged.

In this section, precoding is mentioned to CR, KR and C2C links. How about C2M link? It should add C2M since C2M LT session specifies precoding as one of the options.

**Suggested Remedy**

Add C2M link into the statement: ôThe precoding specifications in this subclause apply to the input and output lanes of a PMA that are connected to the service interface of an xBASE-CRn or xBASE-KRn PMD, or are part of an xAU-n C2C/C2M link.ö

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Background and proposed changes are provided in the the "Precoding" slides in following editorial presentation for CRG review.

**Proposed Response Response Status W**

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

It is not respectively necessary here? X is just a list of different rates.

**Suggested Remedy**

remove the ", respectively,"

**Proposed Response Response Status W**

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.
Cl 176 SC 176.2 P'197 L 3 # 173
Slavick, Jeff Broadcom
Comment Type E Comment Status D (editorial)
Is respectively necessary here? X is just a list of different rates.
Suggested Remedy
remove the "," respectively"
Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Implement with editorial license and discretion.

Cl 176 SC 176.5.1.1 P'200 L 1 # 533
Rechtman, Zvi Nvidia
Comment Type TR Comment Status D DelayOddPCSLs (bucket)
The comment refers to Figure 176a2. The functions of "Delay odd PCSLs by 2 RS-FEC codewords" on Tx path and "Delay even PCSLs by 2 RS-FEC codewords" can be misleading, as they could be interpreted as a delay by 10,880 symbols. The intention is to delay the odd (Tx) and even (Rx) PCSLs by 136 symbols in order to get multiplex and demultiplex symbols from different 2 RS-FEC CWs.
Same apply to Figure 176a9
Suggested Remedy
Modify the description in the Tx path box from "Delay odd PCSLs by 2 RS-FEC codewords" to "Delay odd PCSLs by 136 symbols" and in the Rx path box from "Delay even PCSLs by 2 RS-FEC codewords" to "Delay even PCSLs by 136 symbols"
Proposed Response Response Status W
PROPOSED REJECT.
The function in Fig 176a2 uses the words "2 RS-FEC codewords" as opposed to "136 RS-FEC symbols" because the function aims to align the 2 codewords on even lanes with 2 different codewords on odd lanes by delaying odd lanes by 2 codewords. This enables symbol multiplexing across 4 codewords. Same applies to Fig 176a9, 176a11 and 176a13. While it is not inaccurate to call it a "136 symbol delay", an advantage of using "2 RS-FEC codewords" as opposed to "136 symbols" is that the function name is equally applicable to both 200GE and 400GE SM-PMAs. Moreover, the first line of subclause 176.5.1.3.4 clearly specifies the delay as being 136 RS-FEC symbols, and the subsequent line shows this mathematically as "2 codewords × 136 symbols per codeword / 8 PCS lanes = 136 symbols." Similarly, subclause 176.6.1.2.4 (400GE 16:2 PMA) specifies the delay to be 68 symbols. Hence, the delay value is clearly specified and there is no room for misinterpretation.
The comment proposes an alternate description which is technically correct but does not improve the accuracy or readability of the standard.
Cl 176 SC 176.5.1.1 P 200 L 11 # 567
He, Xiang Huawei
Comment Type TR Comment Status D Deskew
20b deskew is incorrect. According to Motion #10 in https://www.ieee802.org/3/dj/public/23_07/motions_3cwfdj_2307.pdf, it is required to deskew to codeword boundaries.
Suggested Remedy
Change "20b deskew" to "deskew to codeword boundaries" or simply "deskew"
Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment # 368

Cl 176 SC 176.5.1.1 P 200 L 35 # 579
Slavick, Jeff Broadcom
Comment Type E Comment Status D (editorial)
test pattern generate is overlapping with the IS_SIGNAL_request line in Figure 176a2
Suggested Remedy
Move "test pattern generate" to not overlap with the inst.IS_SIGNAL.request/indication line
Same in Figure 176a9,10,13,14,15,19,20,24,25,26
Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Implement with editorial license and discretion.

Cl 176 SC 176.5.1.1 P 200 L 35 # 578
Slavick, Jeff Broadcom
Comment Type E Comment Status D (editorial)
test pattern generate is overlapping with the IS_SIGNAL_request line in Figure 176a2
Suggested Remedy
Move "test pattern generate" to not overlap with the inst.IS_SIGNAL.request line
Same in Figure 176a9,10,13,14,15,19,20,24,25,26
Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Implement with editorial license and discretion.
Skew in series within the PHY sub-layers may not have deterministic sum, making accurate path data delay calculation impossible. See Annex 90A.6 for a more detailed explanation.

Towards the MDI, the transmit SM-PMA function should thus have the option to undo any skew introduced by the Tx PCS layer and AUI links, (i.e. do a full de-skew).

In the Rx direction, the same problem exists. If the SM-PMA does not do a full deskew, then the remaining skew, in series with skew from other layers in the PHY (from AUIs, for example) and from the medium, will have a non-deterministic sum.

Adding an option for the SM-PMA to do a full deskew (not just a 20/40-bit deskew) would be a way to allow implementations to avoid the TimeSync impairment due to skew between the PHY layers.

This is a lot to digest - I can present the reasoning here if leadership thinks it would be worthwhile.

Suggested Remedy
Consider requiring (or allowing as an option) a full deskew instead of the 20/40 bit deskew in clauses (176.5.1.3.1, 176.6.1.2.1, 176.7.1.2.1, 176.8.1.2.1).

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #594.

Functionally, is there anything preventing the SM-PMAs from performing a full deskew instead of only to 20/40-bit boundaries?

A full deskew at the SM-PMA would NOT change end-to-end latency, since the skew is ultimately undone at the Rx PCS.

Keeping the PMA as light as possible (less buffering required) is OK, but if an implementation chooses to do so, performing a full deskew (i.e. to AMs, or CW boundaries) should be allowed for both Rx and Tx.

Suggested Remedy
Add the following note the 20/40 bit deskew clauses (176.5.1.3.1, 176.6.1.2.1, 176.7.1.2.1, 176.8.1.2.1):

Full deskew (to AM boundaries) of PCSLs may optionally be performed by the SM-PMA transmit function.

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Remove the text "(up to 19 bits on any given lane)" from 176.5.1.3.1.
Remove the text "(up to 39 bits on any given lane)" from 176.8.1.2.1.
Implement with editorial license.
For the 800GBASE-R and 1.6TBASE-R PMAs, the 20bit and 40bit deskew provides sufficient alignment to ensure 4 Codeword interleaving on output lane of the PMAs and therefore no changes to the deskew function are required.

Resolve using the response to comment #368

Comment Type T  Comment Status D

There is reference in the text to lock process in Figure 119-12. However, there are exceptions to Figure 119-12 as outlined in 176.5.1.6.

It can be beneficial to refer to 176.5.1.6 which include both the reference to Figure 119-12 and the list of exceptions list

Suggested Remedy
Add a reference to 176.5.1.6 instead of Figure 119-12

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

Add note in parenthesis "(see 176.5.1.6.4)" after Fig 119-12.

Implement with editorial license.

Comment Type T  Comment Status D

There is more details to the AM lock function add a reference

Suggested Remedy
add a "(see 175.5.1.6.4)" after Table 119-1

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #534.

[Editor’s note: Changed clause, subclause from 175, 175.5.1.3.1 to 176, 176.5.1.3.1]
The SM-PMA adds a lot of latency due to the 2x RS-FEC CW delay in the 8:1 and 16:2 SM-
PMAs, as compared to the bit-mux PMAs.
For setups with an MII-Extender it is actually worse, since the penalty would also exist
between the DTE_XS and PHY_XS. If latency is a concern, it actually becomes preferable
to use 100Gbps links for the DTE_XS <-> PHY_XS AUI interface, negating the advantages
of 200Gbps links!
The latency penalty for the 8:1 and 16:2 PMAs should be noted in Clauses 176.5.1.3.4 and
176.6.1.2.4.

Suggested Remedy
Add the following note to the 2xFEC CW delay sub-clauses (176.5.1.3.4 and 176.6.1.2.4):
Note that the delay added to the odd PCSLs (and to the even PCSLs at the far-end)
causes an end-to-end latency increase of 51.4ns as compared to BM-PMAs.

PROPOSED REJECT.
The standard is not expected to note pros and cons of one PMA versus another (in this
case the latency of SM-PMA versus a BM-PMA).
The comment proposes a change that does not improve the clarity or accuracy of the draft.

For Figure 176-5, it has to be explained what AÆ/BÆ shall be.

Suggested Remedy
Add an explanation for AÆ/BÆ, e.g. “AÆ/BÆ are the symbols from previous 2 CWs that
are delayed”

PROPOSED ACCEPT IN PRINCIPLE.
Update the text referencing Fig 176-5 (in 176.5.1.3.4) to state that RS-FEC symbols A and
A’ belong to different codewords from FEC-A, and B and B’ belong to different codewords
from FEC-B.
Implement with editorial license.
Comment Type: T

Comment Status: D

Comment: The comment refers to Figure 176-5.

The diagram represents a specific skew case between PCS lanes. For instance, in the absence of skew between the PCS lanes in the PMA:IS_UNITDATA_0:7.request primitive, the first symbol of A' of the odd PCS lane should be marked as A'' because of the additional one symbol delay prior to the 136 symbols delay.

Suggested Remedy:
- Option 1: Modify only the first A' symbol of the odd PCS lanes to be A''.
- Option 2: Split the drawing into two: one for 200GBASE-R and another for 400GBASE-R. Then, add index numbers to the A, B, A', B' symbols. This could make it easier to understand the drawings and the roles of the symbols in each context.

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

Comment Status: D

Comment: It's a multiplexor or a multiplexing function.

Suggested Remedy:
- Add the word function after multiplexing.

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

Comment Status: D

Comment: In Figure 176-6, the output lane arrow is indicated in the opposite direction than the actual transmission order of the output PCSL symbols.

Suggested Remedy:
- Change the direction of the arrow to follow the actual transmission order.

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

Comment Status: D

Comment: Is there anything preventing an implementation from performing a full deskew at the Rx PMA? It is not technically required, but does not cause any adverse functional effects. A full deskew at the Rx SM-PMA would NOT change end-to-end latency, since the skew is all ultimately undone at the Rx PCS. A deskew upstream would simply offload the deskew from the Rx PCS. Implementations with a SM-PMA attached to an RxPCS will undoubtedly perform the Alignment marker lock only once (not once in the PMA and again in the PCS). AM-lock plus deskew is a very natural coupling of functions.

Suggested Remedy:
- Consider adding the following note to the Rx Alignment marker lock clauses (176.5.1.4.2, 176.6.1.3.2, 176.7.1.3.2, 176.8.1.3.2):
  - After the Alignment Marker lock, no deskew of the PCSLs is required. However, deskewing the PCSLs before the lock would not have and adverse functional effects.

Proposed Response: PROPOSED REJECT.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

Cl 176 SC 176.5.1.5 P205 L20 # 384
Slavick, Jeff
Comment Type E Comment Status D
Detailed functions and state diagrams has no content

Suggested Remedy
Change 176.5.1.6 to be a sub-heading of 176.5.1.5 (4th tier I think).

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Implement with editorial license and discretion.

Cl 176 SC 176.5.1.6.1 P205 L31 # 385
Slavick, Jeff
Comment Type T Comment Status D
The Variables state that these all of them, not inheriting Cl119 functions except for some replacements.

Suggested Remedy
Copy Figure 119-12 into Cl 176 and modify it to use:
restart_lock_dir **with dir in italics **
amps_lock_dir **with dir in italics **
pcs_lane_mapping_dir **with dir in italics **
add a NOTE that italics dir is either mux or demux

In Variables, Constants and Counters sections define everything that is used, referring to Cl 119 when possible.

Change reference to Figure 119-12 to point to the new figure.

With editorial licence

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment # 80.

Cl 176 SC 176.5.1.6.4 P206 L38 # 374
Slavick, Jeff
Comment Type T Comment Status D
Figure 119-12 uses functions and variables defined in CL119 but those aren't called out to be used, just that restart_lock_mux is used to replace restart_lock

Suggested Remedy
add "using the state variables defined in 119.2.6.2" after Table 119-1 with editorial license

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

Cl 176 SC 176.5.1.6.5 P206 L48 # 377
Slavick, Jeff
Comment Type T Comment Status D
Figure 119-12 uses functions and variables defined in CL119 but those aren't called out to be used, just that restart_lock_mux is used to replace restart_lock

Suggested Remedy
add "using the state variables defined in 119.2.6.2" after Table 119-1 with editorial license

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.
### IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

#### Comment #483

**Comment Type:** E  
**Comment Status:** D (editorial)  
**Slavick, Jeff**  
**Broadcom**  

**Comment:** I think it's best if the Start of the counter is the last thing in the Box  

**Suggested Remedy:**  
Move "Start symbol_pair_lock_counter_demux" to be the last thing in LOSS_OF_SYMBOL_PAIR_LOCK box  

**Proposed Response:**  
PROPOSED ACCEPT IN PRINCIPLE.  
Implement with editorial license and discretion.

---

#### Comment #482

**Comment Type:** T  
**Comment Status:** D (bucket)  
**Slavick, Jeff**  
**Broadcom**  

**Comment:** Counter_done needs to be at the end of the counter name.  

**Suggested Remedy:**  
Change symbol_pair_lock_counter_done_demux to symbol_pair+lock_counter_demux_done  

**Proposed Response:**  
PROPOSED ACCEPT IN PRINCIPLE.  
In Fig 176-8, change "symbol_pair_lock_counter_done_demux" to "symbol_pair_lock_counter_demux_done", Remove the definition of the variable "symbol_pair_lock_counter_done_demux" from 176.5.1.6.1. Implement with editorial license.

---

#### Comment #378

**Comment Type:** T  
**Comment Status:** D (bucket)  
**Ofelt, David**  
**Juniper Networks**  

**Comment:** Should there be an arc from ALIGNMENT_FAIL to LOSS_OF_ALIGNMENT?  

**Suggested Remedy:**  
If so, add the arc  

**Proposed Response:**  
PROPOSED REJECT.  
In the ALIGNMENT_FAIL state, restart_lock_mux is set to true which results in AM lock process of Fig 119-12 to be restarted on all lanes. This results in all_locked_mux to be set to false, which causes the state machine of 176-7 to go from ALIGNMENT_FAIL to LOSS_OF_ALIGNMENT state.

---

## Additional Comments

**Comment #538**  
**Comment Type:** TR  
**Comment Status:** D Reorg  
**Rechtman, Zvi**  
**Nvidia**  

**Comment:** The comment refers to Figure 176û8ùPMA receive symbol-pair lock state diagram. The state diagram is defined as single state machine per the entire PMA. However, each PMA lane may have a different reference skew, leading to varying SLIP operation requirements per PMA lane (e.g. one PMA lane doesn't require SLIP because all PCS lanes of that lane are locked, but other PMA lane still need to skew to find the 20 symbol bit boundaries) therefore the state diagram should be define per PMA lane and not for per PMA.  

**Suggested Remedy:**  
Modify the state diagram per PMA lane and not per PMA, this include change in the variables to be defined per <y>:  
restart_lock_demux<y>  
symbol_pair_lock_demux<y>  
start_symbol_pair_lock_counter_demux<y>  
symbol_pair_lock_demux<y>  

**Proposed Response:**  
PROPOSED ACCEPT IN PRINCIPLE.  
Resolver using the response to comment # 80.

---

**Comment #601**  
**Comment Type:** E  
**Comment Status:** D (editorial)  
**de Koos, Andras**  
**Microchip Technology**  

**Comment:** Is specifying the 1:8 SM-PMA really necessary? Apart from the layers it attaches to and the labels on the interfaces, it is identical to the 8:1 PMA.  

**Suggested Remedy:**  
Consider specifying the 1:8 and 8:1 (and equivalent SM-PMAs for other rates) together.  

**Proposed Response:**  
PROPOSED ACCEPT IN PRINCIPLE.  
Implement with editorial license and discretion.
### IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

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**Comment Type:** E  **Comment Status:** D  (editorial)

Would it not be possible to merge Clause 176.5 and 176.6? They are 95% similar, so repeating everything is hardly necessary.

Even the figures for 200GBASE-R SM-PMA (Figure 176û3, Figure 176û4, Figure 176û5) have a general form with a variable number of PCSLs that are suitable for 400GBASE-R

**Suggested Remedy:**

Consider merging subclauses 176.5 and 176.6

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

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

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**Comment Type:** E  **Comment Status:** D  (editorial)

Clauses 176.6, 176.7 and 176.8 are missing the 'overview' sub-clauses (with tables) that exist in Clause 176.5 (e.g. 176.5.1.1). The equivalent content is there but is placed directly in each PMA sub-clause (e.g. 176.6.1)

**Suggested Remedy:**

Structure the subclauses consistently between 200GBASE-R and 400GBASE-R, 800GBASE-R, 1.6TBASE-R.

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

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

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**Comment Type:** TR  **Comment Status:** D  **DelayOddPCSLs (bucket)**

The comment refers to Figure 176û11.

The functions of "Delay odd PCSLs by 2 RS-FEC codewords" on Tx path and "Delay even PCSLs by 2 RS-FEC codewords" can be misleading, as they could be interpreted as a delay by 10,880 symbols.

The intention is to delay the odd (Tx) and even (Rx) PCSLs by 68 symbols in order to get multiplex and demultiplex symbols from different 2 RS-FEC CWs.

Same apply to Figure 176û13

**Suggested Remedy:**

Modify the description in the Tx path box from "Delay odd PCSLs by 2 RS-FEC codewords" to "Delay odd PCSLs by 68 symbols" and in the Rx path box from "Delay even PCSLs by 2 RS-FEC codewords" to "Delay even PCSLs by 68 symbols"

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

PROPOSED REJECT.

Resolve using the response to comment #533.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

---

Cl 176  SC 176.6.1.2.1  P 215  L 22  # 186
Slavick, Jeff  Broadcom

Comment Type  T  Comment Status  D  Reorg
The deskew process doesn’t need an exception since the referred texts says to do it across “ALL” PCSLs

Suggested Remedy
Remove the deskew across 16 lanes exception in 176.6.1.2.1
Remove the deskew across 32 lanes exception in 176.7.1.2.1

Proposed Response  Response Status  W
Resolves the response to comment # 80.

Cl 176  SC 176.6.1.2.5  P 216  L 1  # 290
Galan, Jose Vicente  Maxlinear Inc

Comment Type  T  Comment Status  D  Figures (bucket)
In Figure 176-12, the output lane arrow is indicated in the opposite direction than the actual transmission order of the output PCSL symbols

Suggested Remedy
Change the direction of the arrow to follow the actual transmission order.

Proposed Response  Response Status  W
Proposed Accept In Principle.
Update Fig 176-12 to clarify the order of transmission on the output lane, with editorial license.

Cl 176  SC 176.7.1.2.2  P 223  L 39  # 559
Opsasnick, Eugene  Broadcom

Comment Type  T  Comment Status  D  Figures (bucket)
In Figure 176-16 and Figure 176-17, on the following page, the symbol pattern of the even PCSLs in the upper half (PCSL 16-31) is not shown. It would be easier to see the RS symbol patterns if the figures included at least one even PCSL in the range of 16-31.

Suggested Remedy
These two figures show PCSLs for lanes 0.1, and 31. Suggest to show the PCSL symbol pattern for lanes 0.1, 15, 16, 17,31.

Proposed Response  Response Status  W
Proposed Accept In Principle.
Implement the suggested remedy with editorial license.

Cl 176  SC 176.7.1.2.2  P 223  L 52  # 593
de Koos, Andras  Microchip Technology

Comment Type  T  Comment Status  D  Figures (bucket)
The 800GBASE-R PCS has 4 FEC engines, so figures 176û16, 176û17, 176û18 should use C,D to illustrate the symbols on PCSLs 16-31, rather than A’,B’. The A’,B’ notation is used in 200GBASE-R and 400GBASE-R figures to denote CWs from engines A and B but with the 2CW delay.

Suggested Remedy
Amend Figures 176û16, 176û17, 176û18 to avoid the A’,B’ notation

Proposed Response  Response Status  W
Proposed Accept In Principle.
Clause 176 avoids using “C” or “D” for 800BASE-R PMAs because Clause 172 (800BASE-R PCS) does not use FEC-C and FEC-D. Whereas, “C” and “D” are used in 1.6TBASE-R PMAs because Clause 175 (1.6TBASE-R PCS) uses FEC-C and FEC-D.
However, the clarity of the draft will be improved by defining what A, B, A’, B’ are in the figures Fig 176-16, 176-17 and 176-18.
Therefore, implement the following:
Update the text referencing figures Fig 176-16, Fig 176-17 and 176-18 (in 176.7.1.2) to state the RS-FEC symbols A and B are from FEC-A and FEC-B in flow 0 of the 800GBASE-R PCS, while the RS-FEC symbols A’ and B’ are from flow 1 of the 800GBASE-R PCS.
Implement with editorial license.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

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Galan, Jose Vicente  
Maxlinear Inc

Comment Type: T  
Comment Status: D  
Figures (bucket)

In all Figures in the 800G PMA section, it is referred to AÆ/BÆ symbols, although we have 4 RS CWs

Suggested Remedy

Change to use A, B, C, D for the 4 RS CWs, instead of A, B, AÆ, BÆ

Proposed Response  
Response Status: W  
PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #593

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Galan, Jose Vicente  
Maxlinear Inc

Comment Type: T  
Comment Status: D  
Figures (bucket)

In Figure 176-18, the output lane arrow is indicated in the opposite direction than the actual transmission order of the output PCSL symbols

Suggested Remedy

Change the direction of the arrow to follow the actual transmission order.

Proposed Response  
Response Status: W  
PROPOSED ACCEPT IN PRINCIPLE.

Update Figure 176-18 to clarify the order of transmission on the output lane, with editorial license.

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Slavick, Jeff  
Broadcom

Comment Type: E  
Comment Status: D  
(editorial)

test pattern check is overlapping with IS_SIGNAL.request

Suggested Remedy

Move "test pattern check" to no overlap with IS_SIGNAL.request in Figure 176-21

Proposed Response  
Response Status: W  
PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

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Rechtman, Zvi  
Nvidia

Comment Type: TR  
Comment Status: D  
Precoding

The text currently refers to xAUI-n C2C. However, the adopted PMA baseline proposal stated that the ÆPrecoding capability in all physically instantiated interfaces is Tx: required, Rx: optionalÆ. (per ran_3dj_01a_2303 slide 10). This specification should also encompass xAUI-n C2M.

Suggested Remedy

Add xAUI-n C2M

Proposed Response  
Response Status: W  
PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #21

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Rechtman, Zvi  
Nvidia

Comment Type: T  
Comment Status: D  
Precoding

The paragraph refers only to the case of PMD control function operation, need to refer to Annex 176A for all electrical interfaces.

Suggested Remedy

Replace:
"If the PMA is connected to the service interface of an xBASE-CRn or xBASE-KRn PMD and training is enabled by the management variable mr_training_enable (see 136.7), then recoder_tx_out_enable_i and precoder_rx_in_enable_i shall be set as determined by the PMD control function in the LINK_READY state on lane i (see 136.8.11.7.5 and Figure 136û7). The method by which the MD control function affects these variables is implementation dependent."

With:
"If the PMA support the Control function and start-up protocol for electrical interfaces and training is enabled by the management variable mr_training_enable (see Annex 176A), then precoder_tx_out_enable_i and precoder_rx_in_enable_i shall be set as determined by the control function in the LINK READY state on lane i (see 176A.10.4 and Figure 176Aû6). The method by which the PMA control function affects these variables is implementation dependent."

Proposed Response  
Response Status: W  
PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #21
## Comment

### Comment Type: T

A similar subclause has traditionally been included in the PMA subclauses, defining the skew at each instantiated interface from the PMD to the PCS. Until now, there was only one type of PMA for each Ethernet rate. Now we have two types defined in two separate clauses for 200G, 400G, and 800G. A rate-neutral and type-neutral specification is required. This seems beyond a subclause in Clause 176.

### Suggested Remedy

Create a new annex (or perhaps a subclause in 176B) used to define the skew and skew relationships through the PHY sublayer stack. A presentation supporting this will be provided.

### Proposed Response

**Response Status:** W

PROPOSED ACCEPT IN PRINCIPLE.

A presentation to address this comment is expected.

URL: [brown_3dj_03_2406](#)

[Editor's note: CC many]

---

### Comment

### Comment Type: T

Annex 176C "SM-PMA test vectors" is currently empty.

### Suggested Remedy

Add test vectors for 200GBASE-R 8:1, 400GBASE-R 16:2, 800GBASE-R 32:4, and 1.6TBASE-R 16:8 to Annex 176C based on supporting contribution on May interim.

### Proposed Response

**Response Status:** W

PROPOSED ACCEPT IN PRINCIPLE.

Pending CRG review of presentation and discussion.

---

### Comment

### Comment Type: T

The annex title includes "Control function and start-up protocol", while in the subclauses and text there are alternative terms such as "interface control function", "Start-up protocol", and "training" (176A.9).

This mega-function requires nomenclature to describe it. It would be good to have an acronym-friendly name so that it can be included in tables of other clauses (e.g. Table 116-3, Table 179-1).

### Suggested Remedy

A presentation with proposed nomenclature is planned.

### Proposed Response

**Response Status:** W

PROPOSED ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the 802.3dj task force at the May Interim meeting:


May Interim Straw poll # has the following results:

Straw Poll #4

The nomenclature that I prefer for function defined in Annex 176A is:

A. "Inter-sublayer link training" (ILT or ISLT)

B. "Sublink training" (SLT)

Results (all): A: 81, B: 5

See:


Update the draft such that references to the link training function (AKA control function) use the following name and acronym instead: "inter-sublayer link training" "ILT".

Implement with editorial license.

[Editor's note: The comment type was change from ER to T as it was deemed somewhat technical.]
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

Cl 176A  SC 176A  P 555  L 29  # 146
Simms, William  NVIDIA

Comment Type  E  Comment Status  D
Note in table 176A-3 that 010, 011, 100 are undefined/invalid

Suggested Remedy

3 states of Coefficient select echo are undefined

PROPOSED ACCEPT IN PRINCIPLE.
Implement with editorial license and discretion.

———

Cl 176A  SC 176A.1  P 548  L 12  # 577
Law, David  HPE

Comment Type  TR  Comment Status  D
The use of the terms 'segment' and 'link' in Annexe 176A, for example in 176A.1 where it says, 'in single-segment or multiple-segment links', are problematic.

IEEE Std 802.3 subclause 1.4.505 'segment' defines it as 'The medium connection, including connectors, between Medium Dependent Interfaces (MDIs) in a CSMA/CD local area network.' Subclause 1.4.372 'link' defines it as 'The transmission path between any two interfaces of generic cabling. (From ISO/IEC 11801.)'.

As a result, I believe it would only be correct to call an electrical channel between two PMD sublayers a 'segment'. I do not believe that the electrical channel between any other combinations of sublayers is a 'segment'.

Suggested Remedy

I would suggest 'section' as an alternate to 'segment', but that was used for 'The portion of the link between the PSE Power Interface (PI) and the PD PI.' (see 1.4.378) when PoE had a similar definition problem. Alternatives, therefore, might be 'Division' and 'Sector'.

As another approach, the following is a rewording of 176A.1 to avoid the use of the terms 'segment' and 'link' without the use of a new term. I acknowledge, however, that such an approach would require a significant rewrite of the Annexex.

The start-up protocol facilitates timing recovery and equalization of the electrical channel between adjacent sublayers, or chains of multiple adjacent sublayers while providing a mechanism through which the receiver can configure the transmitter to optimize performance. The protocol supports these functions through the continuous exchange of fixed-length training frames across the electrical channel between adjacent sublayers and the transport of end-to-end indications across chains of multiple adjacent sublayers.

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.
The following contribution was reviewed by the 802.3dj Task Force during the May 2024 Interim meeting https://www.ieee802.org/3/dj/public/24_05/law_3dj_01_2405.pdf
Implement the following with editorial license.
Replace "segment" with "section" and "link" with "path"
Comment Type: ER  Comment Status: D (editorial)

"tx_symbol and rx_symbol variables" do not appear in this annex. They are in fact parameters of the service interface primitives of the sublayer that implements the control function.

SuggestedRemedy

Tie the text defining the symbols to the service interface of the sublayer.

Proposed Response

Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

---

Comment Type: T  Comment Status: D

Subclause 176A.2.2 'Control and status fields' says that 'The control field comprises 16 bits with the structure defined in 176A.3.'; yet figure 176Aû1 'Training frame structure' above shows the control field comprising of 16 cells. It, therefore, appears that the field is comprised of 16 cells that convey 16 bits.

SuggestedRemedy

[1] Change the first paragraph of 176A.2.2 to read 'The control field is comprised of 16 cells which convey 16 bits with the structure defined in 176A.3. The status is comprised of 16 cells which convey 16 bits with the structure defined in 176A.4.'

[2] Change the last sentence of the penultimate paragraph of 176A.2.2 to read 'Within each field, the order of transmission is from bit 15 to bit 0, conveyed by cell 15 to cell 0 respectively.'.

Proposed Response

Response Status: W

PROPOSED REJECT.

The cell concept is described in detail in the following paragraph (second paragraph of 176A.2.2). Note that the text is identical to the text in 136.8.11.1.2.

Text is correct as written, proposed remedy does not improve the clarity of the draft.

---

Comment Type: T  Comment Status: D

Subclause 176A.2.2 says '... if a violation of the DME encoding rules is detected within the control field or the status field, the contents of both fields in that frame are ignored.' If this is requirement, suggest it should be stated using a 'shall' statement.

SuggestedRemedy

Change '... the contents of both fields in that frame are ignored.' to read '... the contents of both fields in that frame shall be ignored.'.

Proposed Response

Response Status: W

PROPOSED REJECT.

Note that this text is identical to the text in 136.8.11.1.2.

Text is correct as written, proposed remedy does not improve the clarity of the draft.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

Cl 176A SC 176A.2.3.2 P552 L 14 # 199
Ran, Adee Cisco
Comment Type TR Comment Status D ILT Pattern (Bucket)

"The default identifier for each lane is its lane number (e.g., the default value for identifier_0 is 0 which selects polynomial_0)"

Some interfaces have 8 lanes.

The default mapping provided in Table 176A1 can be used instead.

Suggested Remedy
Change to "The default identifier for each lane is the same as that of the PRBS13 function, as shown in Table 176A-1".

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Implement the following with editorial license.
Change: "The default identifier for each lane is its lane number"
To: "The default identifier for each lane is the same as that shown in Table 176A-1"

Cl 176A SC 176A.2.3.2 P552 L 26 # 194
Slavick, Jeff Broadcom
Comment Type T Comment Status D ILT Pattern (Bucket)
The PRBS gen should "stop" if training stops.

Suggested Remedy
Add "while training is in progress while this mode is selected" after "is not stopped or reset".

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Implement the following with editorial license.
Add "while training is in progress and this mode is selected" after "is not stopped or reset".

Cl 176A SC 176A.2.3.2 P552 L 31 # 197
Slavick, Jeff Broadcom
Comment Type T Comment Status D ILT Pattern
There is only 1 mode of operation for PRBS13 free-running, PAM4. We do have 1 free mode.

Suggested Remedy
Add PRBS13-free running with precoding as an option for a training pattern.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #358

Cl 176A SC 176A.2.3.3 P552 L 40 # 200
Ran, Adee Cisco
Comment Type TR Comment Status D ILT Pattern
"These three variations are produced as described for the PRBS13 free-running function in 176A.2.3.2"

PRBS13 free-running is defined only with PAM4 and does not have PAM2 or PAM4+precoding variants. These variants are defined for the PRBS13 function in 176A.2.3.1, but the definition of the precoding variant includes resetting of the precoder state at the beginning of each training frame, which would be inadequate.

Suggested Remedy
Change to the following:

The initial state of the PRBS31 generator shall not be all zeros. It may be any other value.

When the training pattern selector is set to PAM4, the training pattern is generated in a similar manner to the definition in 176A.2.3.2, except that PRBS31 generator output is used instead of PRBS13 generator output.

When the training pattern selector is set to PAM2, the training pattern is generated in a similar manner to the definition in 176A.2.3.2, except that PRBS31 generator output is used instead of PRBS13 generator output, and the pair of bits [A, A] is used instead of [A, B].

When the training pattern selector is set to PAM4 with precoding, the training pattern is generated from the PRBS31 PAM4 pattern by precoding the Gray-mapped PAM4 symbols as specified in 135.5.7.2. The precoder initial state is not specified. The state is not re-initialized or reset during generation of the training pattern.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #358

TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched  A/accepted  R/rejected  RESPONSE STATUS: O/open W/written C/closed  Z/withdrawn
SORT ORDER: Clause, Subclause, page, line

Cl 176A SC 176A.2.3.3 P552 L 34 # 548
Rechtman, Zvi Nvidia
Comment Type TR Comment Status D ILT Pattern
In the case of multi-lane operation, if all lanes exit the QUIET state simultaneously and use the same PRBS31 initial seed, there will be an undesired crosstalk effect. This potential issue needs to be addressed

Suggested Remedy
Explicitly define that each lane must use different initial seed.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #358
Comment Type: T Comment Status: D ILT Pattern

PRBS13 free-running can only provide PAM4 it does not have a select for PAM2 or PAM4 with precode while PRBS31 does have those options. So how can we refer to PRBS13 free running for how to map the PRBS data to training pattern.

SuggestedRemedy
Split the 2nd paragraph of 176A.2.3.3 into 3 paragraphs that defines how the pattern for each of the the possible encoding options as is done in 176A.2.3.1

Proposed Response Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #358

Comment Type: T Comment Status: D ILT Pattern (Bucket)

The PRBS gen should "stop" if training stops.

SuggestedRemedy
Add "while training is in progress while this mode is selected" after "is not stopped or reset".

Proposed Response Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
Implement the following with editorial license.
Add "while training is in progress and this mode is selected" after "is not stopped or reset".

Comment Type: T Comment Status: D ILT Pattern (Bucket)

There is no zero pad for PRBS31 free-running. This means we could have a run length of 31 3's in a row when the maximal run length of the PRBS pattern runs into Frame Marker.

SuggestedRemedy
Bring the zero-pad back into the definition of the training frame. Stating that it is immediately precedes the training frame marker to provide a distinct transition from training pattern to frame marker of the next training frame.

Proposed Response Response Status: W
PROPOSED REJECT.
The actual specification is not broken, it is not clear that this is required.
For CRG discussion.

Comment Type: TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general
SORT ORDER: Clause, Subclause, page, line
Cl 176A SC 176A.4 P555 L10 # 549

Rechtman, Zvi
Nvidia

Comment Type T Comment Status D ILT Frame (Bucket)

The comment refers to Table 176A-3 Status field structure. The field in bit 14 - "One" require some explanation. It/Es unclear whether it refers to the support of the newly adopted test patterns, the support of multi-segment operation, or both.

Suggested Remedy
Define the purpose of this bit

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

Implement the following with editorial license.
Add new section after the Receiver Ready section:
"176A.4.2 One
The one bit is set to 1 to signal the local receiver that the link partner supports the multi-segment control function."

Note that comment #196 proposes to change "multi-segment control function" to "inter-sublayer link training". If necessary, adjust the text to reflect the new terminology.

Cl 176A SC 176A.4 P555 L17 # 51

Dudek, Mike
Marvell

Comment Type T Comment Status D ILT Frame

It would be better to have the existing patterns the same as for previous clause 136.

Suggested Remedy
In Table 176A-3 use the 1 in bit 12 for the new patterns keeping the bits 11 and 10 the same as they were in clause 136 i.e. change 010 to PAM4 PRBS13, 100 to PAM4 free running PRBS13, 011 to PAM4 PRB13 with precoding and 110 to PAM4 free-running PRBS31

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #358.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

Comment Type E  Comment Status D  ILT Frame (Bucket)

176A.4.8 'Coefficient status' says 'The acknowledge reflects the value of coef_sts resulting from the procedure described in 176A.6.3.' I don't see a procedure that sets coef_sts in 176A.6.3, but there is one in 176A.6.4. With that said, is it correct that it is just this procedure that sets coef_sts? On review of Figure 176Aû9 'Coefficient update state diagram', I see it directly sets coef_sts to 'not_upd' in the OUT_OF_SYNC state and indirectly sets coef_sts using the procedure described in 176A.6.4 through calls to the UPDATE_C(k) function in the NEW_REQUEST state. This seems to be confirmed by the first paragraph of 176A.6.4 which says 'The handling of incoming requests is specified by the coefficient update state diagram (Figure 176Aû9). The behavior of the UPDATE_C(k) function shall be consistent with the following algorithm.'.

SuggestedRemedy
Change 'The acknowledge reflects the value of coef_sts resulting from the procedure described in 176A.6.3.' to read 'The coefficient status bits reflect the value of coef_sts variable generated by the coefficient update state diagram (Figure 176Aû9).'.

Proposed Response Response Status W
PROPOSED ACCEPT.

Comment Type E  Comment Status D  ILT Frame (Bucket)

176A.4.8 'Coefficient status' says 'The acknowledge reflects the value of coef_sts resulting from the procedure described in 176A.6.3.' I don't see a procedure that sets coef_sts in 176A.6.3, but there is one in 176A.6.4. With that said, is it correct that it is just this procedure that sets coef_sts? On review of Figure 176Aû9 'Coefficient update state diagram', I see it directly sets coef_sts to 'not_upd' in the OUT_OF_SYNC state and indirectly sets coef_sts using the procedure described in 176A.6.4 through calls to the UPDATE_C(k) function in the NEW_REQUEST state. This seems to be confirmed by the first paragraph of 176A.6.4 which says 'The handling of incoming requests is specified by the coefficient update state diagram (Figure 176Aû9). The behavior of the UPDATE_C(k) function shall be consistent with the following algorithm.'.

SuggestedRemedy
Since calls of the UPDATE_C(k) function and direct updates of the coef_sts variable all occur in the Coefficient update state diagram, suggest that 'The acknowledge reflects the value of coef_sts resulting from the procedure described in 176A.6.3.' should be changed to just read 'The acknowledge reflects the value of coef_sts generated by the Coefficient update state diagram'.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

Resolving using the response to comment #564.

Comment Type TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched A/accepted R/rejected RESPONSE STATUS: O/open W/written C/closed Z/withdrawn
SORT ORDER: Clause, Subclause, page, line
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

Comment Type: T  Comment Status: D  ILT Coefficients
To support AUI or PMDs only providing a subset of the available PRESETs we should define a behavior in that scenario.

Suggested Remedy
Add a statement that if the AUI or PMD does not specify coefficient values for a given preset setting then no change is made to the existing settings and ic_sts response of updated is provided.

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
Implement the following with editorial license:
At the end of section 176A.6.2. add the following statement: "If the AUI or PMD does not specify coefficient values for a given preset setting then no change is made to the existing settings and the ic_sts response of updated is provided."

Comment Type: T  Comment Status: D  ILT Coefficients
This entire block of pseudo-code in this subclause is exactly the same as the code in subclause 136.8.11.4.4, and the entire subclause only differs by adding one coefficient (-3) to the k_list. I suggest replacing the text of the entire subclause with a reference to subclause 136.8.11.4.4.

Suggested Remedy
New text for this subclause:
"The handling of incoming requests is specified by the coefficient update state diagram (Figure 136-9).

The behavior of the UPDATE_C(k) function shall be consistent with the algorithm specified in 136.8.11.4.4 with one exception:
- The set of valid equalizer coefficient indices, k_list, is expanded by one from {-2, -1, 0, 1} to {-3, -2, -1, 0, 1}.

Proposed Response  Response Status: W
PROPOSED REJECT.
Annex 176A is intended to be the specification for link training for 200 Gb/s per lane PMDs and potentially higher signaling rate PMDs.

Since it is substantially different from the earlier PMD control function, this annex is written as a complete specification. Although referencing an older subclause in some subclauses is an option, it would be beneficial for readers of the standard to have a complete specification in this annex.
When the receiver frame lock bit in the status field of transmitted training frames is set to 1, the time from the receipt of a new request to the acknowledgment of that request shall be less than 2 ms.”

This requirement was defined in 802.3cd when training was limited in time (to 3 seconds) in order to prevent limiting the number of change requests due to delayed responses.

The new training scheme is not limited in time, and a receiver can use as many requests as it needs.

In some multi-tasking implementations, a hard 2 ms maximum may be challenging to meet. To avoid real-time requirements, it would be sufficient to have 2 ms as the average response time (and it does not need to be normative). The maximum response time can be relaxed without impact to the protocol.

Proposed Response

PROPOSED ACCEPT.

The “Segment by segment training” seems to be an introductory subclause that explains the purpose of the whole thing.

It would help readers if this introduction is placed at the beginning of the annex. The current introduction in 176A.1 seems too brief.

Proposed Remedy

Move 176A.9 and its subclauses into 176A.1 (with some hierarchy) or after it.

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

The arrow pointing to the Interface A ‘Driver’ block and arrow pointing from the Interface B ‘CDR’ block both seem to be pointing in the wrong direction.

Proposed Remedy

Reverse the direction of both arrows.

Proposed Response

PROPOSED ACCEPT.
Subclause 176A.10.1 'State diagram conventions' says that 'The notation used in the state diagrams follows the conventions of 21.5.', however subclause 21.5 does not address the operation of timers.

Suggested Remedy

Suggest that the text 'All timers operate in the manner described in 14.2.3.2.' be inserted as the new second sentence of the second paragraph of subclause 176A.10.1.

Proposed Response

Proposed ACCEPT IN PRINCIPLE.

Implement the following with editorial license.

Insert the text from clause 136.8.11.7.5: "State diagram timers follow the conventions of 14.2.3.2." as the new second sentence of the second paragraph of subclause 176A.10.1.

The last sentence of the tx_disable variable description says that the '... output on the lane is disabled.' Is this correct, the first sentence says that tx_disable '... controls the transmitter's output on the interface.' and tx_disable is defined under subclause 176A.10.2 'Per-interface variables, functions and timers'. Suggest that the reference to 'lane' is changed to 'interface', or use 'all lanes of the interface' in the variable description to reflect the segment_ready variable description immediately above.

Suggested Remedy

[a] Change the text '... output on the lane is disabled.' in the last sentence of the tx_disable variable description to read '... output on the interface is disabled.'.

[b] Change the text '... the transmitter's output on the interface.' in the first sentence of both the tx_disable and tx_mode variable descriptions to read '... the transmitter output on all lanes of the interface.'; and [2] the text '... output on the lane is disabled.' in the last sentence of the tx_disable variable description to read '... output on all lanes of the interface is disabled.'.

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

tx_disable is a per lane variable.

Implement the following with editorial license.

Move the definition of tx_disable to 176A.10.3.

Change the first sentence of the definition...

from: "Boolean variable that controls the transmitter's output on the interface."

to: "Boolean variable that controls the transmitter's output on the lane."
Comment Type: T  Comment Status: D  ILT Diagrams (Bucket)

SuggestedRemedy

1. Add "When it is false, tx_mode controls the content of the transmitter's output on the interface." or "When it is false, tx_mode controls the content of the transmitter's output on all lanes of the interface.", depending on the response to my other comment, to the end of the tx_disable variable description.

2. Change the text "... of the interface." in the first sentence of the tx_mode variable description to read "... of the interface when tx_disable is false."

Proposed Response  Response Status  W

PROPOSED ACCEPT IN PRINCIPLE.

Implement the following with editorial license.

Add the following sentence at the end of the tx_disable definition:

"When it is false, tx_mode controls the content of the transmitter's output on the lane."

Move the definition of tx_mode to 176A.10.3.1 and change the definition of tx_mode... from: "Enumerated variable that controls the content of the transmitter's output of the interface." to: "Enumerated variable that controls the content of the transmitter's output of the lane when tx_disable is false."

Comment Status  D  Response Status: W

ILT Diagrams (Bucket)

Law, David  HPE

176A.10.3 'Per-lane variables, functions, timers and counters' says 'The device implements one instance of each of the interface control state diagrams, and the set of associated ... for each of the n physical lanes on each of its interfaces (see 176A.9)'. I don't think this is correct as I believe that the interface control state diagram is one for each interface of a device (see 176A.10.2), and it is the frame lock and coefficient update state diagrams that are one for each lane of each interface of a device.

SuggestedRemedy

Change "The device implements one instance of each of the interface control state diagrams ..." to read 'The device implements one instance of each of the frame lock and coefficient update state diagrams ...'.

Proposed Response  Response Status  W

PROPOSED ACCEPT IN PRINCIPLE.

The Interface control state diagram in Figure 176A-6 is implemented per lane, only the RTS update state diagram in Figure 176A-7 is implemented per interface.

It would be helpful to separate the state diagrams into the per-interface and per-lane subclauses.

Implement the following with editorial license.

Change the first sentence of 176A.10.2... from: "A device implements one instance of each of the interface control state diagrams" to: "A device implements one instance of the RTS update state diagram".

Break subclause 176A.10.4 (State diagrams) into two subclauses, one in 176A.10.2 (Per-interface variables, functions and timers) and one in 176A.10.3 (Per-lane variables, functions, timings and counters).

Change the title of Figure 176A–6 from "Interface control state diagram" to Figure 176A–6 from "Training control state diagram".
The variables local_tf_lock, remote_tf_lock, local_rx_ready and remote_rx_ready are all defined in 176A.10.3 'Per-lane variables, functions, timers and counters' and are related to a lane, yet they are used by figure 176A-6 'Interface control state diagram'. 176A.10.2 'Per-interface variables, functions and timers' says 'A device implements one instance of each of the interface control state diagrams independently for each of its interfaces (see 176A.9).'.

Suggested Remedy
Perhaps figure 176A-6 'Interface control state diagram' should use a 'interface' version of each of these variables that are a logical AND of the respective lane variable in the case of a multi-lane interface.

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the responses to comments #566, #567 and #571.

The description of the local_tf_lock variable in 176A.10.3.1 says that 'The value of this variable is encoded as the "training lock" bit in the status field of transmitted training frames.', however, there isn't a "training lock" bit defined for the training frames. Since 176A.4.3 'Receiver frame lock' says 'Receiver frame lock ... is not set to 1 until training and local_tf_lock are both true.' it seems that local_tf_lock is encoded in the 'Receiver frame lock' bit.

Suggested Remedy
Change the text '... is encoded as the "training lock" bit ...' in the local_tf_lock variable description to read '... is encoded in the "Receiver frame lock" bit ...'.

Proposed Response
PROPOSED ACCEPT.

The state diagram shown in Figure176A-8 "Training frame lock state diagram" on page 570 and Figure 176A-9 "Coefficient update state diagram" are exactly the same as the state diagrams of the same names in Figure 136-8 and Figure 136-9. Only the reset signal is renamed from "mr_restart_training" to "mr_restart".

Suggested Remedy
Remove Figure 176A-8 and Figure 176A-9.
Change "mr_restart" to "mr_restart_training" in subclause 176A.10.2.1 on page 564, line 21.
Change the text at the bottom of page 566 to refer to the equivalent state diagrams in clause 136 instead of the removed figures (with editorial license).
Any variables defined in subclause 176A.10.3.1 which are only used in the removed state diagrams can also be removed.

Proposed Response
PROPOSED REJECT.
Resolve using the response to comment #457.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

176A.10.2 'Per-interface variables, functions and timers' says 'A device implements one instance of each of the interface control state diagrams independently for each of its interfaces (see 176A.9),' and 176A.10.4 'State diagrams' says 'The interface control state diagram (Figure 176Aû6) defines the operation of the startup protocol for AUIs and PMDs'. 176A.10.4 'State diagrams', however, goes on to say, 'The interface control, frame lock and coefficient update state diagrams shall be implemented for each lane.' This doesn't seem to be in alignment with the prior text and doesn't seem to be correct.

Suggested Remedy

Change the last paragraph of 176A.10.4 to read 'The interface control and RTS update state diagrams shall be implemented for each interface of a device. The frame lock and coefficient update state diagrams shall be implemented for each lane of each interface of a device.'.

Proposed Response  Response Status  W

PROPOSED REJECT.
Resolve using the response to comment #572.

---

176A.10 'The operation of precoding after the completion of the start-up protocol is missing

Suggested Remedy

Add the following text:
"If the LINK READY state is entered with local_tp_mode set to 'PAM4 with precoding', then the PMA shall transmit all subsequent data on the corresponding lane with precoding (see 176.9.1.2).
If the LINK READY state is entered with remote_tp_mode set to 'PAM4 with precoding', then the PMA shall subsequently received data on the corresponding lane includes precoding (see 176.9.1.2)."

Proposed Response  Response Status  W

PROPOSED ACCEPT IN PRINCIPLE.

Implement the following with editorial license.
After the first paragraph of 176A.10, add the following text:
If the LINK READY state in the interface control state diagram (see Figure 176A-6) is entered with local_tp_mode set to "PAM4 with precoding", then the PMD or AUI shall cause the adjacent PMA to transmit all subsequent data on the corresponding lane with precoding (see 176.9.1.2).
If the LINK READY state is entered with remote_tp_mode set to "PAM4 with precoding", then the PMA shall subsequently received data on the corresponding lane includes precoding (see 176.9.1.2)."
There should be an underscore between the timer name and 'done'.

Suggested Remedy

'Suggest that 'recovery_timer done' should be changed to read 'recovery_timer_done'.

Proposed Response

Response Status W

PROPOSED ACCEPT.

The comment refers to Figure 176A-6 Interface control state diagram. The RECOVERY state coupled with the absence of timeouts, introduces a new challenge in identifying marginal performance cases. These cases may lead to repeated transitions between TRAIN_LOCAL/TRAIN_REMOTE/SEGMENT_READY state to/from RECOVERY state in scenarios of alternating local_tf_lock.

A possible solution is to limit the number of RECOVERY events by counting and limiting the number of transitions to the RECOVERY state.

Suggested Remedy

Define a new counter: órecovery_event_countö. This counter increments each time the control state diagram transitions into the RECOVERY state.

Effects on the state diagram:
The órecovery_event_countö should be initialized to 0 in the óSEND_TRAININGö state. Upon entering the RECOVERY state, the órecovery_event_countö should be incremented by 1.

State diagram transition change:
The transition condition from the RECOVERY state to the FAIL state needs to be modified as follows:
Change órecovery_timer doneö to órecovery_timer done || recovery_event_count > Xö, where X is 5 (or to be determined).

Proposed Response

Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

The suggested change has merit, but the suggested threshold of 5 is somewhat arbitrary. Depending on implementation, other thresholds may be preferred, or this condition may be disabled, without affecting interoperability.

Implement the following with editorial license.

Define a new variable in 176A.10.3.1 as follows:

"max_recovery_events. Integer variable that controls the maximum allowed number of transitions into the RECOVERY state in the Interface control state diagram (Figure 176A-6). A value of zero allows unlimited number of transitions. The value of this variable is implementation dependent."

Define a new counter in 176A.10.3.4 as follows:

"recovery_event_count. This counter increments each time the control state diagram (see Figure 176A-6) transitions into the RECOVERY state."

In Figure 176A–6…

Initialize "recovery_event_count" to 0 in the "SEND_TRAINING" state.

In the RECOVERY state increment the "recovery_event_count" by 1.
Modify the transition condition from the RECOVERY state to the FAIL state as follows:

Change "recovery_timer done" to "recovery_timer done + (max_recovery_events != 0)*(recovery_event_count >= max_recovery_events)."

The WAIT_ADJACENT to SWITCH_CLOCK transition condition uses the variable mr_training_enabled, however subclause 176A.10.2.1 'Variables' defines the variable mr_training_enable, not mr_training_enabled.

Suggested Remedy

Change the transition condition '

(lmr_training_enabled + segment_ready) * ...' to read '

(lmr_training_enable + segment_ready) * ...'.

Proposed Response

PROPOSED ACCEPT.

The UPDATE_IC function is called in the OUT_OF_SYNC state of the Figure 176A-9. Since, however, the OUT_OF_SYNC state is entered during reset (reset or mr_restart set true), it would seem unlikely that training frames are being received. If that is the case, it isn’t clear what the value of the ic_req variable is and therefore what the coefficients should be set to.

Another point is that 176A.6.2 says that 'The transmitter equalizer is set to preset 1 upon entry to the QUIET state of the interface control state diagram.' Since the QUIET state of the Interface control state diagram is also entered during reset, it seems the coefficients should be set to preset 1 when the Coefficient update state diagram is in the OUT_OF_SYNC state.

Suggested Remedy

[1] Delete the first sentence of the ic_req definition in 176A.10.3.1.
[2] Add the text 'If the Coefficient update state diagram is in the OUT_OF_SYNC state ic_req is set to preset 1. Otherwise, it is derived from the "initial condition request" bit of the control field of received training frames on the correspondent lane of the interface.' to the end of the ic_req definition in 176A.10.3.1.

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

The editorial team prepared a proposal in the comment resolution slide deck URL/brown_3dj_02_2406. For CRG discussion.

Simms, William
NVIDIA

Comment Type ER
Comment Status D

Figure 176A-6 has an extraneous < in the name 'local_tf_lock'”

Suggested Remedy

change to 'local_tf_lock'

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.
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Type: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
Comment Status: D/dispatched  A/accepted  R/rejected  Response Status: O/open  W/written  C/closed  Z/withdrawn
SORT ORDER: Clause, Subclause, page, line

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### Cl 176D SC 176D.3.3 P 597 L 33 # 423

Li, Tobey  
MediaTek  

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

Signaling rate of 106.255 ± 50 ppm in Table 176Dû1 is incorrect

**Suggested Remedy**  
Change "106.255 ± 50 ppm" to "106.25 ± 50 ppm"

**Proposed Response**  
**Response Status**: W  
PROPOSED ACCEPT IN PRINCIPLE.  
Resolve using the response to comment #361.

### Cl 176D SC 176D.3.4.4 P 602 L 47 # 424

Li, Tobey  
MediaTek  

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

Reference to ERL methodology is missing

**Suggested Remedy**  
Add reference to 176D.4.3.

**Proposed Response**  
**Response Status**: W  
PROPOSED ACCEPT.

### Cl 176D SC 176D.3.4.4 P 603 L 18 # 425

Li, Tobey  
MediaTek  

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

4th order Bessel-Thomson filter BW is TBD

**Suggested Remedy**  
Replace TBD with 62 GHz

**Proposed Response**  
**Response Status**: W  
PROPOSED ACCEPT IN PRINCIPLE.  
Resolve using the response to comment #60.

### Cl 176D SC 176D.3.4.4 P 603 L 30 # 426

Li, Tobey  
MediaTek  

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

"Insertion loss at 26.5625 GHz"

Nyquest frequency in Table 176Dû4 is incorrect

**Suggested Remedy**  
Change "26.5625 GHz" to "53.125 GHz"

**Proposed Response**  
**Response Status**: W  
PROPOSED ACCEPT.

### Cl 176D SC 176D.3.4.4 P 603 L 31 # 451

Li, Tobey  
MediaTek  

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

Moot point maybe given table is all TBD, but the frequency should be 53.125GHz

**Suggested Remedy**  
change to 53.125GHz

**Proposed Response**  
**Response Status**: W  
PROPOSED ACCEPT IN PRINCIPLE.  
Resolve using the response to comment #426.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

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TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched A/accepted R/rejected RESPONSE STATUS: O/open W/written C/closed Z/withdrawn
SORT ORDER: Clause, Subclause, page, line

Page 51 of 137 5/31/2024 10:47:11 AM
Comment Type: T
Comment Status: D
COM pkg tau (bucket)

COM reference package parameter value. (transmission line parameter tau)
In "Table 176D-6" class A package model, transmission line parameter t(tau) value is 6.141e-4 ns/mm, but based on the adopted motion\#10, Nov/2024, ilim_3dj_01a_2311.pdf (page 8-9), the value is 6.141e-3. The value should be 6.141e-3 ns/mm.

Suggested Remedy
Change t(tau) value in Table 176D-6 (class A package) from 6.141e-4 ns/mm to 6.141e-3 ns/mm.
Or simply delete this row, as the t(tau) value in table 93A-3 is 6.141e-3 ns/mm.

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment \#118.

Comment Type: T
Comment Status: D
COM pkg tau (bucket)

COM reference package parameter value. (transmission line parameter tau)
In "Table 176D-6" class B package model, transmission line parameter t(tau) value is 6.141e-4 ns/mm, but based on the adopted motion\#10, Nov/2024, ilim_3dj_01a_2311.pdf (page 8-9), the value is 6.141e-3. The value should be 6.141e-3 ns/mm.

Suggested Remedy
Change t(tau) value in Table 176D-6 (class B package) from 6.141e-4 ns/mm to 6.141e-3 ns/mm.
Or simply delete this row, as the t(tau) value in table 93A-3 is 6.141e-3 ns/mm.

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment \#118.

We need to fill in values for the TBDs AUI C2C device & package parameters in Table 176D-6 and COM parameters in Table 176D-7.

Suggested Remedy
Adopt the values proposed below for AUI C2C:
Table 176D-6:
R_0 = 50 ohms, R_d, = 50 ohms,

Table 176D-7:
f__r, = 0.75* f_b , A_v = 0.413 V, A_fe = 0.413 V, A_ne = 0.608 V, SNR_Tx = 33 dB, A_dd
0.02, R_LM = 0.95, eta_0 = 1.25e-8 V^2/GHz, M = 32,
d_w = 4, N_fix = 28, N_g = 0, N_f = NA, N_max = NA, sigma_RJ = 0.01.

A presentation is planned for the May 2024 interim in which we will provide analysis to support the proposed values.

PROPOSED ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the task force at the May 2024 interim meeting:

The comment addresses multiple open TBDs, but there is not sufficient justification for the proposed values and consensus may not be obvious.

This comment proposes a large set of COM parameter values together, while other comments address subsets of these parameters.

The editorial team prepared a proposal in the comment resolution slide deck ran_3dj_01_2406--comment_resolution_electrical.

For CRG discussion.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>Comment</th>
<th>Page</th>
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</tr>
</thead>
<tbody>
<tr>
<td>176D</td>
<td>176D.4.1</td>
<td>P605</td>
<td>L35</td>
<td>#431</td>
<td></td>
</tr>
</tbody>
</table>

Li, Tobey, MediaTek

**Comment Type**: TR

**Comment Status**: D

Single-ended reference resistance R0 value in Table 176Dû6 is TBD

**Suggested Remedy**

Replace TBD with 50 Ohm

**Proposed Response**

Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #35.

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>Comment</th>
<th>Page</th>
<th>Line</th>
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</tr>
</thead>
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<tr>
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<td>P605</td>
<td>L50</td>
<td>#432</td>
<td></td>
</tr>
</tbody>
</table>

Li, Tobey, MediaTek

**Comment Type**: TR

**Comment Status**: D

Receiver 3 dB bandwidth fr value in Table 176Dû7 is TBD

**Suggested Remedy**

Replace TBD with 0.58*fr

**Proposed Response**

Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #36.

Li, Tobey, MediaTek

**Comment Type**: TR

**Comment Status**: D

C2C should be aligned with C2M and addressing TBDs

**Suggested Remedy**

Propose to use fix 25 tap FFE with 1T DFE

Max # of pre-cursor taps = 6

DFE max tap weight = 0.75

**Proposed Response**

Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #274 and #279.

Ghiasi, Ali, Ghiasi Quantum/Marvell

**Comment Type**: T

**Comment Status**: D

Multiple COM parameters

C2C should be aligned with C2M and addressing TBDs

**Suggested Remedy**

SNRT=33 dB

Add=0.02 UI

Sigma=0.01 UI

RLM=0.95

Eta0=1.25E-8

**Proposed Response**

Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

The following straw poll was taken in the May 2024 interim meeting:

**Straw Poll #7**

I would support putting the COM parameter values eta_0 and d_w and the editors note for AUI C2M and AUI C2C (per lusted_3dj_07_2405, slides 3-4) into the P802.3dj draft specification

Results (all): Y: 67, N: 0, A: 23

The results show consensus for eta_0=1e-8 for C2C and C2M.


The other suggested changes are addressed by multiple other comments. This comment is expected to be partly resolved by the responses to these other comments.

Ghiasi, Ali, Ghiasi Quantum/Marvell

**Comment Type**: T

**Comment Status**: D

C2C reference equalizer should be aligned with C2M and addressing TBDs

**Suggested Remedy**

Propose to use fix 25 tap FFE with 1T DFE

Max # of pre-cursor taps = 6

DFE max tap weight = 0.75

**Proposed Response**

Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #274 and #279.
### IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Proposed Response</th>
<th>Comment Description</th>
<th>Proposed ACCEPT IN PRINCIPLE</th>
<th>Resolution Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td>Zero 2 frequency and pole 3 frequency of Continuous time filter are inconsistent with Table 178Dû13</td>
<td>Replace zero 2 frequency with fb/80</td>
<td>For CRG discussion</td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td></td>
<td>Change pole 3 frequency from &quot;fb&quot; to &quot;fb/80&quot;</td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td>There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck ran_3dj_01_2406--comment_resolution_electrical.</td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td>Transmitter differential peak output in Table 176Dû7 is TBD</td>
<td>Replace Av with 0.413 V</td>
<td>For CRG discussion</td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td></td>
<td>Replace Afe with 0.413 V</td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td></td>
<td>Replace Ane with 0.608 V</td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td>Level separation mismatch ratio RLM in Table 176Dû7 is TBD</td>
<td>Replace TBD with 0.95</td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td></td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td></td>
<td>Resolve using the response to comment #273.</td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td>Transmitter transition time Tr value in Table 176Dû7 is TBD</td>
<td>Replace TBD with 32</td>
<td>For CRG discussion</td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td></td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td></td>
<td>Resolve using the response to comment #360.</td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td>An insertion loss of only 20dB is less than desirable and the equation is TBD.  We shouldn't specify the loss at this time</td>
<td>Change 20dB to TBD.</td>
<td>For CRG discussion</td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td></td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>D</td>
<td></td>
<td></td>
<td>The value 20 dB was not adopted, and its appearance here is unintended. Slide 18 of <a href="https://www.ieee802.org/3/dj/public/24_01/ran_3dj_01_2406--comment_resolution_electrical.pdf">https://www.ieee802.org/3/dj/public/24_01/ran_3dj_01_2406--comment_resolution_electrical.pdf</a> states explicitly that the interconnect length is TBD. Implement suggested remedy with editorial license.</td>
<td></td>
</tr>
</tbody>
</table>
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

Comment on Page 615, Line 20

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

The note "The electrical specifications of C2C components are not equivalent to those of the corresponding PMD's. Specifically the test points at which module compliance is defined are different isn't helpful. What does "not equivalent" mean?. Which corresponding PMD's? Although the module test points are different those for the host are the same as Clause 179.

**Suggested Remedy**
Delete the note.

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

PROPOSED ACCEPT IN PRINCIPLE.
The corresponding PMDs are noted in the third paragraph of 176E.2, which states that a C2M component is functionally equivalent to a PMD. The note appears after the paragraph about the electrical characteristics, and highlights the essential difference between a C2M component and a PMD. It is specific about the test point difference for the module. The description of the C2M component's similarity to a PMD is new, and noting the differences is useful for readers. However, the term "corresponding PMDs" can be clarified. In 176E.2, change "the corresponding PMDs" to "the corresponding PMDs defined in Clause 179". In 176D.2, change "The electrical specifications of C2C components are not equivalent to those of the corresponding PMDs" to "The electrical specifications of C2C components are not identical to those of the corresponding PMDs defined in Clause 178".

Comment on Page 615, Line 33

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

Figure depicts loss should be bump-bump

**Suggested Remedy**
To make it more clear Host C2M Component should be changed to Host C2M Device and Module C2M Device

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

PROPOSED ACCEPT IN PRINCIPLE.
The C2M loss budget is currently TBD, but it is expected that it will be inclusive of packages. However, the suggested remedy does not significantly clarify this fact. It is preferable to align the diagram with Figure 179-2, where the paths between TP0d and TP1 and between TP4 and TP5d are shown to include the package. In figure 176E-2, change "Host ILdd" to "Host package and PCB ILdd", and "Module ILdd" to "Module package and PCB ILdd".

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

PROPOSED REJECT.
The comment is against Figure 176E-2. The following presentation was reviewed by the task force in the May 2024 interim meeting: https://www.ieee802.org/3/dj/public/24_05/ghiasi_3dj_02a_2405.pdf
The comment addresses several open TBDs and the suggested remedy is reasonable, but consensus is not obvious. The editorial team prepared a detailed response in the comment resolution slide deck ran_3dj_01_2406--comment_resolution_electrical. For CRG discussion.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

Cl 176E SC 176E.3.3 P617 L10 #186

Ran, Ade
Cisco

Comment Type TR Comment Status D C2M output
Host output characteristics need to be defined with consideration of the variable output settings that can result from training.

This will affect the entire subclause 176E.3.3.

Suggested Remedy
Define the output characteristics using a methodology similar to that of transmitter specifications in 179.9.4.

Use a table similar to Table 179-7 but with different values due to the higher host channel insertion loss budget for C2M.

A detailed proposal will be provided.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

The following presentation has been reviewed by the task force at the May 2024 interim meeting:

The presentation addressed host output (subject of this comment) and module output (subject of comment #187).

The following straw poll was taken in the May 2024 interim meeting:
Straw Poll #3
I would support the approach for the AUI-C2M host and module output specifications outlined in ran_3dj_02_2405

Results (all): Y: 38, N: 9, NMI: 9, A: 42

However, straw poll #8 related to the jitter measurement had less decisive results:
Y: 12, N: 11, NMI: 22, A: 36

The results of the straw poll show support for the proposed jitter measurement changes, but consensus is not obvious.

Based on these two straw polls, possible approaches are:
A: Implement the proposed changes on slides 6, 8, 10, and 11 of ran_3dj_02_2405, with the exception of the jitter method and parameters.
B: Implement the proposed changes on slides 6, 8, 10, and 11 of ran_3dj_02_2405, but for jitter leave the limit values TBD.
C: Implement the proposed changes on slides 6, 8, 10, and 11 of ran_3dj_02_2405 (including jitter values).

In either approach, editorial license should be included.

For CRG discussion.

Cl 176E SC 176E.3.3 P617 L13 #131

Ghiasi, Ali Ghiasi Quantum/Marvell

Comment Type T Comment Status D C2M output

3 dB BW is TBD

Suggested Remedy
propose to use 0.55*Baudrate=58.4375 GHz but in current OCM code we use Butterworth, should the COM for C2M be changed to BT4 filter?

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #60.

[Editor's note: changed line from 33 to 13]

Cl 176E SC 176E.3.3 P617 L35 #132

Ghiasi, Ali Ghiasi Quantum/Marvell

Comment Type T Comment Status D C2M output

Eye height and VEC are TBD

Suggested Remedy

See Ghiasi C2M May-24 Contribution for background on the numbers
VEC=10.7 dB
VEO=8 mV

Proposed Response Response Status W
PROPOSED REJECT.
The comment addresses open TBDs.

The following presentation was reviewed by the task force at the May 2024 interim meeting:

The presentation includes COM analysis of selected channels, but shows no VEC or EH results, and does not justify using VEC/EH as output specification as proposed in the comment, nor for the proposed values.
<table>
<thead>
<tr>
<th>CI 176E</th>
<th>SC 176E.3.3</th>
<th>P620</th>
<th>L 32</th>
<th># 220</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noujeim, Leesa</td>
<td>Google</td>
<td><strong>Comment Type</strong>: T</td>
<td><strong>Comment Status</strong>: D</td>
<td>ERL Tfx</td>
</tr>
<tr>
<td>Practical test fixtures may have discontinuities close to 0.2ns from the host-facing connection (mating interface). If the intent is to remove the test fixture discontinuities from the ERL calculations, we should adjust the 0.2ns.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suggested Remedy</strong>: Change text to &quot;...Tfx equal to twice the delay between the test fixture connector and the test fixture host-facing connection minus 0.2ns or as needed to remove test-fixture discontinuities from the ERL result&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Proposed Response</strong>: PROPOSED ACCEPT IN PRINCIPLE. Resolve using the response to comment #227.</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>CI 176E</th>
<th>SC 176E.3.4</th>
<th>P621</th>
<th>L 13</th>
<th># 187</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ran, Adee</td>
<td>Cisco</td>
<td><strong>Comment Type</strong>: TR</td>
<td><strong>Comment Status</strong>: D</td>
<td>C2M output</td>
</tr>
<tr>
<td>Module output characteristics need to be defined with consideration of the variable output settings that can result from training.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This will affect the entire subclause 176E.3.4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suggested Remedy</strong>: Define the output characteristics using a methodology similar to that of transmitter specifications in 179.9.4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use a table similar to Table 179-7 but with different values due to the lower insertion loss assumed for the module output test.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A detailed proposal will be provided.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Proposed Response</strong>: PROPOSED ACCEPT IN PRINCIPLE. Resolve using the response to comment #186 (which addresses host characteristics).</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CI 176E</th>
<th>SC 176E.3.4.2</th>
<th>P622</th>
<th>L 49</th>
<th># 221</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noujeim, Leesa</td>
<td>Google</td>
<td><strong>Comment Type</strong>: T</td>
<td><strong>Comment Status</strong>: D</td>
<td>ERL Tfx</td>
</tr>
<tr>
<td>Practical test fixtures may have discontinuities close to 0.2ns from the host-facing connection (mating interface). If the intent is to remove the test fixture discontinuities from the ERL calculations, we should adjust the 0.2ns.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suggested Remedy</strong>: Change text to &quot;...Tfx equal to twice the delay between the test fixture connector and the test fixture host-facing connection minus 0.2ns or as needed to remove test-fixture discontinuities from the ERL result&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Proposed Response</strong>: PROPOSED ACCEPT IN PRINCIPLE. Resolve using the response to comment #227.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CI 176E</th>
<th>SC 176E.3.5</th>
<th>P621</th>
<th>L 7</th>
<th># 133</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghiasi, Ali</td>
<td>Ghiasi Quantum/Marvell</td>
<td><strong>Comment Type</strong>: T</td>
<td><strong>Comment Status</strong>: D</td>
<td>B-T filter BW</td>
</tr>
<tr>
<td>BW is TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suggested Remedy</strong>: propose to use 0.55*Baudrate=58.4375 GHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Proposed Response</strong>: PROPOSED ACCEPT IN PRINCIPLE. Resolve using the response to comment #60.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TYPE**: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
**COMMENT STATUS**: D/dispatched A/accepted R/rejected  **RESPONSE STATUS**: O/open W/written C/closed Z/withdrawn
**SORT ORDER**: Clause, Subclause, page, line

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---

### Comment Type: TR/technical required

#### Comment Status: D/dispatched

- **Cl 176E SC 176E.3.5 P624 L3**: Ran, Adee - Cisco

**Comment**

Host input characteristics need to be defined with consideration of the availability of training. This will affect the entire subclause 176E.3.5.

**Suggested Remedy**

- Define the input characteristics using a methodology similar to that of receiver specifications in 179.9.5, with the required changes due to the lack of a cable assembly.

- Use a table similar to Table 179-10 but with additional rows for DC common-mode voltage and AC common-mode voltage tolerance.

- A detailed proposal will be provided.

**Proposed Response**

- Response Status: W/written

The following presentation has been reviewed by the task force:

- [https://www.ieee802.org/3/dj/public/24_05/ran_3dj_01_2405.pdf](https://www.ieee802.org/3/dj/public/24_05/ran_3dj_01_2405.pdf)

- The following straw poll was taken in the May 2024 interim meeting:

  **Straw Poll #2**

  I would support the approach for the AUI-C2M host and module input specifications outlined in ran_3dj_01_2405

  Results (all) Y: 31, N: 15, NMI: 6, A: 39

- Based on this straw poll, a possible approach is:

  - Implement the proposed changes on slides 6-9 of ran_3dj_01_2405, with editorial license.
  - For CRG discussion.

---

### Comment Type: TR/technical required

#### Comment Status: D/dispatched

- **Cl 176E SC 176E.3.6 P628 L26**: Ran, Adee - Cisco

**Comment**

Module input characteristics need to be defined with consideration of the availability of training. This will affect the entire subclause 176E.3.6.

**Suggested Remedy**

- Define the input characteristics using a methodology similar to that of receiver specifications in 179.9.5, with the required changes due to the lack of a cable assembly and usage of MCB instead of HCB.

- Use a table similar to Table 179-10 but with additional rows for DC common-mode voltage tolerance and AC common-mode voltage tolerance.

- A detailed proposal will be provided.

**Proposed Response**

- Response Status: W/written

The following presentation has been reviewed by the task force in the May 2024 interim meeting:

- [https://www.ieee802.org/3/dj/public/24_05/ghiasi_3dj_02_2405.pdf](https://www.ieee802.org/3/dj/public/24_05/ghiasi_3dj_02_2405.pdf)

- The presentation does not include a proposal equation 176E-3.

---

### Comment Type: T/technical

#### Comment Status: D/dispatched

- **Cl 176E SC 176E.4.1 P632 L6**: Ghiasi, Ali - Ghiasi Quantum/Marvell

**Comment**

Loss is TBD

**Suggested Remedy**

- See Ghiasi C2M May-24 Contribution for background on the numbers

Bump-bump Insertion loss at Nyquist frequency (53.125 GHz) is less than or equal to 28 dB

**Proposed Response**

- Response Status: W/written

The loss in the text is TBD because equation 176E-3 has TBDs. When an equation is provided, the text can be changed accordingly, but the commend does not propose values for the equation.

The following presentation was reviewed by the task force in the May 2024 interim meeting:

- [https://www.ieee802.org/3/dj/public/24_05/ghiasi_3dj_02_2405.pdf](https://www.ieee802.org/3/dj/public/24_05/ghiasi_3dj_02_2405.pdf)

The presentation does not include a proposal equation 176E-3.

[Editor's note: changed page from 621 to 632]
The IL_dd for AUI C2M channel is a TBD

Suggested Remedy
Set IL_dd = 33 per https://www.ieee802.org/3/dj/public/24_01/lusted_3dj_03_2401.pdf

PROPOSED REJECT.
The following presentation has been reviewed by the task force in the May 2024 interim meeting:
The presentation does not include a proposal for the ILdd of the AUI C2M channel as suggested in the comment.
The comment addresses an open TBD and the suggested remedy is reasonable, but consensus is not obvious.
The editorial team prepared a detailed response in the comment resolution slide deck ran_3dj_01_2406--comment_resolution_electrical.
For CRG discussion.

Multiple COM parameters

The COM parameter values for the AUI C2M electrical interfaces in Annex 176E are different from the AUI C2C

Suggested Remedy
Create a new COM parameter values table in 176E.4.2 and use the COM parameter values from https://www.ieee802.org/3/dj/public/24_03/lit_3dj_01a_2403.pdf slide 6 and 11, which are:

- f_r = 0.58
- c(-3) = 0
- c(-2) = 0 min, 0.12 max
- c(-1) = -0.4 min, 0 max
- c(0) = 0.54
- c(1) = 0
- A_v = 0.413
- A_fe = 0.413
- A_ne = 0.45
- eta_0 = 1.25e-8
- SNR_TX = 33
- sigma_RJ = 0.01
- A_DD = 0.02
- R_LM = 0.95
- d_w = 5
- Nfix = 10
- N_g = 1
- N_f = 4
- N_max = 60
- w_max(1) = 1
- w_min(1) = 0
- b_max(1) = 0.75
- b_min(1) = 0

additionally, set MLSE = 0 (not enabled)

PROPOSED ACCEPT IN PRINCIPLE.
The comment raises a valid concern and the suggested remedy may be reasonable, but consensus is not obvious.
Note that although C2M has no channel that needs to be qualified with COM, COM parameters for receiver and transmitter are required for input test calibration.
This comment proposes a large set of COM parameter values together, while other comments address subsets of these parameters.
The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406.
For CRG discussion.

Comment Type TR
Comment Status D

Measurement methodology for C2M should consider the variable output settings that can result from training. Eye opening parameters with specific transmitter settings are not the relevant metrics for transmitter quality anymore.

The measurement methodology of CR transmitter, which focuses on training-related equalizer parameters and training-independent signal parameters, is more suitable.

Suggested Remedy
Move the measurement methodology section into another annex that both Clause 179 and Annex 176E can refer to.

A detailed proposal will be provided.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186.

Comment Type T
Comment Status D

decision-feedback equalizer? The table mentions "feed-forward coefficient"

Suggested Remedy
Update this text

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Comments #186 through #189 suggest using the CR methodology for transmitter and receiver specifications. Based on resolution of these comments, the reference receiver table may be replaced by a COM parameters table.

For CRG discussion after resolution of #186-189.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

Cl 176E SC 176E.5.2 P633 L47 # 136
Ghiasi, Ali Ghiasi Quantum/Marvell
Comment Type T Comment Status D
TP1d and TP4a measurement should be done without device model with just 50 scope termination

Suggested Remedy
Device model - NA
Single ended transmitter termination - NA
Single ended reference resistance - 50 ohms

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #35.

Cl 176E SC 176E.5.2 P634 L6 # 39
Li, Tobey MediaTek
Comment Type TR Comment Status D
Receiver 3 dB bandwidth fr value in Table 176E7 is TBD

Suggested Remedy
Replace TBD with 0.58*fb

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #36.

Cl 176E SC 176E.5.2 P634 L52 # 438
Li, Tobey MediaTek
Comment Type TR Comment Status D
Single-ended reference resistance R0 value in Table 176E7 is TBD

Suggested Remedy
Replace TBD with 50 Ohm

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #35.

Cl 176E SC 176E.5.2 P634 L5 # 137
Ghiasi, Ali Ghiasi Quantum/Marvell
Comment Type T Comment Status D
Single ended receive termination and receive 3 dB BW

Suggested Remedy
Single ended receive termination is the 50 ohm scope termination
Receive 3 dB BW=0.55*106.25=58.4375 GHz

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comments #36 and #396

Cl 176E SC 176E.5.2 P634 L8 # 138
Ghiasi, Ali Ghiasi Quantum/Marvell
Comment Type T Comment Status D
Transmitter equalizer coefficients

Suggested Remedy
Given little benefit of TX FFE C(-3) - NA
C(0)=0.65
C(-1)=[ -0.3:0.02:0 ]
C(-2)=[ 0.02:0.14 ]
C(1)=[ -0.14:0.02:0.14 ] also goes positive to allow slowing driver for reflection mitigation

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #37.
SuggestedRemedy

Replace zero 1 frequency, \( f_z_1 \), with \( \frac{fb}{2.5 \text{ GHz}} \)
Replace zero 2 frequency, \( f_z_2 \), with \( \frac{fb}{80 \text{ GHz}} \)
Replace pole 1 frequency, \( f_p_1 \), with \( \frac{fb}{2.5 \text{ GHz}} \)
Replace pole 2 frequency, \( f_p_2 \), with \( \frac{fb}{80 \text{ GHz}} \)
Replace pole 3 frequency, \( f_p_3 \), with \( \frac{fb}{80 \text{ GHz}} \)

PROPOSED ACCEPT IN PRINCIPLE.

There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406.
For CRG discussion.

SuggestedRemedy

Replace TBD with \( Tr = 4 \text{ ps} \)

PROPOSED ACCEPT IN PRINCIPLE.

Comments #186 through #189 suggest using the CR methodology for transmitter and receiver specifications, based on resolution of these comments, the reference receiver table may be replaced by a COM parameters table.
For CRG discussion after resolution of #186–#189.

SuggestedRemedy

Replace TBD with 0.95

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #273.

SuggestedRemedy

Replace TBD with 32

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #360.
Cl 176E SC 176E.5.2 P635 L35 # 444
Li, Toby
MediaTek

Comment Type TR Comment Status D
"Dp equal to 3" is not right as there are 3 pre-taps for the host

Suggested Remedy
Change "Dp equal to 3" to "Dp equal to 4"

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolves using the response to #30.

Cl 176E SC 176E.5.2 P635 L50 # 140
Ghiasi, Ali
Ghiasi Quantum/Marvell

Comment Type T Comment Status D
Reference equalizer is TBD

Suggested Remedy
Propose to use fix 25 tap FFE with 1T DFE
Max # of pre-cursor taps = 6
DFE max tap weight = 0.75

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Resolves using the response to comment #274 and #279.

Cl 176E SC 176E.5.2 P636 L49 # 523
Dawe, Piers
Nvidia

Comment Type TR Comment Status D
"within the time interval t_s +/-0.05 UI and with accumulated probability for each sample weighted by the function w(t) defined by Equation (176E-4)"; this makes the measurement too tolerant to jitter.

Suggested Remedy
Remove the Gaussian weighting function w(t), increase +/-0.05 to +/-0.07, same as TDECQ. This will make VEC look worse, but will be a better measurement to protect the link. Use this method for CR also, with "software channel" ("far end eye measurement") as appropriate.

Proposed Response Response Status W
PROPOSED REJECT.

The comment does not provide sufficient justification to support the suggested remedy. The suggested remedy does not provide sufficient detail to implement.

Cl 177 SC 177 P257 L28 # 22
Liu, Cathy
Broadcom

Comment Type T Comment Status D
Inner FEC coding gain

This section only mentions that the inner FEC decoder is soft-decision decoder and the details implementation is beyond the scope of the this standard. However, shall we specify the soft-decision decoder's performance bound? If not, the optical PMD BER target or link budget might be missed.

Suggested Remedy
To specify the soft-decision decoder shall provide TBD dB (say 2dB) coding gain over end-end FEC provided that the error statistics are sufficiently random.

Proposed Response Response Status W
PROPOSED REJECT.
Specifying the effectiveness of the Inner FEC is not as simple a coding gain. It needs include the relationship between the errors on the input, errors on the output, and the effect those errors have on the RS-FEC.
A consensus presentation to appropriately define the expected Inner FEC performance is encouraged.

Cl 177 SC 177.1.3 P249 L10 # 11
Huber, Thomas
Nokia

Comment Type T Comment Status D
The second bullet could be written more clearly

Suggested Remedy
Revise to read "Distributing (collecting) the convolutional interleaved data to (from) eight Inner FEC flows

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 177 SC 177.1.3 P249 L14 # 32
Huber, Thomas
Nokia

Comment Type T Comment Status D
The fifth bullet could be written more clearly

Suggested Remedy
Revise to read "8:1 interleaving (1:8 deinterleaving) the eight Inner FEC flows to (from) a single flow"

Proposed Response Response Status W
PROPOSED ACCEPT.
Comment Type: Technical required

Comment Status: Dispatched

Response Status: Written

Huber, Thomas
Nokia

Comment Type: Technical

Comment Status: Dispatched

Comment:
Indicating PAM4 decoding as optional seems a bit misleading. The P{MD isn't doing soft-decoding in any case, so the FEC must do some sort of decoding to recover the bits from the PAM4 symbols.

Suggested Remedy:
Generalize the label in the box to "Decoding", and explain in the text in 177.5.x that there are multiple options for decoding.

Proposed Response: 
Proposed Accept in Principle.

Remove footnote in Figure 177-2.

Comment Type: Technical

Comment Status: Dispatched

Comment:
The comment refers to Figure 177-2.
There is a footnote that PAM4 decoding is optional in case of soft decoding. However, the DataPath is defined using bit streams, also the FEC:IS_UNITDATA_i.indication primitives has two value of 0 or 1, therefore PAM4 decoding must to take place.

Suggested Remedy:
Either remove the footnote, or elaborate on the intention of this footnote.

Proposed Response: 
Proposed Accept in Principle.

Resolving the response to comment # 83.

Comment Type: Technical

Comment Status: Dispatched

Comment:
Due primarily to the convolutional interleaver/deinterleaver, there is a large variation in the input-to-output latency of the Inner FEC sublayer. As such, there is concern that the method to properly calculate the path data delay for the Inner FEC sublayer should be explained in Clause 90, similarly to what is done for the variation from FEC codewords and PCS-lane distribution in clause 90.7.1.

Suggested Remedy:
Do nothing.
Using the general method in Clause 90A, allocating the maximum value of the intrinsic delay to the transmit PHY and the minimum value of the intrinsic delay to the receive PHY, there is no ambiguity.
So it should not be necessary to add to Clause 90 for every new PHY type. The principles laid out in Annex 90A.7 should apply.
If anything, a general note could be added in Clause 177 (or in Clause 45 with the MDIO registers for path data delay values) explaining that the Tx/Rx path data delay values should be calculated following the guidelines in Annex 90A.7, where the maximum latency value is used for the Tx path data delay, and the minimum latency value is used for Rx path data delay.

Proposed Response: 
Proposed Reject.
The suggested remedy does not propose an actionable (within the draft) remedy.
It is not helpful to sprinkle notes related to time synchronization throughout the various sublayer clauses; this was not done in previous clauses/projects. Rather it would be preferable to add the necessary text into Clause 90/Annex 90A. A consensus presentation with a complete proposal is encouraged.
The convolutional interleaver is composed of 3 delay lines where the first delays the PHYs data by eight RS-FEC codewords, the second by four RS-FEC codewords and the last adds no delay. This is correct only if the Q values are 544/272/136/68 for 200G/400G/800G/1.6T. However, the Q values should be 192/96/48/24 as shown in slides 6-11 of he_3dj_01_2307 for 200G/400G/800G/1.6TbE.

Suggested Remedy

Suggest to modify Line 50-51 in page 251 as follows:

The convolutional interleaver is composed of three parallel delay lines (numbered 0 to 2), as illustrated in Figure 177-3. Each delay operator D represents a storage element of 40 bits. From one delay line to the next higher delay line, Q delay operators are deleted. Modify the Q values to 192/96/48/24 for 200G/400G/800G/1.6T.

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #366.

Cl 177 SC 177.4.1 P251 L 50 # 510
Huang, Kechao Huawei Technologies Co., Ltd.

Comment Type T Comment Status D CI (bucket)

Cl 177 SC 177.4.1 P251 L 51 # 544
Rechtman, Zvi Nvidia

Comment Type TR Comment Status D CI (bucket)

The values of Q and the description of the Convolutional interleaver functionality doesn’t match the adopted values in he_3dj_01_2307.pdf

The values should be:

- 200G BASE-R: Q = 192
- 400G BASE-R: Q = 96
- 800G BASE-R: Q = 48
- 1.6T BASE-R: Q = 24

Suggested Remedy

Modify the Q values to:

- 200G BASE-R: Q = 192
- 400G BASE-R: Q = 96
- 800G BASE-R: Q = 48
- 1.6T BASE-R: Q = 24

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #366.

Cl 177 SC 177.4.1 P252 L 9 # 292
Galan, Jose Vicente Maxlinear Inc

Comment Type TR Comment Status D CI (bucket)

The Q values of Convolutional interleaver are not in line with previous contributions, D0.1, D0.2, with the TP2 test vectors of Annex 177A and have to be corrected.

Suggested Remedy

Q=24 for 1.6TBASE-R, Q=48 for 800GBASE-R, Q=96 for 400GBASE-R and Q=192 for 200GBASE-R

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #366.

Cl 177 SC 177.4.1 P252 L 9 # 295
He, Xiang Huawei

Comment Type TR Comment Status D CI (bucket)

The Q values are not the same as the baseline adopted.

Suggested Remedy

According to the adopted baseline, change the Q values as follows:

- 200G BASE-R: Q = 192
- 400G BASE-R: Q = 96
- 800G BASE-R: Q = 48
- 1.6T BASE-R: Q = 24

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.
The delay line for Cl177 starts with feeding data into the longest delay line while Cl184 sends it to the delay line with the shortest delay.

**Suggested Remedy**

Change Cl177 to have the Delay Line 0 be the minimal delay and the Delay Line 2 to be the longest delay.

**Proposed Response**

PROPOSED REJECT.

This is consistent with the adopted baseline. It is correct as documented.

---

The description in "The convolutional interleaver is composed of 3 delay lines where the first delays the PHYs data by eight RS-FEC codewords, the second by four RS-FEC codewords and the last adds no delay" seems to represent block interleave and not convolutional interleave.

**Suggested Remedy**

Modify to:

"The convolutional interleaver is composed of 3 delay lines. For 200GBASE-R the first line (line0) delays the PHYs data by 4x2x192 = 1,536 RS-FEC symbols, the second line (line1) by 4x1x192 = 768 RS-FEC symbols and the last line (line3) adds no delay. For 400GBASE-R the first line (line0) delays the PHYs data by 4x2x96 = 768 RS-FEC symbols, the second line (line1) by 4x1x96 = 384 RS-FEC symbols and the last line (line3) adds no delay. For 800GBASE-R the first line (line0) delays the PHYs data by 4x2x48 = 384 RS-FEC symbols, the second line (line1) by 4x1x48 = 192 RS-FEC symbols and the last line (line3) adds no delay. For 1.6TBASE-R the first line (line0) delays the PHYs data by 4x2x24 = 192 RS-FEC symbols, the second line (line1) by 4x1x24 = 96 RS-FEC symbols and the last line (line3) adds no delay."

**Proposed Response**

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

---

The input and output round-robin operation is defined relatively to the delay/buffering size of each lane. However, there are lines index that represent the delay and simplify the definition.

**Suggested Remedy**

Change:

"The input data round-robin operation is defined relatively to the delay/buffering size of each lane. However, there are lines index that represent the delay and simplify the definition."

To:

"The input data round-robin operation is defined relatively to the delay/buffering size of each lane. However, there are lines index that represent the delay and simplify the definition."

**Proposed Response**

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

---

Was there not a proposal to make the circular shift optional, in order to minimize latency?

**Suggested Remedy**

Consider removing the circular shift if it does offer any worthwhile benefit.

**Proposed Response**

PROPOSED REJECT.

This is consistent with the baseline adopted. The comment does not provide sufficient justification to support the suggested remedy.
I'm not convinced that the circular shift really adds any robustness. Yes, it distances bit-pairs belonging to the same RS-FEC codeword, but without the shift, the consecutive bit pairs (after 8:1 multiplexing) belonging to the same RS-FEC code words would each protected by different Inner FEC code words, would they not? So is the circular shift just protecting against uncorrected inner-FEC codewords that would all land on the same RS-FEC codeword? Seems overkill. Are there simulations/models showing the benefit of including circular shift?

Suggested Remedy
Consider removing the circular shift if it does not offer any worthwhile benefit.

Proposed Response
This is consistent with the baseline adopted. The comment does not provide sufficient justification to support the suggested remedy.

The systematic Hamming code is most naturally defined in terms of its parity-check matrix, as pointed out in many textbooks and standard documents. One famous example is the systematic double-extended Hamming(128,119) code in OIF-400ZR and ITU-T G.709.3.

Suggested Remedy
Suggest to include the construction process and parity-check matrix of the adopted Hamming(68,60) code to enhance the completeness of the document. A Supporting Presentation will be provided.

Proposed Response
This following presentation was reviewed by the 802.3dj task force at the May Interim meeting. https://www.ieee802.org/3/dj/public/24_05/huang_3dj_01a_2405.pdf

A figure illustrating the pad bits and their interval for each inner FEC flow would be useful. I always find myself referring to the equivalent RS-FEC Figures (Figure 119u6 and Figure 119u8).

Suggested Remedy
Consider adding a figure illustrating the pad insertion and interval, in the same style as Figure 119-6

Proposed Response
This following presentation was reviewed by the 802.3dj task force at the May Interim meeting. https://www.ieee802.org/3/dj/public/24_05/huang_3dj_01a_2405.pdf

The following presentation was reviewed by the 802.3dj task force at the May Interim meeting. https://www.ieee802.org/3/dj/public/24_05/huang_3dj_01a_2405.pdf

Implement the suggested remedy with editorial license.
Phase of inner FEC pad vs outer FEC parity bits:
- An inaccuracy in the path data delay of up to 12ps due to arbitrary phase between the output FEC parity bits and the inner FEC pad bits of the phase is not accounted for.
- This arbitrary phase would affect the path data delay values.
- Almost negligible, if my math is correct.

**Suggested Remedy**

3 possible ways to address:

a. Impose a phase relationship between the RS FEC code word boundaries and the inner FEC pad bits, which would mean large-scale changes to the draft.
b. Specify (in clause 90, perhaps) that the path data delay contribution through the inner FEC sublayer shall be strictly additive to the path data delay contribution through the PCS and PMA layers.
c. Ignore. Based on 90A.7, the effect here is small enough to not address specifically.

"Whether the potential delay difference between the aggregated delay and the sum of the individual function delays is small enough to satisfy the timing requirements is up to the individual application."

I prefer option (c). It should not be necessary to add specific text or impose new logical rules to the Inner FEC pad bits to address a potential 12ps path data delay impairment.

**Proposed Response**

PROPOSED REJECT.

The following related presentation was reviewed by the 802.3dj task force at the May Interim meeting. [https://www.ieee802.org/3/dj/public/24_05/he_3dj_01a_2405.pdf](https://www.ieee802.org/3/dj/public/24_05/he_3dj_01a_2405.pdf)

It appeared that there was no consensus to make any related changes to the draft.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

The last paragraph describing options for how the pad insertion could be done is unnecessary. The requirement that it occurs every 8704 CW and follows the Figure 177-6 is sufficient.

**Suggested Remedy**

Remove the last paragraph of 177.4.6

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggest remedy with editorial license.

**Proposed Response**

Delete the paragraph.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggest remedy with editorial license.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

**Proposed Response**

Pad Frame Alignment Sequence

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

Comment Type: T  Comment Status: D  pad insertion (bucket)

The details of how to use the IBSF are beyond the scope of this standard. Does this mean this is vendor discretionary? Or will it be defined in other standard?

Suggested Remedy
Clarify in the text where the use of the IBSF will be defined.

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggestion remedy with editorial license.

Comment Type: TR  Comment Status: D  precoding

The 128,120 Hamming code is very sensitive to error propagation since it can correct up to one error in hard decoding and three errors in soft decoding. Hence, precoding is required

Suggested Remedy
Add precoding, and use the same definition of precoding similar to 176.9.1.2.

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.

Background and proposed changes are provided in the "Precoding" slides in Figure 177-2 in following editorial presentation for CRG review.

URL/brown_3dj_02_2406

Comment Type: T  Comment Status: D  Inner FEC Sync (bucket)

This subclause is confusing and seems to be prescribing a specific implementation. The goal of the process is to find codeword boundaries and remove the pad. If we simply reverse the processes of the tx, this process would (in a logical sense) be performed on the interleaved stream, and would search for the (interleaved) FS pattern

Suggested Remedy
Rewrite the text to describe searching for the FS pattern and finding it at the expected interval

Proposed Response
PROPOSED REJECT.
The comment does not provide sufficient justification to support the suggested remedy. The existing text is consistent with the adopted baseline.

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using response to comment #547
Monitor and drop says you monitor on all flows. But Figure 177-7 is a per flow state diagram. So is each Flow checking for 140 bad out of 150? And 150 is not a multiple of 8 for it to span across all flows evenly.

Suggested Remedy
Change:
"keeps monitoring 150 consecutive codewords on all flows, if at least 140 codewords are invalid, drop sync and restart from step a)."
To:
"each flow counts the number of invalid codewords seen in consecutive non-overlapping 150 codeword windows, if at least 140 codewords are invalid, drop sync and restart from step a)."

Proposed Response

Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.

A figure illustrating the possible one bit-pair of skew and the relationship to the Inner FEC flows would be very helpful here. I only understand because I recall the Task Force presentations!

Suggested Remedy
Consider adding a figure illustrating how the position of the 1 bit-pair of skew determines the Inner FEC flow number.

Proposed Response

Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.

Note that when there is more than one bit error in a codeword there is a chance that the soft decision decoder could miscorrect the codeword.

Proposed Response

Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

Comment Type: TR/technical required

Comment Status: D/dispatched

SuggestedRemedy:

In Figure 177-8, the input variable of state FS_LOCK_INIT is not correct. It would cause a FS lock error.

Propose change:

Change the input variable from `!all_synced` to `all_synced & !fs_lock`.

Change the definition of `all_synced` from:

A Boolean variable that is set to true when sync_flow<x> is true for all eight flows and is set to false when sync_flow<x> is false for any x.

...to:

A Boolean variable that is set to true when inner FEC flow 0 is identified and is set to false when sync_flow<x> is false for any x.

(in page 258 line 48-50)

Proposed Response: Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Change the condition for FS_LOCK_INIT state from "!all_synced" to "all_synced & !fs_lock"

Change the definition of variable "all_synced" from:

"A Boolean variable that is set to true when sync_flow<x> is true for all eight flows and is set to false when sync_flow<x> is false for any x."

...to:

"A Boolean variable that is set to true when inner FEC flow 0 is identified and is set to false when sync_flow<x> is false for any x."

Counters defined here do not seem consistent with those defined in Table 177-4.

Proposed Response: Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment # 183.

Add a counter for uncorrectable codewords (detected with additional one bit parity)

Proposed Response: Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment # 183.

Fix <= symbol in Figure 177-8

Proposed Response: Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.
In order for the Inner FEC in combination with the SM-PMA above to interoperate with the already specified 200GBASE-R, 400GBASE-R, and 800GBASE-R PCS, the total skew introduced by the Inner FEC plus the SM-PMA above should be no higher than the the BM-PMA defined for each rate. Furthermore, the skew should exclude the systematic skew that is added then removed by the 8:1 and 16:2 SM-PMA for 200G/400G.

**Suggested Remedy**

Specify the maximum skew for the combination of Inner FEC sublayer and the SM-PMA sublayer above it, excluding the systematic skew added then removed by the SM-PMA. A number needs to be determined.

**Proposed Response**

Proposed Accept in Principle.

Add an editor's note based on the suggested remedy. A presentation regarding this comment is expected.

Annex title unnecessarily uses the acronym IMDD. Not clear what purpose is achieved that cannot be achieved simply by omitting the use of the acronym IMDD.

**Suggested Remedy**

Delete the acronym IMDD.

**Proposed Response**


The reference to 179.8.9 seems inappropriate here since that subclause contains cross-references specific to the Clause 179.

**Suggested Remedy**

Replicate the content of 179.8.9 here, replacing references to Clause 179 electrical requirements to the corresponding references in Clause 178.

The reference impedance should match the system impedance, Rd as defined in COM spreadsheets.

**Suggested Remedy**

92-ohm, TBD, or straw poll based on proposed values presented in Task Force contributions.

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**Sort Order:** Clause, Subclause, page, line

**Comment Status:** D/dispatched  A/accepted  R/rejected     RESPONSE STATUS: O/open W/written  C/closed Z/withdrawn

---

**Proposed Accept in Principle.**

Implement with editorial license and discretion.
<table>
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<th>SC</th>
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<th>Commenter</th>
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<td>178.9.2</td>
<td>P275</td>
<td>L48</td>
<td>#230</td>
<td>TR</td>
<td>D</td>
<td>Li, Mike</td>
<td>Intel</td>
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<td>Rational, considering the common and cost effective 1.85mm connector BW, and associated ~7% measurement error, give rise to this number.</td>
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<td>Resolve using the response to comment #60.</td>
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<td>TX AC CM (bucket)</td>
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<td>SCMR may need to be relaxed for 200Gb/s. Measure of 15dB full band at TP0v given full band Vcm noise of 80mVpp at TP2.</td>
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<td>PROPOSED REJECT.</td>
<td></td>
<td>The suggested remedy does not propose an actionable (within the draft) remedy. A question or call to action is not a valid request.</td>
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<td>Resolve using the response to comment #28.</td>
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<td>178</td>
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<td>P276</td>
<td>L19</td>
<td>#231</td>
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<td>D</td>
<td>Li, Mike</td>
<td>Intel</td>
<td>B-T filter BW</td>
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<td></td>
<td>The Bessel-Thomson filter should track fr. Between 0.5 fb and 0.6 fb have been shown in presentations.</td>
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<td>RLcc (min) is TBD</td>
<td></td>
<td>Change it to 3.25 db. See lim_3dj_01_2403a.</td>
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<td>Resolve using the response to comment #28.</td>
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**TYPE:** TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general

**COMMENT STATUS:** D/dispatched A/accepted R/rejected  **RESPONSE STATUS:** O/open W/written C/closed Z/withdrawn

**SORT ORDER:** Clause, Subclause, page, line
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

**Comment Type**: TR
**Comment Status**: D
**Li, Mike** Intel

"absolute value of step size for all taps (max)" ingreated from 802.3ck, value not suitable for 802.3dj at 200G/L, and no simod supports"

**SuggestedRemedy**
Change it 0.02, see lim_3dj_01_2405

**Proposed Response**
PROPOSED REJECT.

The following presentation was reviewed by the task force at the May 2024 interim meeting:

The comment and the presentation do not provide sufficient justification to support the suggested remedy.

The step sizes in the PMD Tx specifications do not need to match the COM parameters. They are based on reasonable implementation and measurement accuracy assumptions.


---

**Comment Type**: TR
**Comment Status**: D
**Li, Mike** Intel

"value at min state for c(û1) (max)" from 802.3ck, parameter not suitable for 802.3dj at 200G/L, and no simod supports"

**SuggestedRemedy**
change it to -0.4, see lim_3dj_01_2405

**Proposed Response**
PROPOSED REJECT.

The following presentation was reviewed by the task force at the May 2024 interim meeting:

The comment and the presentation do not provide sufficient justification to support the suggested remedy.

The step sizes in the PMD Tx specifications do not need to match the COM parameters. They are based on reasonable implementation and measurement accuracy assumptions.


---

**Comment Type**: TR
**Comment Status**: D
**Mellitz, Richard** Samtec

"value at min state for c(û1) (max)" from 802.3ck, parameter not suitable for 802.3dj at 200G/L, and no simod supports"

**SuggestedRemedy**
change SNDR to 33.5 dB.

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #45.
<table>
<thead>
<tr>
<th>Cl 178</th>
<th>SC 178.9.2.1.2</th>
<th>P 276</th>
<th>L 38</th>
<th># 236</th>
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<td>Intel</td>
<td>Comment Type: TR</td>
<td>Comment Status: D</td>
<td>Output jitter (max) TBD</td>
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<td>Proposed Response</td>
<td>Response Status: W</td>
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<td>The comment addresses an open TBD and the suggested remedy is reasonable, but consensus is not obvious. There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406. For CRG discussion.</td>
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<table>
<thead>
<tr>
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<th>L 37</th>
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<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
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<td></td>
<td></td>
<td>It is assumed based on the subclause/page/line, the suggested remedy seems to ask to change Table 178-8. Resolve using the response to comment #28.</td>
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<table>
<thead>
<tr>
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<th>P 278</th>
<th>L 26</th>
<th># 238</th>
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<td>The comment addresses an open TBD and the suggested remedy is reasonable, but consensus is not obvious. There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406. For CRG discussion.</td>
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<td>The comment addresses an open TBD and the suggested remedy is reasonable, but consensus is not obvious. There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406. For CRG discussion.</td>
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</tbody>
</table>

---

**Output jitter (max) TBD**

**Suggested Remedy**
- Reaplace TBDs with:
  - J rms : 0.023 UI
  - J 2.7u03: 0.102 UI
  - J 2.7u: 0.110 UI
- Even–odd jitter, pk-pk: 0.025 UI
- See lim_3dj_01_2403a, lim_3dj_01_2405, and [1], [2], [3]

**PROPOSED ACCEPT IN PRINCIPLE.**
- The comment addresses an open TBD and the suggested remedy is reasonable, but consensus is not obvious. There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406. For CRG discussion.

**scale ERL parameter form 0.3ck**

**Suggested Remedy**
- In Table 178-7 change TBD's as follows
  - Tr 0.005 ns
  - η 0 GHz
  - N 400 UI
- See lim_3dj_01_2403a

**PROPOSED ACCEPT IN PRINCIPLE.**
- It is assumed based on the subclause/page/line, the suggested remedy seems to ask to change Table 178-8. Resolve using the response to comment #28.

---

**TX jitter**

**Suggested Remedy**
- Replace it with 0.005 ns, see lim_3dj_01_2403a

**PROPOSED ACCEPT IN PRINCIPLE.**
- Resolve using the response to comment #28.

---

**E RL**

**Suggested Remedy**
- Replace it with 0 GHz, see lim_3dj_01_2403a

**PROPOSED ACCEPT IN PRINCIPLE.**
- Resolve using the response to comment #28.
Comment Type TR  Comment Status D  ERL
SuggestedRemedy  repalce it with 0.618, see lim_3dj_01_2403a
Proposed Response Response Status W  PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #28.

Comment Type TR  Comment Status D  ERL
SuggestedRemedy  repalce it with 400, see lim_3dj_01_2403a
Proposed Response Response Status W  PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #28.

Comment Type TR  Comment Status D  ERL
SuggestedRemedy  repalce it with 44, see lim_3dj_01_2403a, lim_3dj_01_2405
Proposed Response Response Status W  PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #28.

Comment Type TR  Comment Status D  ERL
SuggestedRemedy  repalce it with 80 GHz, see lim_3dj_01_2403a
Proposed Response Response Status W  PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #28.

Comment Type TR  Comment Status D  ERL
SuggestedRemedy  repalce it with 400, see lim_3dj_01_2403a
Proposed Response Response Status W  PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to #30.

Comment Type TR  Comment Status D  ERL
SuggestedRemedy  repalce it with 44, see lim_3dj_01_2403a, lim_3dj_01_2405
Proposed Response Response Status W  PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #28.

The baud rate has doubled from .3ck,. If loading is scaled down with the baud rate, the physical setting time would remain unchanged. Adjust Nv and Dp accordingly.

SuggestedRemedy  Change Nv=TBD to Nv=400
Proposed Response Response Status W  PROPOSED ACCEPT IN PRINCIPLE.
The comment addresses an open TBD and the suggested remedy is reasonable, but consensus is not obvious.

There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406.

For CRG discussion.
<table>
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<td><strong>Comment Status</strong>: D</td>
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<tr>
<td>adjust SCMR with loss correction factor</td>
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<tr>
<td><strong>Suggested Remedy</strong>: add + loss correction factor to equation 178-1</td>
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<td>Resolve using the response to comment #45.</td>
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<td>dERL is TBD</td>
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<tr>
<td><strong>Suggested Remedy</strong>: replace it with -3dB, see lim_3dj_01_2403a</td>
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<td>Resolve using the response to comment #28.</td>
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<tr>
<td>B-T filter BW</td>
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<tr>
<td>The Bessel-Thomson filter should track fr which between 0.5 and 0.6 has been shown in presentations.</td>
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<tr>
<td><strong>Suggested Remedy</strong>: change TBD to 67GHz</td>
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<td>Resolve using the response to comment #60.</td>
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<td>BER/FLR</td>
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<tr>
<td>FEC symbol error ratio is not aligned with DER value</td>
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<td><strong>Suggested Remedy</strong>: change it to 2e-3</td>
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<td><strong>Response Status</strong>: W</td>
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<tr>
<td>The comment addresses an inconsistency between FEC SER and DER.</td>
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<tr>
<td>The same value appears in Table 179-11 for the CR test. Table 176D-4 has TBD instead.</td>
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<tr>
<td>The required test performance needs to be aligned with the DER allocation for each interface, but consensus on the suggested remedy is not obvious. The test requirement should to account for correlated errors and the FEC symbol interleaving scheme.</td>
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<tr>
<td>However, the suggestion is likely a move in the right direction.</td>
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<tr>
<td>Implement the suggested remedy, and add an editor's note below Table 178-10 stating that the FEC symbol error ratio requirement need to be verified and updated as necessary.</td>
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<tr>
<td>Apply similar changes in Table 179-11.</td>
<td></td>
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<tr>
<td>Add a similar editor's note below table 176D-4 and, if required following resolution of other comments, in 176E as appropriate.</td>
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<td><strong>Comment Status</strong>: D</td>
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<tr>
<td>IL for Class A PKG are TBDs</td>
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</tr>
<tr>
<td><strong>Suggested Remedy</strong>: For Test1, replacel them with IL(min): 13.5dB, ILmax: 14.5 dB; for Test2, replacel them with IL(min): 27.5dB, ILmax: 28.5; see li_3dj_01_2311, liusted_3dj_02_2311.pdf</td>
<td></td>
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<tr>
<td><strong>Proposed Response</strong>:</td>
<td><strong>Response Status</strong>: W</td>
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<tr>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
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**TYPE**: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
**COMMENT STATUS**: D/dispatched  A/accepted  R/rejected  **RESPONSE STATUS**: O/open  W/written  C/closed  Z/withdrawn
**SORT ORDER**: Clause, Subclause, page, line
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

**Comment Type:** TR

**Comment Status:** D

**SuggestedRemedy:**

For Test1, replace them with IL(min): 10.5dB, ILmax: 11.5 dB; for Test2, replace them with IL(min): 21.5dB, ILmax: 22.5; see li_3dj_01_2311, lusted_3dj_02_2311.pdf  

**Proposed Response:** PROPOSED ACCEPT.

**Comment Status:** D

**Response Status:** W

**Comment:** The test channel COM, calculated per items 3) through 7) in 93C.2, is at least 3 dB

**SuggestedRemedy:**

Change it to "The test channel COM, calculated per item e) through h) in 178.9.3.3, is at least 3 dB" to be correct  

**Proposed Response:** PROPOSED ACCEPT IN PRINCIPLE. Implement the suggested remedy with editorial license.

**Comment Status:** D

**Response Status:** W

**Comment:** Minimum COM in Table 178-11 is TBD  

**SuggestedRemedy:**

Replace TBD with 3 dB in Table 178-11 and in line 28 of page 284

**Proposed Response:** PROPOSED ACCEPT IN PRINCIPLE. Resolve using the response to comment #250.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

**Comment #250**

Comment Type: TR

Comment Status: D

Suggested Remedy:

- Use 3 dB as minimum COM as in .3ck or TBD to 3 (same in 178.10.1 line 28)

Proposed Response:

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #250.

**Comment #34**

Comment Type: TR

Comment Status: D

Suggested Remedy:

- Repalced it with 28 dB, Class A PKG pairs with Class A PKG
  25 dB, Class A PKG pairs with Class B PKG
  22 dB, Class B PKG pairs with Class B PKG

Proposed Response:

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #34.

**Comment #252**

Comment Type: TR

Comment Status: D

Suggested Remedy:

- Repalced the TBD with 11 dB, see oif2023.531.00

Proposed Response:

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #28.

**Comment #34**

Comment Type: T

Suggested Remedy:

- The reader may be tempted to interpret the parameters in Tables 178-12 and 178-13 as implementation requirements. E.g., “Receiver discrete-time equalizer parameters” may mistakenly be interpreted as requirements for receiver implementations. It would be worthwhile to add text here clarifying that the parameters represent a minimum level performance and that there is expected to be a variety of approaches to implementation that achieve this performance.

Proposed Response:

Add text stating the parameter values in the tables are chosen to represent the minimum required transmitter and receiver performance and they do not represent required implementation details. Compliant implementations are only required to meet or exceed this minimum level of performance. Similarly in 179.11.7 and 176.D.4.1.

Add the following note to 178.10.1.

"NOTE—The parameters and values in Table 178–12 and Table 178–13 correspond to behavioral models of transmitters and receivers that are compliant to the PMD specifications in this clause. The purpose of these parameters and values is to compute COM, a channel metric, and they do not represent requirements for transmitter and receiver implementations. It is expected that a variety of approaches to transmitter and receiver implementation will be able to meet the PMD specifications in this clause."

Add similar notes to 179.11.7 and 176.D.4.1.

Implement with editorial license.
**Comment Type**: TR  **Comment Status**: D  **COM pkg tau (bucket)**

**SuggestedRemedy**

Replace the value in Table 178-12 (class A package) from 6.141e-4 ns/mm to 6.141e-3 ns/mm.

**Proposed Response**  **Response Status**: W  PROPOSED ACCEPT IN PRINCIPLE.

Resolving using the response to comment #118.

**Comment Type**: T  **Comment Status**: D  **COM ref pkg (bucket)**

In Table 178-12, the transmission line parameters for the "Class B package model" do not match the adopted baseline proposal li_3dj_01a_2311 slide 9.

**SuggestedRemedy**

Replace the characteristic impedance for stage 1 with 92 Ohms, and the length/characteristic impedances for stage 2 through 4 with 70 Ohms/1 mm, 80 Ohm/1 mm, and 100 Ohm/0.5 mm respectively. Similarly in Table 179-15 and Table 176D-6.

**Proposed Response**  **Response Status**: W  PROPOSED ACCEPT.

Resolving using the response to comment #35.

**Comment Type**: TR  **Comment Status**: D  **R_0**

**SuggestedRemedy**

Replace TBD with 50 Ohm

**Proposed Response**  **Response Status**: W  PROPOSED ACCEPT IN PRINCIPLE.

Resolving using the response to comment #35.
<table>
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<tr>
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<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
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<td>178</td>
<td>178.10.1</td>
<td>285</td>
<td>38</td>
<td>254</td>
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<td>Intel</td>
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<td>178</td>
<td>178.10.1</td>
<td>285</td>
<td>41</td>
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<td>Intel</td>
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<td>Rd(R) TBD</td>
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</table>

### Comment 178, SC 178.10.1, P 285, L 38
**Detected Problem:**
Repaced it w 50 ohm, see see lim_3dj_01_2405, slide 5

**Proposed Response**
**Response Status**
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #35.

**Comment 178, SC 178.10.1, P 285, L 40
**Detected Problem:**
(Table 178û12): Computation can be independent of R0. Add a note to explain. S parameter can utilize any R0. For computation purposes s-parameters are converted to 50 ohms which is the native impedance for the most common test equipment.

**Proposed Response**
**Response Status**
PROPOSED ACCEPT IN PRINCIPLE.
There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406.

**Comment 178, SC 178.10.1, P 285, L 41
**Detected Problem:**
Change R0 for TBD to 50 ohms and add a note indicating the imported s-parameter are to be converted into 50 ohm reference before computation.

**Proposed Response**
**Response Status**
PROPOSED ACCEPT IN PRINCIPLE.
There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406.

**Comment 178, SC 178.10.1, P 285, L 41
**Detected Problem:**
Change R0 for TBD to 50 ohms and add a note indicating the imported s-parameter are to be converted into 50 ohm reference before computation.

**Proposed Response**
**Response Status**
PROPOSED ACCEPT IN PRINCIPLE.
There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406.

**Comment 178, SC 178.10.1, P 285, L 41
**Detected Problem:**
Repaced it w 46.25 ohm, see see lim_3dj_01_2405, slide 5

**Proposed Response**
**Response Status**
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #396.

**Comment 178, SC 178.10.1, P 285, L 41
**Detected Problem:**
Repaced it w 46.25 ohm, see see lim_3dj_01_2405, slide 5

**Proposed Response**
**Response Status**
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #396.

**Comment 178, SC 178.10.1, P 285, L 41
**Detected Problem:**
Repaced it w 46.25 ohm, see see lim_3dj_01_2405, slide 5

**Proposed Response**
**Response Status**
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #396.

**Comment 178, SC 178.10.1, P 285, L 41
**Detected Problem:**
Repaced it w 46.25 ohm, see see lim_3dj_01_2405, slide 5

**Proposed Response**
**Response Status**
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #396.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

**Comment Type:** Parameters "f_min", "delta_f", and "M" are defined in Table 178-13 but are not used in Annex 178A. Any guidance on appropriate choices for measurement start frequency, frequency step, and simulation time step may be provided in a general way in Annex 178A (see, for example, 178A.1.3). The values for these parameters rarely, if ever, change and it seems unnecessary to add a row for them to an already lengthy table.

**Suggested Remedy:**
Remove these parameters from Table 178-13. Also remove these parameters from Tables 179-16 and Table 176D-7.

**Proposed Response:**
PROPOSED ACCEPT IN PRINCIPLE.
The suggested remedy is reasonable, but consensus is not obvious.

**Other comments:**
Other comments suggest changing M from TBD to 32, as in previous projects.
Pending CRG discussion.

---

**Comment Type:**
Receiver 3 dB bandwidth fr value in Table 178-13 is TBD

**Suggested Remedy:**
Replace TBD with 0.58*fb

**Proposed Response:**
PROPOSED ACCEPT IN PRINCIPLE.

---

**Comment Type:**
The COM parameter values for the 200GBASE-KR1, 400GBASE-KR2, 800GBASE-KR4 and 1.6TBASE-KR8 PMDs are TBDs

**Suggested Remedy:**
In table 178-13, use the COM parameter values from https://www.ieee802.org/3/dj/public/24_01/healey_3dj_01_2401.pdf slide 18, which are:

- f_r = 0.58
- c(-3) = 0
- c(-2) = 0
- c(-1) = 0
- c(0) = 1
- c(1) = 0
- A_v = 0.413
- A_fe = 0.413
- A_ne = 0.45
- eta_0 = 6e-9
- SNR_TX = 33
- sigma_RJ = 0.01
- A_DD = 0.02
- R_LM = 0.95
- d_w = 5
- Nfix = 10
- N_q = 0
- N_f = 0
- N_max = 0
- b_max(1) = 0.85
- b_min(1) = 0

Additionally, set MLSE = 0 (not enabled)

**Proposed Response:**
PROPOSED ACCEPT IN PRINCIPLE.
The comment addresses open TBDs and the suggested remedy may be reasonable, but consensus is not obvious.
This comment proposes a large set of COM parameter values together, while other comments address subsets of these parameters.
The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406.
For CRG discussion.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

**Comment Type: TR**

Presentation so far have used fr of 0.5, 0.55, 0.58, and 0.6. 67 Ghz limits on test equipment and cabling/connector modal physics suggest at least a 9 dB loss is required for good measurements at 67 GHz. Set fr to 0.6 or lower to achieve this.

**Suggested Remedy:**

change TBD to 0.6.

**Proposed Response:**

PROPOSED ACCEPT IN PRINCIPLE.

The comment addresses an open TBD and the comment and SR are reasonable, but consensus is not obvious.

There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406.

For CRG discussion.

---

**Comment Type: TR**

The max/min values and step size of transmitter equalizer in Table 178-13 need to match those in the Table 178-6 and those in sub-clauses 179.9.4.1.4 & 179.9.4.1.5

**Suggested Remedy:**

On line 14 replace TBD with -0.06:0.02:0
On line 18 replace TBD with 0:0.02:0.12
On line 22 replace TBD with -0.34:0.02:0
On line 26 replace TBD with 0.5
On line 28 replace TBD with -0.2:0.02:0

**Proposed Response:**

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #37.

---

**Comment Type: TR**

C(-3) not needed

**Suggested Remedy:**

Delete it, see see lim_3dj_01_2405, slide 5

**Proposed Response:**

PROPOSED ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the task force at the May 2024 interim meeting: https://www.ieee802.org/3/dj/public/24_05/lim_3dj_01_2405.pdf

The comment and the presentation do not provide sufficient justification to support the suggested remedy.

Resolve using the response to comment #37.

---

**Comment Type: TR**

Presentations so far have not shown the need for Tx FFE. Change to no TXFFE until further data is provided.

Rx noise may suggest a need for the TXFFE which would improve performance. It's not clear from a channel perspective that the TX FFE is not a zero sum gain compared to the Rx noise loss of COM. Until Rx FFE noise is better defined zero out TxFFE.

**Suggested Remedy:**

Change TBDs for c(-3),c(-2),c(-1), and c(1) to zero. Set C(0) tp 1.

**Proposed Response:**

PROPOSED ACCEPT IN PRINCIPLE.

There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406.

For CRG discussion.
The following presentation was reviewed by the task force at the May 2024 interim meeting:
The comment and the presentation do not provide sufficient justification to support the suggested remedy.
Resolve using the response to comment #37.

PROPOSED ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the task force at the May 2024 interim meeting:
The comment and the presentation do not provide sufficient justification to support the suggested remedy.
Resolve using the response to comment #37.

PROPOSED ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the task force at the May 2024 interim meeting:
The comment and the presentation do not provide sufficient justification to support the suggested remedy.
Resolve using the response to comment #37.

PROPOSED REJECT.

The following presentation was reviewed by the task force at the May 2024 interim meeting:
The comment and the presentation do not provide sufficient justification to support the suggested remedy.
Resolve using the response to comment #37.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

<table>
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<tr>
<th>Cl 178</th>
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<th>P 286</th>
<th>L 32</th>
<th># 264</th>
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<td>Comment Status D</td>
<td>COM CTLE parameters</td>
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<th>P 286</th>
<th>L 40</th>
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<th>P 286</th>
<th>L 42</th>
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<th>L 46</th>
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<td>0.413, 0.413, 0.608 V (Av, Afe, Ane)</td>
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<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
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<tr>
<td>Resolve using the response to comment #38.</td>
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</table>
Comment Type  T  Comment Status  D  COM voltage parameters
Transmitter differential peak output voltage in Table 178-13 is TBD

Suggested Remedy
- Replace \(A_v\) with 0.413 V
- Replace \(A_{fe}\) with 0.413 V
- Replace \(A_{ne}\) with 0.608 V

Proposed Response  Response Status  W
- PROPOSED ACCEPT IN PRINCIPLE.
- Resolve using the response to comment #38.

Comment Type  TR  Comment Status  D  COM voltage parameters
Transmitter transition time \(T_{tr}\) value in Table 178-13 is TBD

Suggested Remedy
- Replace TBD with \(T_{tr} = 4\) ps

Proposed Response  Response Status  W
- PROPOSED ACCEPT IN PRINCIPLE.
- Resolve using the response to comment #39.

Comment Type  TR  Comment Status  D  COM \(\eta_0\)

Suggested Remedy
- Replace it with \(5 \times 10^{-9} \text{ V}^2/\text{GHz}\)

Proposed Response  Response Status  W
- PROPOSED REJECT.
- The presentation is based on COM4.50draft3 using MLSE. The MLSE implementation within that code is however tentative and has not been fully debugged. Making a decision on the critical \(\eta_0\) parameter is therefore premature.
- The comment and the presentation do not provide sufficient justification to support the suggested remedy.
- Although Straw Poll #7 in the May 2024 meeting showed consensus for the value 1e-8 for C2C and C2M, CR/KR were not addressed.
- The values 5e-9 and 6e-9 are suggested in various comments without substantial justification.
- Further analysis and consensus building are encouraged.
Comment Type: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general

SORT ORDER: Clause, Subclause, page, line

COMMENT STATUS: D/dispatched  A/accepted  R/rejected  RESPONSE STATUS: O/open  W/written  C/closed  Z/withdrawn

EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

---

### Comment Type: TR

**Comment Status:** D

**Suggested Remedy:**

- Replace TBD with 6e⁻⁹ V²/GHz

**Proposed Response:**

- **Response Status:** W

- PROPOSED REJECT.

- Resolve using the response to comment #269.

---

### Comment Type: TR

**Comment Status:** D

**Suggested Remedy:**

- Replace TBD with 33 dB

**Proposed Response:**

- **Response Status:** W

- PROPOSED ACCEPT IN PRINCIPLE.

- The following presentation was reviewed by the task force at the May 2024 interim meeting:


- The comment and the presentation do not provide sufficient justification to support the suggested remedy. Resolve using the response to comment #45.

---

### Comment Type: TR

**Comment Status:** D

**Suggested Remedy:**

- Replace TBD with 0.01 UI

**Proposed Response:**

- **Response Status:** W

- PROPOSED ACCEPT IN PRINCIPLE.

- The following presentation was reviewed by the task force at the May 2024 interim meeting:


- The comment and the presentation do not provide sufficient justification to support the suggested remedy. Resolve using the response to comment #236.

---

### Comment Type: TR

**Comment Status:** D

**Suggested Remedy:**

- Replace TBD with 0.95

**Proposed Response:**

- **Response Status:** W

- PROPOSED ACCEPT IN PRINCIPLE.

- The following presentation was reviewed by the task force at the May 2024 interim meeting:


- The comment and the presentation do not provide sufficient justification to support the suggested remedy. However, the comment addresses an open TBD and the suggested remedy is reasonable. The same value is suggested in 5 comments (273, 409, 420, 436, 442). Implement the suggested remedy.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

Comment Type TR  Comment Status D  SuggestedRemedy
Level separation mismatch ratio RLM in Table 178-13 is TBD

Proposed Response
Replace TBD with 0.95

Li, Tobey  MediaTek

Comment Type TR  Comment Status D  SuggestedRemedy
Nfix TBD

Proposed Response
Replace it w 24, see lim_3dj_01_2405, slide 5

Li, Mike  Intel

Comment Type TR  Comment Status D  SuggestedRemedy

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #273.

Li, Mike  Intel

Comment Type TR  Comment Status D  SuggestedRemedy

Proposed Response
PROPOSED REJECT.
The comment addresses an open TBD and the suggested remedy is reasonable, but consensus is not obvious.
The following presentation was reviewed by the task force in the May 2024 interim meeting: https://www.ieee802.org/3/dj/public/24_05/lusted_3dj_07_2405.pdf
The comment and the presentation do not provide sufficient justification to support the suggested remedy.
The following straw poll was taken in the May 2024 interim meeting:
Straw Poll #7
I would support putting the COM parameter values eta_0, d_w and
and the editors note for AUI C2M and AUI C2C (per lusted_3dj_07_2405, slides 3-4) into the P802.3dj draft specification
Results (all): Y: 67, N: 0, A: 23
The results show consensus for d_w=5 for C2C and C2M.

Li, Mike  Intel

Comment Type TR  Comment Status D  SuggestedRemedy

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #273.

Li, Mike  Intel

Comment Type TR  Comment Status D  SuggestedRemedy

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #273.
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
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<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Proposed Response</th>
<th>Response Status</th>
<th>Comment Status</th>
<th>Response Status</th>
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<th>Comment Status</th>
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<tbody>
<tr>
<td>178</td>
<td>178.10.1</td>
<td>287</td>
<td>16</td>
<td>277</td>
<td>TR</td>
<td>D</td>
<td>NI TBD</td>
<td>Replace it w 5.</td>
<td>TR</td>
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<td>D</td>
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<td>178</td>
<td>178.10.1</td>
<td>287</td>
<td>17</td>
<td>278</td>
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<td>D</td>
<td>Namx TBD</td>
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<td>178</td>
<td>178.10.1</td>
<td>287</td>
<td>18</td>
<td>279</td>
<td>TR</td>
<td>D</td>
<td>Wamx(j) TBD</td>
<td>Replace it w 0.7.</td>
<td>TR</td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td>W</td>
<td>D</td>
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<tr>
<td>178</td>
<td>178.10.1</td>
<td>287</td>
<td>19</td>
<td>280</td>
<td>TR</td>
<td>D</td>
<td>bmaxTBD</td>
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<td>W</td>
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<td>287</td>
<td>20</td>
<td>281</td>
<td>TR</td>
<td>D</td>
<td>bminTBD</td>
<td>Replace it w 0.3.</td>
<td>TR</td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td>W</td>
<td>D</td>
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</table>

**Note:**

- **Comment Type:** TR/technical required, ER/editorial required, GR/general required
- **Comment Status:** D/dispatched, A/accepted, R/rejected
- **Response Status:** O/open, W/written, C/closed, Z/withdrawn

**Type:**

- **TYPE:** TR/technical required, ER/editorial required, GR/general required
- **COMMENT STATUS:** D/dispatched, A/accepted, R/rejected
- **RESPONSE STATUS:** O/open, W/written, C/closed, Z/withdrawn

**Sort Order:**

- **SORT ORDER:** Clause, Subclause, page, line

---

The comment addresses an open TBD and the suggested remedy is reasonable, but consensus is not obvious. There are several comments on this topic. The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406. For CRG discussion.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

### Comment Type: TR  Comment Status: D
CL 178  SC 178.10.1  L 22  # 283
Li, Mike  Intel

**Comment:** no floating tap coefficient max limit

**Suggested Remedy:**

- Added a new line for floating tap coefficient max limit and set it to 0.05
  
  see \textit{lim\_3dj\_01\_2405}, slide 5

**Proposed Response:**

- PROPOSED ACCEPT IN PRINCIPLE.
  
  Resolve using the response to comment #275.

### Comment Type: TR  Comment Status: D
CL 178  SC 178.10.1  L 23  # 284
Li, Mike  Intel

**Comment:** no floating tap coefficient min limit

**Suggested Remedy:**

- Added a new line for floating tap coefficient min limit and set it to -0.05
  
  see \textit{lim\_3dj\_01\_2405}, slide

**Proposed Response:**

- PROPOSED ACCEPT IN PRINCIPLE.
  
  Resolve using the response to comment #275.

### Comment Type: TR  Comment Status: D
CL 178  SC 178.10.2  L 23  # 41
Mellitz, Richard  Samtec

**Comment:** SNR\_TX can be SNDR when loss correction is employed

**Suggested Remedy:**

- Change TBD to 33.5 dB

**Proposed Response:**

- PROPOSED ACCEPT IN PRINCIPLE.
  
  Resolve using the response to comment #45.
**Comment Type:** TR  
**Comment Status:** D

**Channel ILdd (bucket)**

Define the channel insertion loss to include the package i.e TP0d to TP5d.

**Suggested Remedy**

Change TBD to 40 dB

**Proposed Response**

PROPOSED REJECT.

The comment addresses an open TBD, but the ILdd limit in this subclause is expected to be a frequency-dependent mask. The suggested remedy is a single number, which is inadequate.

**Comment Status:** D

**Response Status:** W

---

**Comment Type:** TR

**Comment Status:** D

**Channel ILdd (bucket)**

Define the channel insertion loss to include the package i.e TP0d to TP5d.

**Suggested Remedy**

Change TBD to 40 dB

**Proposed Response**

PROPOSED REJECT.

The comment addresses an open TBD, but the ILdd limit in this subclause is expected to be a frequency-dependent mask. The suggested remedy is a single number, which is inadequate.

**Comment Status:** D

**Response Status:** W

---

**Comment Type:** TR

**Comment Status:** D

**ERL**

scale ERL parameter form 0.3ck

**Suggested Remedy**

In table 178-14 change TBD's as follows
- Tr 0.005 ns
- £x 0 GHz
- ?x 0.618
- N 7000 UI

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #28.

**Comment Status:** D

**Response Status:** W

---

**Comment Type:** T

**Reference to the wrong section 178A.1.6.4**

**Suggested Remedy**

Change reference to section 178A.1.8.1

**Proposed Response**

PROPOSED ACCEPT.

---

**Comment Type:** T

**Comment Status:** D

**h_ISI in equation (178A-29) should not include the main cursor (h_ISI(main) = 0)**

**Suggested Remedy**

Add a case to define h_ISI(n) = 0 for n = d+1

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.
The relationship between "detector error ratio", "PAM-L symbol error ratio", and "bit error ratio" is not documented and, as a result, not generally understood. While these quantities are related, they are not interchangeable. Prior assumptions that they are interchangeable has led to errors in the translation between COM results and expected (measured) receiver performance. This new annex gives us an opportunity to clarify the relationship between DER0 and other terms or to replace DER0 with a more generally understood term.

**Suggested Remedy**

Slide 5 of [https://www.ieee802.org/3/dj/public/23_11/healey_3dj_01a_2311.pdf](https://www.ieee802.org/3/dj/public/23_11/healey_3dj_01a_2311.pdf) suggest expressions for relationship between detector error ratio and other terms. Either replace "DER0" with a target PAM-4 symbol error ratio (or bit error ratio) and adjust the equations for calculating COM accordingly, or document the relationship between DER0 and the other two terms.

**Proposed Response**

The editorial team prepared a proposal in the comment resolution slide deck URL/ran_3dj_01_2406.

**DER0 EQ is wrong**

The factor 2/3 in equation (178A-36) is specific to PAM4. This change does not apply if the equation is rewritten. See contributions lim_3dj_02_2405.pdf and shakiba_3dj_01_2405.pdf.

**Suggested Remedy**

Change 2/3 to L/2(L-1) to make it general. Note that L=4 still yields 2/3. Please refer to contribution tbd.

**Proposed Response**

Resolve using the response to comment #362.
<table>
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<tr>
<th>Cl</th>
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<th>SC</th>
<th>178A.1.11</th>
<th>P660</th>
<th>L33</th>
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<tr>
<td>Li, Mike</td>
<td>Intel</td>
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<td>TR</td>
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<td>D</td>
<td><strong>Suggested Remedy</strong></td>
<td>M methodology MLSD_PAM EQ (178A-37)</td>
</tr>
<tr>
<td><strong>Comment</strong></td>
<td>Update the equation per slide 4 of lim_3dj_02_2405, see also a marked version in the support data sheet.</td>
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<td><strong>Response Status</strong></td>
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<table>
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<th>SC</th>
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<th>L33</th>
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<td>Huawei Technologies Canada</td>
<td><strong>Comment Type</strong></td>
<td>T</td>
<td><strong>Comment Status</strong></td>
<td>D</td>
<td><strong>Suggested Remedy</strong></td>
<td>M methodology MLSD_PAM</td>
</tr>
<tr>
<td><strong>Comment</strong></td>
<td>The factor 3/4 in equation (178A-37), as is or rewritten, is specific to PAM4. See contributions lim_3dj_02_2405.pdf and shakiba_3dj_01_2405.pdf.</td>
<td></td>
<td></td>
<td></td>
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<td><strong>Proposed Response</strong></td>
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<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
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<th>179.9.3</th>
<th>P309</th>
<th>L14</th>
<th>#</th>
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<tr>
<td>Kocsis, Sam</td>
<td>Amphenol</td>
<td><strong>Comment Type</strong></td>
<td>T</td>
<td><strong>Comment Status</strong></td>
<td>D</td>
<td><strong>Suggested Remedy</strong></td>
<td>R_0</td>
</tr>
<tr>
<td><strong>Comment</strong></td>
<td>The reference impedance should match the system impedance, Rd as defined in COM spreadsheets.</td>
<td></td>
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<tr>
<td><strong>Proposed Response</strong></td>
<td><strong>Response Status</strong></td>
<td>W</td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
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</table>

**Comment Type:** TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general  
**COMMENT STATUS:** D/dispatched A/accepted R/rejected  
**RESPONSE STATUS:** O/open W/written C/closed Z/withdrawn  
**SORT ORDER:** Clause, Subclause, page, line
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

Cl 179 SC 179.9.4 P309 L23 # 388
Kocsis, Sam
Amphenol

Comment Type T  Comment Status D  BT LP 3dB BW of "40GHz"

Suggested Remedy
"TBD" as cited in other places of the document

Proposed Response  Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
The value 40 GHz is a leftover from an older clause and has not been adopted.
Resolve using the response to comment #60.

Cl 179 SC 179.9.4 P309 L23 # 310
Li, Tobey
MediaTek

Comment Type TR  Comment Status D  4th order Bessel-Thomson filter with 3 dB bandwidth of 40 GHz is inconsistent with Clause 178.9.2, Annex 176D.3.3, and Annex 176E.3.3

Suggested Remedy
Change "40 GHz" to either TBD or 62 GHz

Proposed Response  Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
The value 40 GHz is a leftover from an older clause and has not been adopted.
Resolve using the response to comment #60.

Cl 179 SC 179.9.4 P309 L23 # 124
Sakai, Toshiaki
Socionext

Comment Type T  Comment Status D  Transmitter signal measurement filter bandwidth description.
"Unless specified otherwise, transmitter signal measurements are made for each lane separately using a fourth-order Bessel-Thomson low-pass response with 3 dB bandwidth of 40 GHz, with AC-coupled connection from TP2 to the test equipment."
The 4th-BW filter BW should be TBD GHz", the same as for CL178.9.2, AN176D.3.3 and AN176E.3.3, as the Nyquist frequency of the signal is 53.125GHz and 40GHz is too low..

Suggested Remedy
Change 40GHz to either TBD or 62 GHz

Proposed Response  Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
The value 40 GHz is a leftover from an older clause and has not been adopted.
Resolve using the response to comment #60.

Cl 179 SC 179.9.4 P309 L44 # 511
Dawe, Piers
Nvidia

Comment Type T  Comment Status D  AC common-mode voltages are not as large as this in practice, even at 200G/lane

Suggested Remedy
Reduce both AC common-mode voltage limits for CR, KR, C2C and C2M.

Proposed Response  Response Status W
PROPOSED REJECT.
The comment does not provide sufficient justification to support the suggested remedy. A question or call to action is not valid.

Cl 179 SC 179.9.4 P309 L46 # 512
Dawe, Piers
Nvidia

Comment Type TR  Comment Status D  Supply voltages and voltage swing trend downwards over the years. This 1200 mV max has not changed since 10GBASE-KR, a long time ago. C2M has 750 mV.

Suggested Remedy
Reduce 1200 mV to e.g. 1000 mV, here, in the receiver Table 179-10 and in the text in 179.9.5.2. Reduce the steady-state voltage vs max from 0.6 V to 0.5 V. Similarly for KR and C2C.

Proposed Response  Response Status W
PROPOSED REJECT.
The suggested remedy does not propose an actionable (within the draft) remedy. A question or call to action is not valid.

TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched  A/accepted  R/rejected  RESPONSE STATUS: O/open  W/written  C/closed  Z/withdrawn
SORT ORDER: Clause, Subclause, page, line
Our way of measuring jitter doesn't work well enough with the increased max host loss over 3ck. It is not clear that it can or should be fixed. Our way of defining SNDR doesn't work correctly over host loss either. This can be fixed, but "vertical and horizontal noise" act together to degrade BER: more of one goes with less of the other.

**Suggested Remedy**

Delete the SNDR and jitter specs. Add a VEC-like, TDECQ-like spec using this clause’s COM reference receiver which can be implemented in a scope. Similarly for KR and C2C.

**Proposed Response**

**Response Status:** W

PROPOSED REJECT.

The suggested remedy does not propose an actionable (within the draft) remedy. A question or call to action is not valid.

In addition, the comment includes a claim that measurements are not feasible, which is not substantiated and is contrasted by existing contributions, e.g. https://www.ieee802.org/3/dj/public/adhoc/electrical/24_0104/calvin_3dj_elec_01a_240104.pdf.

The baud rate has doubled from .3ck. If loading is scaled down with the baud rate, the physical setting time would remain unchanged. Adjust Np and Dp accordingly.

**Suggested Remedy**

Change Np from 200 to 400. Change Dp from 4 to 8.

**Proposed Response**

**Response Status:** W

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to #30.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

---

**Comment Type:** Propose Accept in Principle

**Comment Status:** Dispatched

**Proposed Response:**

The comment is related to the number of UI after the pulse peak that should be excluded from calculations of SNR_ISI. The comment and suggested remedy seem reasonable, but consensus is not obvious. If it is agreed that 6 is not the right number, but there is no consensus on 20, then an editor's note can be added to state that a larger number is required but the specific number needs more work (instead of changing to TBD).

For CRG discussion.

---

**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

Delete the SNDR section. Add a VEC-like, TDECQ-like spec using this clause's COM reference receiver which can be implemented in a scope. Similarly for KR and C2C.

---

**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

As explained in other comments, up to 3ck the SNDR spec acted together with the jitter spec to protect the link performance - but we don't have a satisfactory way of measuring jitter at today's speeds and losses, and separating the two things out "leaves margin on the table".

Delete the SNDR section. A detailed proposal will be provided.

---

**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

The suggested remedy does not propose an actionable (within the draft) remedy. A question or call to action is not valid.

In addition, the comment includes a claim that measurements are not feasible, which is not substantiated and is contrasted by existing contributions, e.g. https://www.ieee802.org/3/dj/public/adhoc/electrical/24_0104/calvin_3dj_elec_01a_240104.pdf.

---

**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

SNDR reduces with loss and used that way for equation 178A018.

---

**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

The transmitter SNDR is defined by the measurement method described in 120D.3.1.6 plus a power loss factor defined in xxxx.

---

**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

This methodology should be used for all electrical interfaces, with adequate adjustments.

---

**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

Based on https://www.ieee802.org/3/dj/public/adhoc/electrical/24_0104/calvin_3dj_elec_01a_240104.pdf, the jitter measurement methodology of existing clauses 162, 163, and 120G (specifically using the two edges R03/F30) is feasible for measurements with a loss 30 dB. It is expected that the same method can be used for higher losses as long as the scope can maintain CDR lock.

---

**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

A detailed proposal will be provided.

---

**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

The following presentation was reviewed by the task force in the May 2024 interm:

https://www.ieee802.org/3/dj/public/24_05/ran_3dj_03_2405.pdf

In addition, additional presentations related to jitter were:


https://www.ieee802.org/3/dj/public/24_05/zivny_3dj_01a_2405.pdf

Resolve using the response to comment #236.

---

**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

The suggested remedy does not propose an actionable (within the draft) remedy. A question or call to action is not valid.

In addition, the comment includes a claim that measurements are not feasible, which is not substantiated and is contrasted by existing contributions, e.g. https://www.ieee802.org/3/dj/public/adhoc/electrical/24_0104/calvin_3dj_elec_01a_240104.pdf.

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**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

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In addition, additional presentations related to jitter were:


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**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

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In addition, the comment includes a claim that measurements are not feasible, which is not substantiated and is contrasted by existing contributions, e.g. https://www.ieee802.org/3/dj/public/adhoc/electrical/24_0104/calvin_3dj_elec_01a_240104.pdf.

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**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

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https://www.ieee802.org/3/dj/public/24_05/ran_3dj_03_2405.pdf

In addition, additional presentations related to jitter were:


https://www.ieee802.org/3/dj/public/24_05/zivny_3dj_01a_2405.pdf

Resolve using the response to comment #236.

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**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

The suggested remedy does not propose an actionable (within the draft) remedy. A question or call to action is not valid.

In addition, the comment includes a claim that measurements are not feasible, which is not substantiated and is contrasted by existing contributions, e.g. https://www.ieee802.org/3/dj/public/adhoc/electrical/24_0104/calvin_3dj_elec_01a_240104.pdf.

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**Comment Type:** TR

**Comment Status:** Dispatched

**Proposed Response:**

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https://www.ieee802.org/3/dj/public/24_05/ran_3dj_03_2405.pdf

In addition, additional presentations related to jitter were:


https://www.ieee802.org/3/dj/public/24_05/zivny_3dj_01a_2405.pdf

Resolve using the response to comment #236.
**IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment**

**Comment Type:** TR  **Comment Status:** D  **Tx jitter (bucket)**

Measuring jitter separately to other impairments relies on a better slew rate to noise ratio than we have at the observation point, and better than what is needed to make good links.

**Suggested Remedy:**
Delete the jitter section. Add a VEC-like, TDECQ-like spec using this clause’s COM reference receiver which can be implemented in a scope. Similarly for KR and C2C.

**Proposed Response**
PROPOSED REJECT.
The suggested remedy does not propose an actionable (within the draft) remedy. A question or call to action is not valid.
In addition, the comment includes a claim that measurements are not feasible, which is not substantiated and is contrasted by existing contributions, e.g. https://www.ieee802.org/3/dj/public/adhoc/electrical/24_0104/calvin_3dj_elec_01a_240104.pdf.
Note that the importance of controlling jitter separately from other impairment has been addressed in https://www.ieee802.org/3/dj/public/24_05/ran_3dj_03_2405.pdf.

---

**Comment Type:** TR  **Comment Status:** D  **scale ERL parameter form 0.3ck**

in table 163-7 change TBD’s as follows
Tr 0.005 ns
x 0 GHz
?x 0.618
N 1600 UI

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE.
It is assumed that, based on the subclause/page/line, the suggested remedy is asking to change Table 179-9.
Resolve using the response to comment #28.

---

**Comment Type:** TR  **Comment Status:** D  **COM**

The COM values need to be set to make progress. Until a more comprehensive proposal is presented use what is in 0.3ck and many other prior standards

**Suggested Remedy**
set COM to 3 dB

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #250.

---

**Comment Type:** TR  **Comment Status:** D  **COM values in Table 179û11 are TBD**

**Suggested Remedy**
Replace TBD with 3 dB

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #250.

---

**Comment Type:** TR  **Comment Status:** D  **COM values in Table 179û11 are TBD**

**Suggested Remedy**
Replace TBD with 3 dB

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #250.

---

**Comment Type:** TR  **Comment Status:** D  **COM values in Table 179û11 are TBD**

**Suggested Remedy**
Replace TBD with 3 dB

---

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

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #250.

---

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

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #250.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

**Comment Type:** TR  **Comment Status:** D  **Suggested Remedy:**

4th order Bessel-Thomson filter BW is TBD

**Proposed Response**

Replace TBD with 62 GHz

**PROPOSED ACCEPT IN PRINCIPLE.**

Resolve using the response to comment #60.

---

**Comment Type:** TR  **Comment Status:** D  **Suggested Remedy:**

Table 179-12: Jitter mask extended below 40Khz and above 40MHz for completeness

**Proposed Response**

Case A - please amend to <= 0.04, Case F, please amend to >= 40

**PROPOSED REJECT.**

The comment does not provide sufficient justification to support the suggested remedy.

Note that the jitter cases are matched to the expected CDR bandwidth which is matched to the CRU bandwidth adopted by motion #7 in the May 2023 meeting (see https://www.ieee802.org/3/dj/public/23_05/motions_3cwdfdj_2305.pdf). This bandwidth is the same as in existing specifications, e.g., for 100 Gb/s per lane PMDs, which have the same test cases in Table 162–17.

---

**Comment Type:** T  **Comment Status:** D  **Suggested Remedy:**

Practical test fixtures may have discontinuities close to 0.2ns from the host-facing connection (mating interface). If the intent is to remove the test fixture discontinuities from the ERL calculations, we should adjust the 0.2ns

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #227.
Noujeim, Leesa
Comment Type T Comment Status D Nominal impedance (bucket)
There is no test method or definition for the nominal characteristic impedance of the cable assembly. The components (e.g., paddle card, twinax) within a cable assembly may have different nominal characteristic impedances. There is no need to specify the nominal characteristic impedance of the cable assembly, since the performance of the cable assembly is determined by cl 179.11.2-7.

Suggested Remedy
Remove "The nominal characteristic impedance of the cable assembly is 100 ohms".

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPAL.
It is important to define the reference impedance for return loss specifications etc., but as the comment correctly suggests, there is no need to specify a nominal value. Implement the suggested remedy.

Kocsis, Sam
Comment Type T Comment Status D Nominal impedance (bucket)
Nominal characteristic impedance of the cable assembly is ~92-ohm.

Suggested Remedy
Contributions to the task force have demonstrated the nominal characteristic impedance of the cable assembly is ~92-ohm.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPAL.
It is understood that the suggested remedy is to change the nominal impedance from 100 to 92 Ohm. However, as noted in comment #216, there is no need to specify a nominal impedance. Resolve with using the response to comment #216.

Dawe, Piers
Comment Type T Comment Status D ERL Tfx
Practical test fixtures may have discontinuities close to 0.2ns from the host-facing connection. If the intent is to remove the test fixture discontinuities from the ERL calculation, we should adjust the 0.2ns.

Suggested Remedy
Change text to ".Tfx equal to twice the delay between the test fixture connector and the test fixture host-facing connection minus 0.2ns or as needed to remove test-fixture discontinuities from the ERL result".

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPAL.
Resolve using the response to comment #227.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

Kocsis, Sam
Amphenol

Comment Type: T, Comment Status: D

ERL requirement for cable assembly that have COM less than "4dB"

Suggested Remedy
Change "4dB" to "TBD". Historical precedent may not be relevant for this specification

Proposed Response: Response Status: W
PROPOSED REJECT.
The comment does not provide sufficient justification to support the suggested remedy. Note that any content of the draft can be changed if there is consensus, but changing from a number to TBD does not move us forward.

Mellitz, Richard
Samtec

Comment Type: TR, Comment Status: D

The data rate was doubled and cable length was scaled by a factor of 2 from .3ck. Adjust ERL parameters accordingly

Suggested Remedy
in table 179-14 change TBD's as follows
Tr 0.005 ns
fx 0 GHz
fx 0.618
N 4500 UI

Proposed Response: Response Status: W
PROPOSED ACCEPT IN PRINCIPLE. Resolve using the response to comment #28.

Li, Tobey
MediaTek

Comment Type: T, Comment Status: D

Single-ended reference resistance R0 value in Table 179-15 is TBD

Suggested Remedy
Replace TBD with 50 Ohm

Proposed Response: Response Status: W
PROPOSED ACCEPT IN PRINCIPLE. Resolve using the response to comment #35.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

<table>
<thead>
<tr>
<th>Cl 179</th>
<th>SC 179.11.7</th>
<th>P 331</th>
<th>L 43</th>
<th># 52</th>
</tr>
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<tbody>
<tr>
<td>Mellitz, Richard</td>
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<tr>
<td>Comment Type: TR</td>
<td>Comment Status: D</td>
<td>R_0</td>
<td></td>
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<tr>
<td>(Table 179:5) Computation can be independent of R_0. Add a note to explain. S parameter can utilize any R_0. For computation purposes s-parameters are converted to 50 ohms which is the native impedance for the most common test equipment.</td>
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<tr>
<td>SuggestedRemedy:</td>
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<tr>
<td>Change R_0 for TBD to 50 ohms and add a note indicating the imported s-parameter are to be converted into 50 ohm reference before computation.</td>
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<td>Response Status: W</td>
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<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
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<th>P 331</th>
<th>L 44</th>
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<td>Comment Type: T</td>
<td>Comment Status: D</td>
<td>COM R_d</td>
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<td>Rd(t) = &quot;TBD&quot;</td>
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<tr>
<td>SuggestedRemedy:</td>
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<td></td>
<td></td>
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<tr>
<td>Change &quot;TBD&quot; to &quot;92-ohm&quot; to match majority of contributions to the Task Force, and better align with Zc definition in package</td>
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<tr>
<td>Proposed Response:</td>
<td>Response Status: W</td>
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<tr>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
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<td></td>
<td></td>
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<tr>
<td>Resolve using the response to comment #396.</td>
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<td>Comment Type: T</td>
<td>Comment Status: D</td>
<td>COM R_d</td>
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<tr>
<td>RD(r) = &quot;TBD&quot;</td>
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<tr>
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<tr>
<td>Change &quot;TBD&quot; to &quot;92-ohm&quot; to match majority of contributions to the Task Force, and better align with Zc definition in package</td>
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<td>Resolve using the response to comment #396.</td>
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<th>P 332</th>
<th>L 12</th>
<th># 615</th>
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</thead>
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<tr>
<td>Li, Tobey</td>
<td>MediaTek</td>
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<tr>
<td>Comment Type: TR</td>
<td>Comment Status: D</td>
<td>COM f_r</td>
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<td>Receiver 3 dB bandwidth fr value in Table 179:16 is TBD</td>
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<td>SuggestedRemedy:</td>
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<tr>
<td>Replace TBD with 0.58*fb</td>
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<tr>
<td>Proposed Response:</td>
<td>Response Status: W</td>
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<tr>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
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<td></td>
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<tr>
<td>Resolve using the response to comment #396.</td>
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</tbody>
</table>
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

Comment Type: TR  Comment Status: D  Multiple COM parameters

The COM parameter values for the 200GBASE-CR1, 400GBASE-CR2, 800GBASE-CR4 and 1.6TBASE-CR8 PMDs are TBDs

SuggestedRemedy

In table 179-16, Use the COM parameter values from https://www.ieee802.org/3/dj/public/24_01/healey_3dj_01_2401.pdf slide 18, which are:

- \( f_r = 0.58 \)
- \( c(-3) = 0 \)
- \( c(-2) = 0 \)
- \( c(-1) = 0 \)
- \( c(0) = 1 \)
- \( c(1) = 0 \)
- \( A_v = 0.413 \)
- \( A_{fe} = 0.413 \)
- \( A_{ne} = 0.45 \)
- \( \eta_0 = 6e-9 \)
- \( SNR_{TX} = 33 \)
- \( \sigma_RJ = 0.01 \)
- \( A_{DD} = 0.02 \)
- \( R_{LM} = 0.95 \)
- \( d_w = 5 \)
- \( N_{fix} = 10 \)
- \( N_g = 0 \)
- \( N_{f} = 0 \)
- \( N_{max} = 0 \)
- \( b_{max}(1) = 0.85 \)
- \( b_{min}(1) = 0 \)

Additionally, set MLSE = 0 (not enabled)

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

The comment addresses open TBDs and the suggested remedy may be reasonable, but consensus is not obvious.

This comment proposes a large set of COM parameter values together, while other comments address subsets of these parameters.

The editorial team prepared a proposal in the comment resolution slide deck URL/Ran_3dj_01_2406.

For CRG discussion.
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>Type</th>
<th>Comment</th>
<th>Suggested Remedy</th>
<th>Proposed Response</th>
<th>Response Status</th>
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<tr>
<td>179</td>
<td>179.11.7</td>
<td>332</td>
<td>50</td>
<td>TR</td>
<td>Transmitter transition time Tr value in Table 179-16 is TBD</td>
<td>Replace TBD with Tr = 4 ps</td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td>W</td>
<td>D</td>
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<tr>
<td>179</td>
<td>179.11.7</td>
<td>332</td>
<td>53</td>
<td>TR</td>
<td>One sided noise spectral density in Table 179-16 is TBD</td>
<td>Replace TBD with 6e-9 V^2/GHz</td>
<td>PROPOSED REJECT.</td>
<td>W</td>
<td>D</td>
</tr>
<tr>
<td>179</td>
<td>179.11.7</td>
<td>333</td>
<td>9</td>
<td>TR</td>
<td>Level separation mismatch ratio RLM in Table 179-16 is TBD</td>
<td>Replace TBD with 0.95</td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td>W</td>
<td>D</td>
</tr>
<tr>
<td>179</td>
<td>179A</td>
<td>664</td>
<td>L</td>
<td>E</td>
<td>Figure 179A-1 and figure 179A-2 are not showing completely in my PDF file</td>
<td></td>
<td></td>
<td>D</td>
<td>(editorial)</td>
</tr>
</tbody>
</table>

**Suggested Remedy**

- Replace TBD with Tr = 4 ps
- Replace TBD with 6e-9 V^2/GHz
- Replace TBD with 0.95
- Implement with editorial license and discretion
- Resolve using the response to comment #39.
- Resolve using the response to comment #269.
- Resolve using the response to comment #360.
- Resolve using the response to comment #42.
- Implement with editorial license and discretion.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

**Comment Type:** TR  
**Comment Status:** D  
**Reference to a diagram with TP0d and TP5d is required**

**Suggested Remedy:**
Add TP0d and TP5d to figure 93B-1 and table 93B-1

**Proposed Response:** Response Status W  
**Proposed Accept in Principle.**
Annex 93B is irrelevant for CR.
Also, Annex 93B is not referenced anywhere in the draft, nor in previous backplane PMD clauses 163 and 137.
A diagram with the new test points exists in Figure 179–2 and can be referenced instead.
Add a reference in 179A.2 to Figure 179-2. Implement with editorial license.

**Comment Type:** T  
**Comment Status:** D  
**Host designated losses of 6.5, 11.5, and 16.5 are for TP0d to TP2**

**Suggested Remedy:**
Move the losses to the TP0d to TP2 column
Min host loss is the MCB loss of 2.8 dB
Max loss is dependent on actual package loss and should be removed

**Proposed Response:** Response Status W  
**Proposed Reject.**
The host losses adopted are those of
https://www.ieee802.org/3/dj/public/23_11/tracy_3dj_01a_2311.pdf, slide 12. This slide explicitly refers to "Device Package + Host PCB", which does not extend to TP2.

**Proposed Response:** Response Status W  
**Proposed Accept in Principle.**
Replace "2*ILdd_(host+TFmax)" with "ILdd_(host+TFmax)_one end + ILdd_(host+TFmax)_other end" with editorial license to accommodate asymmetric Link Configurations in Table 179A-3.

**Comment Type:** T  
**Comment Status:** D  
**Doubling ILdd_(host+TFmax) implies both ends of the link have the same host designations.**

**Suggested Remedy:**
Replace "2*ILdd_(host+TFmax)" with "ILdd_(host+TFmax)_end1 + ILdd_(host+TFmax)_end2" or similar notation to accommodate asymmetric Link Configurations in Table 179A-3.

**Proposed Response:** Response Status W  
**Proposed Accept in Principle.**
Replace "2*ILdd_(host+TFmax)" with "ILdd_(host+TFmax)_one end + ILdd_(host+TFmax)_other end" with editorial license to accommodate asymmetric Link Configurations in Table 179A-3.
EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

<table>
<thead>
<tr>
<th>Cl 179A</th>
<th>SC 179A.5</th>
<th>P667</th>
<th>L32</th>
<th>#586</th>
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<tr>
<td>Comment Type</td>
<td>T</td>
<td>Comment Status</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>MCB via allowance and HCB are TBD</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Suggested Remedy**

See Ghiasi C2M May-24 presentation

MCB via = 0.8 dB

HCB=3.8 dB to allow practical implementations

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the task force in the May 2024 interim meeting: https://www.ieee802.org/3/dj/public/24_05/ghiasi_3dj_02a_2405.pdf

The comment addresses an open TBD and the suggested remedy seems reasonable, but consensus is not obvious.

For CRG discussion.

<table>
<thead>
<tr>
<th>Cl 179A</th>
<th>SC 179A.7</th>
<th>P668</th>
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<tr>
<td>&quot;TP0 and TP5&quot;</td>
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</table>

**Suggested Remedy**

Change to "TP0d and TP5d"

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

<table>
<thead>
<tr>
<th>Cl 179A</th>
<th>SC 179A.7</th>
<th>P668</th>
<th>L9</th>
<th>#215</th>
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**Suggested Remedy**

Change to "TP0d and TP5d"

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

<table>
<thead>
<tr>
<th>Cl 179A</th>
<th>SC 179B</th>
<th>P670</th>
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**Suggested Remedy**

Change to "TP0d and TP5d"

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

<table>
<thead>
<tr>
<th>Cl 179B</th>
<th>SC 179B</th>
<th>P670</th>
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**Suggested Remedy**

Change to "TP0d and TP5d"

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

<table>
<thead>
<tr>
<th>Cl 179B</th>
<th>SC 179B</th>
<th>P670</th>
<th>L</th>
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**Suggested Remedy**

Change to "TP0d and TP5d"

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

**Comment Type**: E  **Comment Status**: D (editorial)

- Figure 179B-2 figure is not showing completely in my PDF file

**Suggested Remedy**

- PROPOSED ACCEPT IN PRINCIPLE.
  - Implement with editorial license and discretion.

---

**Comment Type**: T  **Comment Status**: D (bucket)

- Incorrect Annex reference 120G

**Suggested Remedy**

- Replace 120G with 176E

**Proposed Response**

- PROPOSED ACCEPT.

---

**Comment Type**: T  **Comment Status**: D (bucket)

- Missing reference to Module compliance at TP1 and TP4

**Suggested Remedy**

- Add "Module measurements for Modules specified in Annex 176E are made at module
  compliance points TP1 and TP4 (see Figure 176E–4) with test fixtures as specified in
  179B.3."

**Proposed Response**

- PROPOSED ACCEPT IN PRINCIPLE.

---

**Comment Type**: TR  **Comment Status**: E

- At least the symbol rate is known

**Suggested Remedy**

- set fb to 106.25 Gbd

**Proposed Response**

- PROPOSED ACCEPT.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

Comment Type: T, Comment Status: D

MDIs are mechanical entities. For 106.25 GBd operation, there are SFP2 (SFF-TA-1031) and QSFP2 (SFF-TA-1027). Any "SFP224" would be an SFP2 module or cable end with 200G-capable circuitry, but this annex is for the MDI, not the circuitry. Similarly for "QSFP224" and QSFP2.

Suggested Remedy
Correct the names. Add references to SFF-TA-1011 which relates the names and specs for the SNIA-SFF modules, and SFF-8665, which defines the components of a QSFPx "solution".

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.
There was broad consensus to use names of MDI types (part of baseline proposal) currently in the draft as follows: SFP224, SFP-DD224, QSFP224, QSFP-DD1600, OSFP1600.
Resolve using the response to comment #506, which addresses the normative references.

Comment Type: TR, Comment Status: D

Refer to the specification for each connector type where each is first mentioned. See another comment against 1.3 for the reference docs.

Suggested Remedy
Per comment

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #506.

Comment Type: E

"QSFP-DD800"

Suggested Remedy
Change to "QSFP-DD1600"

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #506.

Comment Type: T

There is no QSFP-DD1600 TBD MSA document. QSFP-DD1600 is defined in the singular QSFP-DD MSA document

Suggested Remedy
Change "the QSFP-DD1600 TBD MSA" to "the QSFP-DD/QSFP-DD800/QSFP-DD1600 Hardware Specification".

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #506.

Comment Type: T

There is no OSFP1600 TBD MSA document. OSFP1600 is defined in the singular OSFP MSA document, particularly section 4.

Suggested Remedy
Change "the OSFP1600 TBD MSA" to "the OSFP Octal Small Form Factor Pluggable Module specification" or "section 4 of the OSFP Octal Small Form Factor Pluggable Module specification".

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #506.

Comment Type: T

MDIs are mechanical entities. For 106.25 GBd operation, there are SFP2 (SFF-TA-1031) and QSFP2 (SFF-TA-1027). Any "SFP224" would be an SFP2 module or cable end with 200G-capable circuitry, but this annex is for the MDI, not the circuitry. Similarly for "QSFP224" and QSFP2.

Suggested Remedy
Correct the names. Add references to SFF-TA-1011 which relates the names and specs for the SNIA-SFF modules, and SFF-8665, which defines the components of a QSFPx "solution".

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.
There was broad consensus to use names of MDI types (part of baseline proposal) currently in the draft as follows: SFP224, SFP-DD224, QSFP224, QSFP-DD1600, OSFP1600.
Resolve using the response to comment #506, which addresses the normative references.

Comment Type: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general

SORT ORDER: Clause, Subclause, page, line

COMMENT STATUS: D/dispatched A/accepted R/rejected RESPONSE STATUS: O/open W/written C/closed Z/withdrawn
## IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

### Comment 180: SC 180.4
**Comment Type:** T  |  **Comment Status:** D  |  **Proposed Response:**
---|---|---
**Prior to 180.4 add section for PMA function to support precoder to mitigate burst errors**

**Suggested Remedy:**
- The transmitter needs to support $1/(1+D)$ mod 4 precoding, as specified in 135.5.7.2, 120.5.7.2, and 173.5.7.2, 6 and 176.9.1.2, that may be enabled or disabled as needed with OLT, without OLT the optical transmitter should enable $1/(1+D)$ mod 4 precoding to mitigate burst error.

**Proposed Response:**
- PROPOSED ACCEPT IN PRINCIPLE.
- Resolve using the response to comment #21

### Comment 180: SC 180.6.2
**Comment Type:** T  |  **Comment Status:** D  |  **Proposed Response:**
---|---|---
**In 802.3db we acknowledged that single-lane PMDs are often packaged in multilane modules, and subject to much the same crosstalk as multilane PMDs.**

**Suggested Remedy:**
- Delete footnote e, "No aggressors needed for 200GBASE-DR1." In 180.8.13 Stressed receiver sensitivity, add "For a receiver in a multilane device, the OMA outer of the aggressor lanes is specified in Table 180-8."

**Proposed Response:**
- PROPOSED ACCEPT IN PRINCIPLE.
- The concern raised by the comment is relevant to modules with parallel-fiber connectors.
- Implement the suggested remedy with editorial license.
- For CRG discussion.

---

**TYPE:** TR/technical required  |  **ER:** editorial required  |  **GR:** general required  |  **T:** technical  |  **E:** editorial  |  **G:** general

**COMMENT STATUS:** D/dispatched  |  A/accepted  |  R/rejected  |  **RESPONSE STATUS:** O/open  |  W/written  |  C/closed  |  Z/withdrawn

**SORT ORDER:** Clause, Subclause, page, line

---

**EE 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments**

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**Eye Diagram (for results of tests on TX output)**

---

**Eye Diagram (for results of tests on RX output)**

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**Eye Diagram (for results of tests on RX output)**

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**Eye Diagram (for results of tests on RX output)**

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**Eye Diagram (for results of tests on RX output)**

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**Eye Diagram (for results of tests on RX output)**

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**Eye Diagram (for results of tests on RX output)**

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**Eye Diagram (for results of tests on RX output)**

---

**Eye Diagram (for results of tests on RX output)**
The power budget does not explicitly say what the penalty allocation is for MPI and DGD. It's implied by the difference between Allocation for penalties (for max TDECQ) and TDECQ(max). This makes it hard for average readers to understand the power budget.

**Suggested Remedy**

Add to Table 180-9, footnote (b), "This value includes an allocation of 0.1 dB for MPI and DGD penalties."

**Proposed Response**

Proposed Accept in Principle. Implement the suggested remedy with editorial license.

---

Footnote b did not clarify what's the composition of total 3.5dB allocation for penalties.

**Suggested Remedy**

Recommend to add "Allocations to penalties for DRx series including penalties due to dispersion 3.4dB, DGD and MPI 0.1dB" to footnote b.

**Proposed Response**

Proposed Accept in Principle. Resolve using the response to comment #127.

---

ITU-T G.652.B cabled fiber attenuation is only specified for 1310 nm and 1550 nm wavelengths. It is not specified for wavelengths between 1260 nm and 1310 nm and not meant to be used in xWDM applications.

**Suggested Remedy**

Remove ITU-T G.652.B (dispersion unshifted) as a fiber option.

**Proposed Response**

Proposed Accept.
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

---

**Comment 180.7.3.2**

**Comment Type:** T  
**Comment Status:** IEC revision

IEC 61753-1-1 has been superseded by IEC 61753-1.

**Suggested Remedy:**

- Change "IEC 61753-1-1" to "IEC 61753-1".

**Proposed Response**  
**Response Status:** W  
**PROPOSED ACCEPT IN PRINCIPLE.**

Change "IEC 61753-1-1" to "IEC 61753-1" and add "IEC 61753-1:2020, Fibre optic interconnecting devices and passive components – Performance standard - Part 1: General and guidance" to 1.3 Normative references.

---

**Comment 180.7.3.3**

**Comment Type:** T  
**Comment Status:** IEC revision

IEC 61753-021-2 has been superseded by IEC 61753-021-02.

**Suggested Remedy:**

- Change "IEC 61753-021-2" to "IEC 61753-021-02".

**Proposed Response**  
**Response Status:** W  
**PROPOSED ACCEPT IN PRINCIPLE.**

Change "IEC 61753-021-2" to "IEC 61753-021-02" and add "IEC 61753-021-02:2023, Fibre optic interconnecting devices and passive components - Performance standard - Part 021-02: Single-mode fibre optic connectors terminated as pigtails and patchcords for category C - Controlled environment" to 1.3 Normative references.

---

**Comment 180.7.3.4**

**Comment Type:** T  
**Comment Status:** IEC revision

IEC 61753-021-2 has been superseded by IEC 61753-021-02.

**Suggested Remedy:**

- Change "IEC 61753-021-2" to "IEC 61753-021-02".

**Proposed Response**  
**Response Status:** W  
**PROPOSED ACCEPT IN PRINCIPLE.**

Resolve using the response to comment #339.

---

**Comment 180.8.5**

**Comment Type:** T  
**Comment Status:** D  
**IEC revision**

121.8.5.2 Table 121-11 specifies ORL of 21.4dB be applied for TX testing. For 200GBASE-DR1, this needs to be 15.1dB.

**Suggested Remedy:**

- Add a new exception to the list in 180.8.5:  
- The optical return loss is as given in Table 180-6.

**Proposed Response**  
**Response Status:** W  
**PROPOSED ACCEPT IN PRINCIPLE.**

Add a new exception to the list in 180.8.5:  
- The optical return loss is as given in Table 180-7.

Implement with editorial license.
### IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

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<thead>
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<th>Cl 180</th>
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<th>P364</th>
<th>L23</th>
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<td>Keysight Technologies</td>
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</table>

**Comment Type**: T  **Comment Status**: D  **TDECQ**

The current method for optimizing the tap weights of equalizer in the TDECQ reference receiver is described in clause 121.8.5. The equalizer tap coefficients are iteratively adjusted to effectively minimize the TDECQ penalty. Although not explicitly stated, one way to view this is that ANY combination of tap weights is valid and that ALL combinations should be tried to ensure the optimum tap weight combination is used when calculating TDECQ. As the equalizer length has been increased from 5 taps to 15 taps, the time required to verify all possible tap weights is likely problematic. This issue was managed in the 802.3 db project, where a 9 tap virtual equalizer is used for TDECQ. The following text was added to clause the definition of the TDECQ method: “The lowest measured TDECQ values are achieved with the equalizer optimization method described in 121.8.5. Alternative optimization methods such as minimum mean squared error (MMSE) may be used to determine equalizer tap weights to reduce test time, and are expected to report equal or higher values of TDECQ. These alternative methods should not be used for receiver sensitivity and stressed receiver sensitivity calibration.” Note that the MMSE optimization method is used in almost all TDECQ measurements performed today.

**Suggested Remedy**

Add the following text at line 36 (end of exceptions list): The lowest measured TDECQ values are achieved with the equalizer optimization method described in 121.8.5. Alternative optimization methods such as minimum mean squared error (MMSE) may be used to determine equalizer tap weights to reduce test time, and are expected to report equal or higher values of TDECQ. These alternative methods should not be used for receiver sensitivity and stressed receiver sensitivity calibration.

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

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

### Comment Type: TR  **Comment Status**: D  **TDECQ**

Current baseline proposal is lacking tap weight restrictions, which were indicated as TBD when adopted.

**Suggested Remedy**

Propose adopting the TDECQ tap weight restrictions as presented in welch_3dj_01_0524.

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

PROPOSED REJECT.

The following presentation was reviewed by the 802.3dj task force at the May Interim meeting:


There did not seem to be consensus relating to this proposal. Pending CRG discussion.

### Comment Type: T  **Comment Status**: D  **RIN-OMA**

“The upper -3 dB limit of the measurement apparatus is to be approximately equal to the signaling rate”: I believe this dates back at least to the first Fibre Channel, ~1 Gb/s, long before adaptive equalisers that optimise the receiver bandwidth. We have a RIN spec to help the accuracy of the TDECQ spec, which is the actual assessment of signal quality. Gigabit Ethernet now uses 937.5 MHz, 75% of the signalling rate. Measuring a peaky noise spectrum in too much bandwidth gives a flattering average, which is not what we want.

**Suggested Remedy**

Change the bandwidth for RIN measurement to be the same as the TDECQ receiver’s BT4 filter (50% of signalling rate ~ 53.1 GHz) or 75%, or something in between.

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

PROPOSED ACCEPT IN PRINCIPLE. The following presentation was reviewed by the 802.3dj task force at the May Interim meeting:

https://www.ieee802.org/3/dj/public/24_05/johnson_3dj_03a_2405.pdf

Implement suggested remedy stated in the presentation with editorial license.
The required -3dB BW for the measurement system is not achievable with existing technology. (State of the art power meters with a maximum 120 GHz bandwidth, would require the bandwidth of the photodetector to be substantially higher than 120 GHz to achieve the current system bandwidth required for the test system, as defined in clause 52).

**Proposed Response**

The bandwidth of the RIN-OMA test system should be based on the expected bandwidth of the system receivers and consider the expected noise spectrum of transmitters. Spec limits for RIN OMA may need adjustment to adapt to any changes in the test method.

**Proposed Accept in Principle.**

Resolve using the response to comment #518.

---

More exceptions - I found these in 167.8.14.

**Suggested Remedy**

The applied sinusoidal jitter is specified in 180.8.13.1. The values of overshoot/undershoot and transmitter power excursion of the stressed receiver conformance signal are within the limits specified in Table 180-7.

For a receiver in a multilane device, the OMA outer of the aggressor lanes is specified in Table 180-8.

Add a sinusoidal jitter section following 167.8.14.1 (but see next comment).

**Proposed Response**

PROPOSED REJECT.

The comment does not provide sufficient justification to support the suggested remedy.

---

IEC 60950-1 has been superseded by IEC 62368-1.

**Suggested Remedy**

Change "IEC 60950-1" to "IEC 62368-1".

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Change "IEC 60950-1" to "IEC 62368-1".

---

Bit number should match number of lanes

**Suggested Remedy**

Change 1.9.4 to 1.9.n. Below, change 1.10.4 to 1.10.n. Similarly in other clauses.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.
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<td>Comment Status</td>
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<td>Editorial (bucket)</td>
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<tr>
<td>The PHY bracket in Figure 181-1 is shown encompassing the MDI layer, which isn't consistent with previous PMDs.</td>
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<tr>
<td>SuggestedRemedy</td>
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<tr>
<td>Shorten the PHY bracket to exclude the MDI layer.</td>
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<td>Implement the suggested remedy with editorial license.</td>
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<td>Precoding</td>
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<tr>
<td>Prior to 181.4 add section for PMA function to support precoder to mitigate burst errors</td>
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<tr>
<td>SuggestedRemedy</td>
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<tr>
<td>The transmitter need to supports 1/(1+D) mod 4 precoding, as specified in 135.5.7.2, 120.5.7.2, 173.5.7.2, 6 and 176.9.1.2, that may be enabled or disabled as needed with OLT, without OLT the optical transmitter should enable 1/(1+D) mod 4 precoding to mitigate burst error.</td>
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<td>Resolve using the response to comment #21</td>
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<td>TX specs</td>
</tr>
<tr>
<td>Total average launch power (max) in Table 181-5 is TBD for 800GBASE-FR4-500.</td>
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<tr>
<td>Replace TBD with a value equal to the Average launch power, each lane (max) + 6 dB, which is 4.9 + 6 = 10.9 dB. This methodology is consistent with previous FR4 PMDs (clauses 122, 151).</td>
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</tr>
<tr>
<td>Difference in launch power between any two lanes (OMAouter) (max) in Table 181-5 is TBD for 800GBASE-FR4-500.</td>
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<tr>
<td>Replace TBD with a value of OMAouter(max) minus OMAouter(min) or 4 dB, whichever is smaller, consistent with other FRn/LRn clauses (122, 151).</td>
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<td>Implement the suggested remedy with editorial license.</td>
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### IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

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#### Yu, Rang-chen  InnoLight

**Comment Type:** TR  **Comment Status:** D  **RX specs**

The delta between 'Tx_Pavg(min)' and 'Rx_Pavg(min)' should equal to 'Channel insertion loss' (3.5dB for FR4-500)

**Suggested Remedy**

Rx_Pavg (min) in Table 181-6 should be -2.2dBm-3.5dB=-5.7dBm

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

PROPOSED ACCEPT IN PRINCIPLE.

In Table 181-6, change the value for "Average receive power, each lane (min)" to -5.7.

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</table>

#### Johnson, John  Broadcom

**Comment Type:** T  **Comment Status:** D  **RX specs**

Difference in receive power between any two lanes (OMAouter) (max) in Table 181-6 is TBD for 800GBASE-FR4-500.

**Suggested Remedy**

Replace TBD with a value of 4.1 dB, consistent with other FR4 PMDs (Cl. 122, 151)

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

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

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</table>

#### Yu, Rang-chen  InnoLight

**Comment Type:** TR  **Comment Status:** D  **power budget**

Power budget (for maximum TDECQ) for 800GBASE-FR4-500 in Table 181-7 could be incorrect. It should be equal to channel IL + allocation for penalties (for maximum TDECQ).

**Suggested Remedy**

Power budget (for maximum TDECQ) in Table 181-7 should be updated to 7.4 dB

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

PROPOSED ACCEPT.

<table>
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</table>

#### Yu, Rang-chen  InnoLight

**Comment Type:** TR  **Comment Status:** D  **power budget**

DGDMAX (in Table 18108) probably used DGDMean=0.8ps, it should be 2.24ps refer to 802.3df DR series.

**Suggested Remedy**

Recommend change to 2.24ps

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

PROPOSED ACCEPT IN PRINCIPLE.

Implement proposed remedy with editorial license.
### Comment Type: TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general

### Comment Status: D/dispatched A/accepted R/rejected

### RESPONSE STATUS: O/open W/written C/closed Z/withdrawn

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<tr>
<td>181</td>
<td>181.7.1</td>
<td>383</td>
<td>26</td>
<td>336</td>
<td>TR</td>
<td>D</td>
<td>Optical channel specs</td>
<td>TR</td>
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<tr>
<td>181</td>
<td>181.7.3</td>
<td>384</td>
<td>43</td>
<td>343</td>
<td>T</td>
<td>D</td>
<td>IEC revision</td>
<td>W</td>
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</table>

**ITU-T G.652.B cabled fiber attenuation is only specified for 1310 nm and 1550 nm wavelengths. It is not specified for wavelengths between 1260 nm and 1310 nm and not meant to be used in xWDM applications**

**Suggested Remedy**

Remove ITU-T G.652.B (dispersion unshifted) as a fiber option.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Resolving the use of the response to comment #335.

<table>
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<td>181</td>
<td>181.8.5</td>
<td>386</td>
<td>41</td>
<td>5</td>
<td>T</td>
<td>D</td>
<td>TDECQ</td>
<td>T</td>
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</table>

The current method for optimizing the tap weights of equalizer in the TDECQ reference receiver is described in clause 121.8.5. The equalizer tap coefficients are iteratively adjusted to effectively minimize the TDECQ penalty. Although not explicitly stated, one way to view this is that ANY combination of tap weights is valid and that ALL combinations should be tried to ensure the optimum tap weight combination is used when calculating TDECQ. As the equalizer length has been increased from 5 taps to 15 taps, the time required to verify all possible tap weights is likely problematic. This issue was managed in the 802.3 db project, where a 9 tap virtual equalizer is used for TDECQ. The following text was added to clause the definition of the TDECQ method: 6The lowest measured TDECQ values are achieved with the equalizer optimization method described in 121.8.5. Alternative optimization methods such as minimum mean squared error (MMSE) may be used to determine equalizer tap weights to reduce test time, and are expected to report equal or higher values of TDECQ. These alternative methods should not be used for receiver sensitivity and stressed receiver sensitivity calibration.6. Note that the MMSE optimization method is used in almost all TDECQ measurements performed today.

**Suggested Remedy**

Add the following text at line 53 (end of exceptions list): The lowest measured TDECQ values are achieved with the equalizer optimization method described in 121.8.5. Alternative optimization methods such as minimum mean squared error (MMSE) may be used to determine equalizer tap weights to reduce test time, and are expected to report equal or higher values of TDECQ. These alternative methods should not be used for receiver sensitivity and stressed receiver sensitivity calibration.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Resolving the use of the response to comment #17.

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<tbody>
<tr>
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<td>386</td>
<td>41</td>
<td>5</td>
<td>T</td>
<td>D</td>
<td>Reference (bucket)</td>
<td>W</td>
</tr>
</tbody>
</table>

The TDECQ methods reference channel requirements in 121.8.5.2 instead of the channel requirements in local clause 181.8.5.1.

**Suggested Remedy**

Replace the reference to 121.8.5.2 with reference to 181.8.5.1.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.
<table>
<thead>
<tr>
<th>Cl</th>
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<th>Comment Type</th>
<th>Comment Status</th>
<th>Proposed Response</th>
<th>Comment</th>
<th>Suggested Remedy</th>
</tr>
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<tr>
<td>181</td>
<td>SC 181.8.5</td>
<td>P 387</td>
<td>L 3</td>
<td>TR</td>
<td>D</td>
<td></td>
<td>Current baseline proposal is lacking tap weight restrictions, which were indicated as TBD when adopted.</td>
</tr>
<tr>
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<td></td>
<td>PROPOSED REJECT.</td>
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<td>Propose adopting the TDECQ tap weight restrictions as presented in welch_3dj_01_0524.</td>
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<tr>
<td>181</td>
<td>SC 181.8.5.1</td>
<td>P 387</td>
<td>L 19</td>
<td>T</td>
<td>D</td>
<td></td>
<td>The maximum and minimum dispersion values in this table should be replaced by equations similar to ones found in previous clauses (i.e. Table 151-12). This method is sometimes called &quot;CM1&quot;.</td>
</tr>
<tr>
<td></td>
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<td>Implement suggested remedy with editorial license</td>
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<tr>
<td>182</td>
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</table>
IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

Maki, Jeffery
Juniper Networks

Comment Type: TR
Comment Status: D
IMDD acronym (bucket)
Associated clause description is malformed. The acronym IMDD is used, which does not appear in the actual Clause 177 title. Why preclude that at some future point in time that Clause 177 is used for something other than IMDD? Also, there is no use of "Coherent" to describe Inner FECs used for coherent PMDs to setup the appropriate parallelism of terminology.

Suggested Remedy
Delete the acronym IMDD.

Proposed Response
PROPOSED ACCEPT.

Proposed Response
Response Status: W

Cl 182 SC 182.6.1 P 401 L 21 # 528
Welch, Brian
Cisco

Comment Type: TR
Comment Status: D
TX specs
In later 100G/1000G/10000G specs (ie, 100GBASE-FR4 and 100GBASE-LR2) the difference between OMA(min) and Pave(min) was 3dB, to reflect the case of infinite extinction ratio. In the adopted baselines this narrowed to 2.5 dB as it was not updated to reflect the changes to effective TDECQ(min).

Suggested Remedy
Propose changing "Average launch power, each lane (min)" in Table 182-7 from -2.1 dBm to -2.6 dBm.

Proposed Response
Response Status: W

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

Proposed Response
Response Status: W

Cl 182 SC 182.6.3 P 404 L 3 # 71
Yu, Rang-chen
InnoLight

Comment Type: T
Comment Status: D
cost budget
Although TDECQmax is still TBD. However, the footnote b should also indicate the allocation for penalties, just leave dispersion section as TBD for future update.

Suggested Remedy
Recommend to add "Allocations to penalties for DRx-2 series including penalties due to dispersion TBDdB, DGD and MPI 0.4dB" to footnote b.

Proposed Response
Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #128 with the exception that the value is .4dB and not .5dB.
Implement with editorial license.

Proposed Response
Response Status: W

Cl 182 SC 182.4 P 397 L 20 # 147
Ghiasi, Ali
Ghiasi Quantum/Marvell

Comment Type: T
Comment Status: D
Precoding
Prior to 182.4 add section for PMA function to support precoder to mitigate burst errors

Suggested Remedy
The transmitter need to support 1/(1+D) mod 4 precoding, as specified in 135.5.7.2, 120.5.7.2, and 173.5.7.2, 6 and 176.9.1.2, that may be enabled or disabled as needed with OLT, without OLT the optical transmitter should enable 1/(1+D) mod 4 precoding to mitigate burst error.

Proposed Response
Response Status: W

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using response to comment #21.
**Comment Type:** TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general

**Comment Status:** D/dispatched  A/accepted  R/rejected  
**Response Status:** O/open  W/written  C/closed  Z/withdrawn

**Sort Order:** Clause, Subclause, page, line

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**EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment**

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<tr>
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<th>#337</th>
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<td>ITU-T G.652.B cabled fiber attenuation is only specified for 1310 nm and 1550 nm wavelengths. It is not specified for wavelengths between 1260 nm and 1310 nm and not meant to be used in xWDM applications</td>
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<tr>
<td><strong>Suggested Remedy:</strong></td>
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<tr>
<td>Remove ITU-T G.652.B (dispersion unshifted) as a fiber option.</td>
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<tr>
<td>IEC 61753-021-2 has been superseded by IEC 61753-021-02.</td>
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<td>Change &quot;IEC 61753-021-2&quot; to &quot;IEC 61753-021-02&quot;.</td>
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<td>Connector labeling</td>
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<td>To support breakout, loopback, and OAN/OLT connectro should be labeled</td>
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<td><strong>Suggested Remedy:</strong></td>
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<tr>
<td>DR2-2 connector should be labeled as Tx1Tx2 ---- Rx2Rx1</td>
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<td>To support breakout, loopback, and OAN/OLT connectro should be labeled</td>
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<td>DR2-8 connector should be labeled as Tx1Tx2Tx3Tx4Tx5Tx6Tx7Tx8 Rx8Rx7Rx6Rx5Rx4Rx3Rx2Rx1</td>
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<tr>
<td>#347</td>
<td>T</td>
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<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
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<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
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<td>T</td>
<td>IEC 61753-021-2 has been superseded by IEC 61753-021-02.</td>
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<tr>
<td>#350</td>
<td>T</td>
<td>The current method for optimizing the tap weights of equalizer in the TDECQ reference receiver is described in clause 121.8.5. The equalizer tap coefficients are iteratively adjusted to effectively minimize the TDECQ penalty. Although not explicitly stated, one way to view this is that any combination of tap weights is valid and that all combinations should be tried to ensure the optimum tap weight combination is used when calculating TDECQ. As the equalizer length has been increased from 5 taps to 15 taps, the time required to verify all possible tap weights is likely problematic. This issue was managed in the 802.3 db project, where a 9 tap virtual equalizer is used for TDECQ. The following text was added to clause the definition of the TDECQ method: “The lowest measured TDECQ values are achieved with the equalizer optimization method described in 121.8.5. Alternative optimization methods such as minimum mean squared error (MMSE) may be used to determine equalizer tap weights to reduce test time, and are expected to report equal or higher values of TDECQ. These alternative methods should not be used for receiver sensitivity and stressed receiver sensitivity calibration”. Note that the MMSE optimization method is used in almost all TDECQ measurements performed today.</td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td>O</td>
</tr>
</tbody>
</table>

**Suggested Remedy**

Add the following text at line 44 (end of exceptions list): The lowest measured TDECQ values are achieved with the equalizer optimization method described in 121.8.5. Alternative optimization methods such as minimum mean squared error (MMSE) may be used to determine equalizer tap weights to reduce test time, and are expected to report equal or higher values of TDECQ. These alternative methods should not be used for receiver sensitivity and stressed receiver sensitivity calibration.
**EEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments**

---

**Comment Type**  | **Comment Status**  | **Page**  | **Line**  | **#**  
--- | --- | --- | --- | ---  
T  | D  | 411  | 30  | 3  

**Comment:** Johnsen, John

**Comment Type**  | **Comment Status**  | **Page**  | **Line**  | **#**  
--- | --- | --- | --- | ---  
T  | D  | 411  | 30  | 3  

**Comment:** TDECQ

**Comment Type**  | **Comment Status**  | **Page**  | **Line**  | **#**  
--- | --- | --- | --- | ---  
T  | D  | 411  | 30  | 3  

**Comment:** 121.8.5.2 Table 121-11 specifies ORL of 21.4dB be applied for TX testing. For 200GBASE-FR1, this needs to be 17.1dB.

**Suggested Remedy:**

- Add a new exception to the list in 182.8.5:
  "-. The optical return loss is as given in Table 182-7."

**Proposed Response:**

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

---

**Comment Type**  | **Comment Status**  | **Page**  | **Line**  | **#**  
--- | --- | --- | --- | ---  
T  | D  | 411  | 30  | 3  

**Comment:** Current reference is made to compliance channel in 121.8.5.2, which is for 500m instead of 2km

**Suggested Remedy:**

- Create new subclause 182.8.5.1 and refer to it instead of 121.8.5.2. Create 182.5.2.1 with contents along the lines of 124.8.5.1 from 802.3df with the same compliance channel.
  Develop with editorial license

**Proposed Response:**

- PROPOSED ACCEPT IN PRINCIPLE.
  Implement the suggested remedy with editorial license.
  For CRG discussion

---

**Comment Type**  | **Comment Status**  | **Page**  | **Line**  | **#**  
--- | --- | --- | --- | ---  
T  | D  | 411  | 30  | 3  

**Comment:** The required -3dB BW for the measurement system is not achievable with existing technology. (State of the art power meters with a maximum 120 GHz bandwidth, would require the bandwidth of the photodetector to be substantially higher than 120 GHz to achieve the current system bandwidth required for the test system, as defined in clause 52)

**Suggested Remedy:**

- The bandwidth of the RIN-OMA test system should be based on the expected bandwidth of the system receivers and consider the expected noise spectrum of transmitters. Spec limits for RIN OMA may need adjustment to adapt to any changes in the test method

**Proposed Response:**

- PROPOSED ACCEPT IN PRINCIPLE.
  Resolve using the response to comment #518

---

**Comment Type**  | **Comment Status**  | **Page**  | **Line**  | **#**  
--- | --- | --- | --- | ---  
T  | D  | 411  | 30  | 3  

**Comment:** IEC 60950-1 has been superseded by IEC 62368-1.

**Suggested Remedy:**

- Change "IEC 60950-1" to "IEC 62368-1".

**Proposed Response:**

- PROPOSED ACCEPT IN PRINCIPLE.
  Resolve using the response to comment #342.

---

**Comment Type**  | **Comment Status**  | **Page**  | **Line**  | **#**  
--- | --- | --- | --- | ---  
T  | D  | 411  | 30  | 3  

**Comment:** The transmitter need to supports 1/(1+D) mod 4 precoding, as specified in 135.5.7.2, 120.5.7.2, and 173.5.7.2, 6 and 176.9.1.2, that may be enabled or disabled as needed with OLT, without OLT the optical transmitter should enable 1/(1+D) mod 4 precoding to mitigate burst error.

**Proposed Response:**

- PROPOSED ACCEPT IN PRINCIPLE.
  Resolve using response to comment #21.
<table>
<thead>
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<tbody>
<tr>
<td>T</td>
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<td>W</td>
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</table>

**Suggested Remedy**

- Replace TBD with a value equal to the Average launch power, each lane (max) + 6 dB, which is 4.9 + 6 = 10.9 dB. This methodology is consistent with previous FR4 PMDs (clauses 122, 151) and 800GBase-LR4 in this Table.

- **Recommended Relationship**
  - With 'OMAout (min)'=1.9dBm, then 'Average launch power, each lane' for 800G LR4 in Table 183-6 should be changed to -1.1dBm.

- **Proposed Response**
  - Implement the suggested remedy with editorial license.

- **Suggested Remedy**
  - Replace 'Average launch power, each lane (max)' in Table 183-6 from -1.8 dBm to -2.2 dBm.

- **Proposed Response**
  - Resolve using the response to comment #164.

- **Suggested Remedy**
  - Replace TDECQ with max(TECQ, TDECQ) for both PMDs, as has been done in all other PMDs in Clauses 180-182. Note that max(TECQ, TDECQ) is already in Equation 183-1.

- **Proposed Response**
  - Implement suggested remedy with editorial license.

- **Suggested Remedy**
  - With 'OMAout (min)'=0.8dBm, then 'Average launch power, each lane (min)' in Table 183-6 should be changed to -2.2dBm.

- **Proposed Response**
  - Implement the suggested remedy with editorial license.

- **Suggested Remedy**
  - Replace TDECQ with max(TECQ, TDECQ) for both PMDs, as has been done in all other PMDs in Clauses 180-182. Note that max(TECQ, TDECQ) is already in Equation 183-1.

- **Proposed Response**
  - Implement suggested remedy with editorial license.

- **Suggested Remedy**
  - With 'OMAout (min)'=0.8dBm, then 'Average launch power, each lane (min)' in Table 183-6 should be changed to -2.2dBm.

- **Proposed Response**
  - Implement the suggested remedy with editorial license.

- **Suggested Remedy**
  - Replace TDECQ with max(TECQ, TDECQ) for both PMDs, as has been done in all other PMDs in Clauses 180-182. Note that max(TECQ, TDECQ) is already in Equation 183-1.

- **Proposed Response**
  - Implement suggested remedy with editorial license.

- **Suggested Remedy**
  - Change spec format consistent with FR4

- **Proposed Response**
  - Resolve using the response to comment #12
### IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

**Comment Type** T, **Comment Status** D, TX specs

**Difference in launch power between any two lanes (OMAouter) (max) in Table 183-6 is TBD for 800GBASE-FR4.**

**Suggested Remedy**
- Replace TBD with a value of OMAouter(max) minus OMAouter(min) or 4 dB, whichever is smaller, consistent with other FRn/LRn clauses (122, 151).

**Proposed Response**
- **Proposed Accept in Principle.**
- Implement the suggested remedy with editorial license.

---

**Comment Type** TR, **Comment Status** D, RX specs

**The delta between 'Tx_Pavg(min)' and 'Rx_Pavg(min)' should equal to 'Channel insertion loss' (4.0dB for FR4)**

**Suggested Remedy**
- Rx_Pavg (min) in Table 183-7 should be -2.2dBm-4.0dB=-6.2dBm

**Proposed Response**
- **Proposed Accept in Principle.**
- For Table 183-7, in the 800GBASE-FR4 column, change the value for "Average receive power, each lane (min)" to -6.2.

---

**Comment Type** TR, **Comment Status** D, RX specs

**The delta between 'Tx_Pavg(min)' and 'Rx_Pavg(min)' for 800G LR4 should equal to 'Channel insertion loss' (6.3dB for LR4)**

**Suggested Remedy**
- Rx_Pavg (min) for 800G LR4 in Table 183-7 should be -1.1dBm-6.3dB=-7.4dBm

**Proposed Response**
- **Proposed Accept in Principle.**
- For Table 183-7, in the 800GBASE-LR4 column, change the value for "Average receive power, each lane (min)" to -7.4.

---

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

**Difference in receive power between any two lanes (OMAouter) (max) in Table 183-7 is TBD for 800GBASE-FR4.**

**Suggested Remedy**
- Replace TBD with a value of 4.1 dB, consistent with other FR4 PMDs (Cl. 122, 151)

**Proposed Response**
- **Proposed Accept in Principle.**
- Implement the suggested remedy with editorial license.

---

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

**Adding explanation on allocation for penalties calculation.**

**Suggested Remedy**
- Use same approach than for the insertion loss adding a note in the LR4 value with the text:"Allocation for penalties is calculated using an additional penalty of 0.7dB from DGD, and 0.4dB from MPI".

**Proposed Response**
- **Proposed Accept.**

**Proposed Response**
- **Proposed Accept.**
- Resolve using the response to comment #502.

---

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

**Footnote e did not clarify what's the composition of total 5dB allocation for penalties.**

**Suggested Remedy**
- Recommend to add "Allocations to penalties for 800G-LR4 including penalties due to dispersion 3.9dB, DGD 0.7dB and MPI 0.4dB" to footnote e.

**Proposed Response**
- **Proposed Accept in Principle.**
- Resolve using the response to comment #502.
Although TDECQmax is still TBD. However, the footnote should also indicate the allocation for penalties, just leave dispersion section as TBD for future update.

**Suggested Remedy**

Recommend to add "Allocations to penalties for 800G-FR4 including penalties due to dispersion TBDdB, DGD and MPI 0.5dB" to footnote e.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE. Resolve using the response to comment #171.

---

The positive and negative dispersion values in this table should come from a channel model that uses a statistical approach. A contribution on fiber dispersion statistics will be submitted.

**Suggested Remedy**

Replace TBDs with values agreed upon by the Task Force.

**Proposed Response**

PROPOSED REJECT.

The following presentation was reviewed by the 802.3dj task force at the May Interim meeting:

https://www.ieee802.org/3/dj/public/24_05/parsons_3dj_01a_2405.pdf

The presentation provided an overview of the latest fiber data set that could be used to determine dispersion parameters but no specific values were provided or directions on how to modify the draft.

---

Comment 183.7.1 is TBD.

**Suggested Remedy**

Use the same text and table as given in 182.7.1. Since this sub-clause only reiterates fiber cable specs from external standards, not 802.3 specific specs, this should not be controversial.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE. Implement the suggested remedy with editorial license.
The current method for optimizing the tap weights of equalizer in the TDECQ reference receiver is described in clause 121.8.5. The equalizer tap coefficients are iteratively adjusted to effectively minimize the TDECQ penalty. Although not explicitly stated, one way to view this is that ANY combination of tap weights is valid and that ALL combinations should be tried to ensure the optimum tap weight combination is used when calculating TDECQ. As the equalizer length has been increased from 5 taps to 15 taps, the time required to verify all possible tap weights is likely problematic. This issue was managed in the 802.3 db project, where a 9 tap virtual equalizer is used for TDECQ. The following text was added to clause the definition of the TDECQ method:

"The lowest measured TDECQ values are achieved with the equalizer optimization method described in 121.8.5. Alternative optimization methods such as minimum mean squared error (MMSE) may be used to determine equalizer tap weights to reduce test time, and are expected to report equal or higher values of TDECQ. These alternative methods should not be used for receiver sensitivity and stressed receiver sensitivity calibration."

Proposed Response

Add the following text at line 40 (end of exceptions list): The lowest measured TDECQ values are achieved with the equalizer optimization method described in 121.8.5. Alternative optimization methods such as minimum mean squared error (MMSE) may be used to determine equalizer tap weights to reduce test time, and are expected to report equal or higher values of TDECQ. These alternative methods should not be used for receiver sensitivity and stressed receiver sensitivity calibration.

PROPOSED ACCEPT IN PRINCIPLE.

The Inner FEC as defined, includes the PMA. Shall make this clear to the reader.

Suggested Remedy

Either add sentence: "This Inner FEC sublayer includes functionality often associated with the PMA sublayer", or split the PMA function

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #17

The bandwidth of the RIN-OMA test system should be based on the expected bandwidth of the system receivers and consider the expected noise spectrum of transmitters. Spec limits for RIN OMA may need adjustment to adapt to any changes in the test method.

Suggested Remedy

For consistency with the rest of the document, remove the dashed boxes.

Proposed Response

PROPOSED REJECT.

The dashed boxes clearly denote the transmit and receive functions. Removing the dashed boxes does not improve clarity of the draft.
The second sentence of the paragraph (discussing the distribution to 32 lanes by the permutation function) seems to imply that the 32 lanes were interleaved into a serial stream after they were reordered and deskewed, but the text doesn't actually say that is done.

**Suggested Remedy**

If the intent is that the 32 lanes are re-interleaved, and then the permutation function distributes the symbols back to 32 lanes (in something other than a round-robin manner), change the end of the first sentence to say "are reordered, deskewed, and serialized". If the intent is that the permutation process just moves symbols around among the 32 lanes, change the second sentence to say "The RS-FEC symbols are then rearranged across the 32 lanes by a permutation function.*

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the following with editorial license.

Change "The RS-FEC symbols are then distributed over the 32 lanes by a permutation function." to "The RS-FEC symbols are then rearranged across the 32 lanes by a permutation function.*".

**Comment Status**

D/dispatched

**Response Status**

W/written

---

The Inner FEC transmit (184.4) and receive (184.5) functions provide a BCH encoder/decoder and other functions to be performed on each PCS lane. Although there is one per PCS lane, these should be called "flows" rather than "lanes" to be consistent with other FEC clauses and to differentiate between "lanes" that go between sublayers.

**Suggested Remedy**

When describing the process applied to each PCS lane in each direction, use the word "flow" rather than "lane".

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

**Comment Status**

D/dispatched

**Response Status**

W/written

---

The process provided in 184.4.1 "Alignment lock and deskew" merely maps bits on the FEC service interface to vectors; it does not include and RS-FEC symbol alignment. The process in 184.4.2 remaps the vectors such that there is alignment to the RS-FEC symbols and the lanes are properly ordered.

**Suggested Remedy**

Either combine the two subclauses and process into one subclause or move the RS-FEC symbol alignment process in 184.4.2 to 184.4.1.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the following with editorial license.

Move the RS-FEC symbol alignment process in 184.4.2 to 184.4.1.
What is the purpose of this mapping? There are 32 lanes being received, this process is simply aligning them based on the RS FEC frame, so it doesn't seem like a mapping is needed.

Suggested Remedy

Either explain why this mapping process is needed, or delete it.

---

The lane reorder process is stated as being optional, however, that is not the case. It is not required (or optional) if the lanes are already in order (e.g., connected to a PCS above) and mandatory if the lanes may not be in order (e.g., connected to an 8:32 PMA above), thus it is conditional, rather than optional.

Suggested Remedy

Change the first 2 sentences in 184.4.2 to "If the sublayer above the Inner FEC does not provide the PCS lanes in order at the service interface, the lane reordering function shall re-order the PCS lanes according to the PCS lane number."

PROPOSED ACCEPT IN PRINCIPLE.

---

Lane reordering is not optional; the lanes have to be put in the correct order. If they happen to arrive in the correct order, it's a simple process.

Suggested Remedy

Change the second sentence to say "The lane reorder process shall order the PCS lanes according to the PCS lane number."

PROPOSED ACCEPT IN PRINCIPLE

---

It is not clear why this description is needed. Other clauses about reordering don't have this.

Suggested Remedy

Delete the last paragraph.

---

Implement the following with editorial license.

Change: "If that is the case, the optional lane reorder function shall order the PCS lanes according to the PCS lane number." to: "The lane reorder function shall order the PCS lanes according to the PCS lane number."
This figure is not clear, nor is the relationship of the figure to the pseudocode beneath it. I think the columns 0-3 are just numbers that relate to the post-FEC distribution process. I have no idea why there are 32 sets of 4 symbols, as the algorithm doesn’t do anything on a four-symbol basis. The function is simply reversing flow1 and flow0 every two columns, so that each lane has interleaved symbols from all four codewords. This could be described more simply by using blocks of 16 symbols in the figure (i.e., block 0 would be lanes 0-15 in column 0, block 1 would be lanes 16-31 in column 0, etc.).

**Suggested Remedy**

Revise the figure as suggested. The input side would look like this (where each row here is corresponding to 16 PCS lanes in the figure):

| 0 2 4 6 |
| 1 3 5 7 |

and the output would be

| 0 2 5 7 |
| 1 3 4 6 |

This will remove any confusion about whether the 32 blocks are supposed to be somehow related to the 32 PCS lanes, and it will be easier to see what is changing between the figures.

**Proposed Response**

Proposed Accept in Principle.

Implement the suggested remedy with editorial license.
Comment Type | Comment Status | Algorithm (Bucket)
---|---|---
Huber, Thomas | Nokia | 

**Comment Type**

Since the convolutional interleaver operates separately on each PCS lane, there's no value in having an algorithm that includes the PCS lanes. Since it operates on 40-bit units, there's also no need to include bit-level description.

**Suggested Remedy**

State that the algorithm describes the operation on the 40 bit entities and is run on each PCS lane independently. This allows elimination of the p and j variables.

**Proposed Response**

PROPOSED REJECT.

This is correct as written. Removing the lanes and bits does not seem to add clarity, better have the detailed function as described in the adopted baseline.

---

**Comment Type**

The algorithm relating the convolutional interleaver output to its input doesn't work when i < 36 - it refers to negative block numbers for the input (permo) while the delay lines are filling, and those negative numbers need to be ignored as the process starts up. In other words, given the input sequence of 40-bit blocks 0, 1, 2, 3, ..., the convolutional interleaver is supposed to produce the output sequence 0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, and then each successive set of 3 is 3 more than the previous (so it continues 39, 22, 25, 8, ...). The algorithm says that output 0 is input 0-18 x (0 mod 3), so that produces 0 as expected, but output 1 is then supposed to be input 1-18 x (1 mod 3), which is -17, not 3.

**Suggested Remedy**

The text above figure 184-4 already provides an algorithmic description of how the interleaver works. Rather than a second algorithmic description, it might be better to show the worked example as noted in the comment - i.e., show a table of input blocks from 0 to 42, and the corresponding output blocks.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #613.

---

**Comment Type**

The first statement should not be a 'shall' (which indicates a PICS item of conformance). The second sentence is correct, in that there are 32 encoders, but what's actually required is that each lane has an encoder.

**Suggested Remedy**

Revise the paragraph to read: The BCH encoder works in conjunction with the RS(544,514) FEC to increase the FEC coding gain. There is a BCH encoder process for each PCS lane.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the following with editorial license.

---

**Comment Type**

For perm[i, 40(i-18 x i mod 3)+j], the column index 40(i-18 x i mod 3)+j may be a negative value.

**Suggested Remedy**

Suggest to add one sentence after Line 9: When 40(i-18 x i mod 3)+j is negative, perm[i, 40(i-18 x i mod 3)+j] will be undetermined value from initial buffer of the convolutional interleaver.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the following with editorial license.

Add the following sentence after Line 9: "When 40(i-18 x i mod 3)+j is negative, perm is undefined."

---

**Comment Type**

The text above figure 184-4 already provides an algorithmic description of how the interleaver works. Rather than a second algorithmic description, it might be better to show the worked example as noted in the comment - i.e., show a table of input blocks from 0 to 42, and the corresponding output blocks.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #613.
The variable p is being overloaded - it is used at line 35 as a lane index, and at line 40 as the parity polynomial. Since the BCH encoding is done per lane, there really no need to have a variable related to the lane number. The text can simply state that the algorithm is applied to each lane individually.

**Proposed Response**

Removal the lane does not seem to add clarity, better have the detailed function as described in the accepted baseline.

**Proposed Accept in Principle.**

Change the flow index from p to q to remove p overload.

---

It is said "4-bit pilot symbols (PS) are inserted every 64 4-bit blocks (one 4-bit PS, 63 4-bit message blocks)." But in Figure 184-5, message blocks m<0:63>, m<64:127>, etc., between pilot symbols has 64 4-bit blocks.

**Proposed Response**

Change Figure to match the text, i.e., change m<0:63> to m<0:62>, change m<64:127> to m<63:125>, etc.

**Proposed Accept in Principle.**

Implement suggested remedy with editorial license.

---

The first sentence of the second paragraph could be written more clearly.

**Proposed Response**

Replace with "Two streams of DSP frames, one for each polarization, are generated by the inner FEC."

**Proposed Accept.**
### IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comment

<table>
<thead>
<tr>
<th>Cl</th>
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<td>Nokia</td>
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</table>

**Comment Type:** T  **Comment Status:** D  **DSP (Bucket)**

It is not clear what "192 bits that are complemented with zeros" is intended to mean. Based on what is in Table 184-2, I think the intent is that a zero is inserted after each bit of the PRBS9 output to form the bit-pairs that become the PS symbols. Also, the text talks about 4-bit PS symbols, but Table 184-2 is showing bit-pairs for each component rather than 4-bit symbols without explaining that outputs 0 and 1 are for the X polarization (so the X PRBS is spread across outputs 0 and 1) and outputs 2 and 3 are for the Y polarization.

**Suggested Remedy:**

Revise the two paragraphs above Table 184-1 to read as follows:

For both DSP frame 0 and DSP frame 1, the generator is initialized using the seed at the start of every DSP frame. The generator produces a sequence of 192 bits. A zero bit inserted after each bit to generate the bit-pairs that form the pilot symbols, which use the outer points of the 16QAM constellation.

The generator polynomial and seed values are shown in Figure 184-6 and listed in Table 184-1. The complete pilot sequence is shown in Table 184-2. The bit-pairs for the X polarization are distributed in a round-robin manner to outputs 0 and 1. The bit-pairs for the Y polarization are distributed in a round-robin manner to outputs 2 and 3.

**Proposed Response**  **Response Status:** W  **PROPOSED ACCEPT.**

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</table>

**Comment Type:** T  **Comment Status:** D  **Order (Bucket)**

The overall flow would be improved if it went BCH interleaver, 4-level signal mapping, DSP frame, with all the pilot symbol details then in the DSP frame clause.

**Suggested Remedy:**

Revise so the flow is like this:

184.4.7 BCH interleaver
184.4.8 Four-level signal mapping (current 184.4.9, without subclauses)
184.4.9 DSP frame generation (current 184.4.7.1)
184.4.9.1 Pilot sequence (current 184.4.7.2 and 184.4.9.1)

**Proposed Response**  **Response Status:** W  **PROPOSED REJECT.**

The text is correct as written. The actual order is the right one. It describes the bit blocks generation and handling, then the mapping to four levels.

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</table>

**Comment Type:** T  **Comment Status:** D  **Interface (Bucket)**

The paragraph that begins with "the signals Rx_Xi, Rx_XQ, à" doesn’t seem to make sense. The Tx and Rx signals are not guaranteed to be the same (i.e., Tx_XI can be received as any of the four components), but the contents of Tx_XI aren’t distributed to all the Rx signals.

**Suggested Remedy:**

Change the title to "4-level signal mapper", and make the corresponding change in 184.5.3.

**Proposed Response**  **Response Status:** W  **PROPOSED ACCEPT.**
Similar changes should be made in the convolutional de-interleaver as were requested for the convolutional interleaver in earlier comments.

Suggested Remedy
Revise the items in the lettered list and the algorithm to align with whatever changes are agreed for the convolutional interleaver.

Proposed Response  Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Implement suggested remedy with editorial license.

It is possible that one polarization is locked but the other polarization can not get locked. With the current variable list and state diagrams this can not be identified or reported. (This is a little different from AM lock process across PCS lanes, where it is way up in the sublayers higher than the pilot sequence lock, and it may not be a problem.)

Suggested Remedy
Recommend to add a timer (value TBD) to indicate that it has waited long enough after one polarization is locked but the other is still not locked.

Proposed Response  Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

The LOCK_INIT state in Figure 184û9 'DSP lock state diagram' includes the action 'test_sym <= false', however the test_sym variable isn't defined in subclause 184.6.2 'Variables' and isn't used anywhere else in Figure 184û9.

It seems that this should have been 'test_ps <= false' as the test_ps variable isn't initialised during reset in the LOCK_INIT state but used to control the GET_SYMBOL to FIND_1ST transition below.

Suggested Remedy
Change 'test_sym <= false' to read 'test_ps <= false'.
### Comment #184: SC 184.6.5 P 462 L 22 # 560

**Law, David**

**HPE**

**Comment Type:** T  **Comment Status:** D  **Diagrams**

N (the number of consecutive PS symbols matching the expected value for a given polarization stream required to enter frame lock), and M (the number of consecutive PS symbols that don't match the expected value for a given polarization stream required to exit frame lock) used in Figure 184.9 'DSP lock state diagram' aren't defined in subclause 184.6 'Inner FEC state diagrams' or its subclauses.

Suggest that these values should be defined in one place (I assume in subclause 184.5.4 'DSP frame synchronization and pilot removal' which includes the text 'The values of N and M are TBD.), with a pointer to this subclause elsewhere.

**Suggested Remedy**

1. Insert a new subclause 184.6.5 'Constants' as follows, renumbering the following subclause.

   **N** The number of consecutive PS symbols matching the expected value for a given polarization stream required to enter frame lock (see 184.5.4).

   **M** The number of consecutive PS symbols that don't match the expected value for a given polarization stream required to exit frame lock (see 184.5.4).

2. In subclause 184.6.2 'Variables', change the text 'It is set to true when TBD PS symbols ...' to read 'It is set to true when M PS symbols ...' in the variable 'restart_lock' description.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

In the first paragraph of clause 184.5.4 remove: "The values of N and M are TBD."

Add subclause: "184.6.5 Constants"

M

The number of consecutive PS symbols that don't match the expected value for a given polarization stream required to exit frame lock (see 184.5.4).

N

The number of consecutive PS symbols matching the expected value for a given polarization stream required to enter frame lock (see 184.5.4).

Assuming comment #307 is accepted, add values of M and N.

In subclause 184.6.2 'Variables', change the text for "restart_lock" from: "It is set to true when TBD PS symbols ..." to: "It is set to true when M PS symbols ..."

---

### Comment #184: SC 184.8 P 464 L 10 # 873

**He, Xiang**

**Huawei**

**Comment Type:** TR  **Comment Status:** D  **Diagrams**

The variable 'alignment_status' used in the LOSS_OF_ALIGNMENT and ALIGNMENT_ACQUIRED states is misspelt.

Suggested Remedy

Suggest that 'alignment_status' should read 'alignment_status'.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #372.

---

### Comment #372

Only "alignment_valid" is reported, not individual "dsp_lock<x>" variables.

Suggested Remedy

It is recommended to report both "dsp_lock<x>" in table 184-7, as we did for PCS lane lock where we reported "Lane x aligned" for all PCS lanes.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.
Table 185-1, Figure 185-1, Figure 185-2 does not reflect the PHY type and clause correlation in Table 169-3a. There is no mention of 800GBASE-R BM-PMA, 800GAU-I8 2C2, 800GAU-I8 2C2M, 800GBASE SM-PMA, 800GAUI-4 2C2, and 800GAUI-4 2C2M.


**Suggested Remedy**

Clause 185 needs to be updated to reflect these layers.

Table 185-1 needs the following entries -

- 800GBASE-R BM-PMA - conditional
- 800GAU-I8 2C2 - optional
- 800GAU-I8 2C2M - optional
- 800GBASE SM-PMA - conditional
- 800GAU-I4 2C2 - optional
- 800GAU-I4 2C2M - optional

Add note "C= Conditional, 800GBASE-R BM-PMA is conditional, pending implementation of 800GAUI-4 2C2/2C2M"

Figure 185-1 should include a PMA sublayer in the diagram and be added to legend below Figure 185-2 needs to be updated to show the 800GBASE-R PMA Sublayer and service interface between the PCS and Inner FEC.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Some optional and conditional sublayers are missing from Table 185-1 and the conditions for include the SM-PMA and BM-PMA should be included in this table.

Regarding Figure 185-1 and Figure 185-2, no PMA is shown because the 800GBASE-LR1 Inner FEC sublayer connects directly with the PCS; a PMA is not required between the PCS and the 800GBASE-LR1 Inner FEC. Note that the 800GBASE-LR1 Inner FEC subsumes some functions/services normally provided by a PMA for the PMD.

Add the following rows in Table 185-1:

- 800GBASE-R BM-PMA - conditional
- 800GAU-I8 2C2 - optional
- 800GAU-I8 2C2M - optional
- 800GBASE SM-PMA - conditional
- 800GAU-I4 2C2 - optional
- 800GAU-I4 2C2M - optional

Add note "C= Conditional, 800GBASE-R BM-PMA is conditional, pending implementation of 800GAUI-4 2C2/2C2M"

**Suggested Remedy**

The TBDs need to be replaced by values. Follow the same methodology as in 154 and latest draft D3.0 of P802.3cw

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Replace contents by The sum of the transmit and receive delays at one end of the link contributed by the 800GBASE-LR1 PMD including 2 m of fiber in one direction shall be no more than 16 384 bit times (32 pause_quanta or 20.48 ns).

A description of overall system delay constraints and the definitions for bit times and pause_quanta can be found in 169.4 and its references.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggested remedy and update Table 169-4 with editorial license.

**Suggested Remedy**

Add an entry for Tx clock phase noise (PN): Maximum PN mask

Add an entry for: Tx clock phase noise (PN); Maximum total integrated random jitter

Add an entry for: Tx clock phase noise (PN); Maximum total periodic jitter

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement suggest remedy with editorial license.
800GBASE-LR1 is being defined to allow unlocked lasers with frequency errors larger than the DSP digital acquisition range. Additional parameters are required for the Tx laser to accommodate this. Values will be provided after further study, but the new parameters can be added to Table 185-4. A supporting contribution will be provided.

**Suggested Remedy**

Add the following parameters to Table 185-4:

- Maximum Tx laser frequency slew rate: Preacquisition [Units GHz/s]
- Maximum Tx laser frequency slew rate: Post acquisition [Units GHz/ms]
- Laser Relative Frequency tracking accuracy [Units GHz]

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the 802.3dj task force at the May Interim meeting:


Implement suggest remedy with editorial license.

---

TQM is currently undefined. Recommend adopting RSNR Penalty as a TQM. Supporting Contribution to be provided.

**Suggested Remedy**

Replace TQM with RSNR Penalty

**Proposed Response**

PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.

---

The draft contains separate specifications of X-Y power imbalances and I-Q imbalance.

**Suggested Remedy**

Having a separate X-Y and I-Q imbalance specification splits the imbalance power budget and results in a tighter specification than necessary. These specifications should be combined into a single lane-to-lane imbalance specification. See


**Proposed Response**

PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.
Average receiver power (min) and the per-lane transmit power (min) specifications should be tied to an appropriate transmit quality metric similar to the TDECQ specifications in other IMDD clauses.

Suggested Remedy:
See https://grouper.ieee.org/groups/802/3/dj/public/24_01/kota_3dj_01a_2401.pdf and https://grouper.ieee.org/groups/802/3/dj/public/23_11/kota_3dj_01a_2311.pdf for initial proposals on how to tie the RX sensitivity and TX power specifications with a transmit quality metric. This provides flexibility to allow module designers to explore design tradeoffs to simplify designs in ways which can benefit end users.

PROPOSED REJECT.
This comment was WITHDRAWN by the commenter.

A value of -27dB is appropriate for Maximum discrete reflectance.

Suggested Remedy:
Replace TBD for Maximum discrete reflectance with -27

PROPOSED ACCEPT.

A value of 24dB is appropriate for Optical Return Loss.

Suggested Remedy:
Replace TBD in Table 185-7 with 24

PROPOSED ACCEPT.

The scrambled idle test pattern for 800GBASE-R PCS is defined in 172.2.4.11, not 175.2.4.11.

Suggested Remedy:
Change "175.2.4.11" to "172.2.4.11" and format as external reference.

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

The scrambled idle test pattern for 800GBASE-R PCS is defined in 172.2.4.11, not 175.2.4.11.

Suggested Remedy:
Change "175.2.4.11" to "172.2.4.11" and format as external reference.

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

The 800GBASE-LR1 Inner FEC would not see or use scrambled idles as its input. The input to the 800GBASE-LR1 Inner FEC should be "scrambled idle processed by 800GBASE-R PCS and then encoded by the 800GBASE-LR1 Inner FEC".

Suggested Remedy:
Change "pattern description" column in Table 185-9 to "Scrambled idle processed by 800GBASE-R PCS and then encoded by the 800GBASE-LR1 Inner FEC".

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

IEC 61753-021-2 has been superseded by IEC 61753-021-02.

Suggested Remedy:
Change "IEC 61753-021-2" to "IEC 61753-021-02".

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #339.
IEC 61753-021-2 has been superseded by IEC 61753-021-02.

**Suggested Remedy**

Change "IEC 61753-021-2" to "IEC 61753-021-02".

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #339.

---

**Comment Type** T  **Comment Status** D  **IEC revision**

**DE KOOS, ANDRAS**  **Microchip Technology**

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

**ER1 PCS:** Planting the seed for when the PCS is ready to be properly reviewed.

How to calculate the path data delay across the ER1 PCS/PMA? Clause 90 and Annex 90A give general rules, like how to calculate the rx/tx path data delay when there are functions within the PHY that introduce cyclical delay.

But the path data delay in the ER1 PCS is very different from anything that has been imagined in Clause 90 - an Ethernet stream that floats within a GMP frame will present unique challenges; it is not immediately clear how to determine the min/max latency across such a PCS.

This might be worse than the Alignment marker issue!

**Suggested Remedy**

**Proposed Response**

PROPOSED REJECT.

The suggested remedy does not provide sufficient detail to implement.

---

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

**STASSAR, PETER**  **Huawei Technologies**

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

**Delay**

The TBDs need to be replaced by values. Follow the same methodology as in 154 and latest draft D3.0 of P802.3cw

**Suggested Remedy**

Replace contents by The sum of the transmit and receive delays at one end of the link contributed by the 800GBASE-LR1 PMD including 2 m of fiber in one direction shall be no more than 16 384 bit times (32 pause_quanta or 20.48 ns).

A description of overall system delay constraints and the definitions for bit times and pause_quanta can be found in 169.4 and its references.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Implement the suggested remedy and update Table 169-4 with editorial license.

For CRG discussion.
# IEEE P802.3dj D1.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet 1st Task Force review comments

<table>
<thead>
<tr>
<th>Cl 187</th>
<th>SC 187.5</th>
<th>P 502</th>
<th>L 17</th>
<th># 117</th>
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<td>Huawei Technologies</td>
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<td>Previously for Clause 154 and draft Clause 156 in D3.0 for P802.3cw 20 dB maximum receiver reflectance has been used, which is a common value in the industry and in draft Clause 155.5.2</td>
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<td>For Receiver reflectance (max) replace TBD by 20 dB for both ER1-20 and ER1</td>
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<td>Negative dispersion does not occur around 1550 nm. 0 ps/nm is the minimum. Only need min and max dispersion as in draft D3.0 of P802.3cw. A safe upper limit of 20 ps/nm/km can be used for a wavelength close to 1550 nm</td>
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<td>Replace &quot;Positive dispersion (max)&quot; by &quot;Chromatic dispersion (max)&quot; with value 400 ps/nm for ER1-20 and 800 ps/nm for ER1. Replace &quot;Negative dispersion (min)&quot; by &quot;Chromatic dispersion (min)&quot; with value 0 ps/nm for both ER1-20 and for ER1.</td>
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**Type:** TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general  
**Comment Status:** D/dispatched  A/accepted  R/rejected  
**Response Status:** O/open  W/written  C/closed  Z/withdrawn  
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