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 indication 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.

---

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 8x 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

Visit the following websites for more information:

- [https://osfpmsa.org/specification.html](https://osfpmsa.org/specification.html)

Refer to these documents from 179C.
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

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

Comment Type TR
Comment Status A

SuggestedRemedy

800BASE-ER1 is defined as using 800BASE-R encoding, but per 802.3df-2024, 1.4.184e - "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.

800GBASE-ER1 is defined as using 800GBASE-R encoding, but per 802.3df-2024, 1.4.184e - "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.

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 800BASE-ER1 and 800BASE-ER1-20 to the following:

1.4.184da 800BASE-ER1: IEEE 802.3 Physical Layer specification for 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 IEEE Std 802.3, Clause 186 and Clause 187).

1.4.184db 800BASE-ER1-20: IEEE 802.3 Physical Layer specification for 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 IEEE Std 802.3, Clause 186 and Clause 187).

Implement with editorial license.

SuggestedRemedy

Since 800BASE-ER1 and -ER1-20 have a separate PCS, the definition for 800BASE-ER1 and ER1-20 should refer to 800BASE-ER1 encoding rather than 800BASE-R encoding.

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

Accept in principle.
Resolve using the response to comment #309.

Response

Huber, Thomas
Nokia

Comment Type T
Comment Status A

SuggestedRemedy

The abbreviation "MLSD" is used numerous times in Annex 178A to reference Maximum Likelihood Sequence Detection and should be added to the abbreviations list.

Add MLSD | Maximum Likelihood Sequence Detection

Accept in principle.
Implement suggested 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
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**: R  **timesync (bucket)**

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

*Presentation will be prepared for this comment.*

**Response**  **Response Status**: C
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**: A  **timesync (bucket)**

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

**Response**  **Response Status**: C
ACCEPT.

---

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

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

**Response**  **Response Status**: C
ACCEPT.

---

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

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

**Response**  **Response Status**: C
ACCEPT.

---

**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

---

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

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

**Response**  **Response Status**: C
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.
### 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>
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<td><strong>Comment Status</strong></td>
<td><strong>R</strong></td>
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<td><strong>Suggested Remedy</strong></td>
<td>Add MDIO interface registers for Inner FEC sublayers defined in Clause 177 and 184.</td>
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<tr>
<td><strong>Comment</strong></td>
<td>Add definitions for the new register set defined for the Inner FEC sublayers in 30.3.1.1 - 30.1.1.14.</td>
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<td><strong>Presentation will be prepared for this comment.</strong></td>
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**Response**

**Response Status C**

**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_05/03_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.

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<td><strong>A</strong></td>
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<tr>
<td><strong>Suggested Remedy</strong></td>
<td>It's unfortunate that 800GBASE-ER1 and 800GBASE-ER1-20 are in different registers, and 800GBASE-ER1-20, having less reach, should come first</td>
<td></td>
<td></td>
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<tr>
<td><strong>Comment</strong></td>
<td>Move 800GBASE-ER1 from 1.73.14 to 1.74.0. 1.73.14 goes back to reserved - maybe it can be used for 800GBASE-LR20-1 :)</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

**Response**

**Response Status C**

**ACCEPT.**

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

https://www.ieee802.org/3/dj/public/24_05/03_3dj_01_2405.pdf

Implement the changes proposed in slavick_3dj_01_2405 with editorial license and using appropriate editing instructions.

<table>
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<tr>
<td><strong>Suggested Remedy</strong></td>
<td>We are now using a Next Page to advertise IEEE defined PHYs. However the order of when Next Pages are introduced, defined and then used is a bit out of order. So re-arranging the order in which AN is specified would help readers to better understand what how Next Pages are defined, how to use them and when to use them.</td>
<td></td>
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</table>

**Response**

**Response Status C**

**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_05/03_3dj_01_2405.pdf

Implement the changes proposed in slavick_3dj_01_2405 with editorial licence and using appropriate editing instructions.

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<td><strong>Comment Status</strong></td>
<td><strong>A</strong></td>
<td><strong>(bucket1p)</strong></td>
</tr>
<tr>
<td><strong>Suggested Remedy</strong></td>
<td>Table 73-5 is missing the indication of highest priority.</td>
<td></td>
<td></td>
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</tbody>
</table>

**Response**

**Response Status C**

**ACCEPT.**

### 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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**Page 4 of 129**

**6/12/2024 1:37:21 PM**
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

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.

**Response**
**Response Status** C
**REJECT.**

The IEEE 802.3dj Task Force reviewed the following presentation during the May Interim meeting:
https://www.ieee802.org/3/dj/public/24_05/ran_3dj_05_2405.pdf

The presentation does not provide sufficient detail to implement. A consensus presentation with a complete proposal is encouraged.

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.

**Response**
**Response Status** C
**ACCEPT.**

In table 116-3, 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., 200GBASE-KR1 and 200GBASE-CR1

**Response**
**Response Status** C
**ACCEPT IN PRINCIPLE.**
Implement 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**
**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 #151**

**Comment Type:** TR  
**Comment Status:** A  
**Response Status:** C  

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

**Response:**  
ACCEPT.

---

**Comment #152**

**Comment Type:** TR  
**Comment Status:** A  
**Response Status:** C  

200GBASE-R SM PMA delay constraint is missing

**Suggested Remedy:**  
A suggested remedy is not provided.

200GBASE-R 8:1, 1:8, and 1:1 PMA types, all SM-PMA types are listed. 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. However, in this case using the SM-PMA term would be helpful. With editorial license include the term SM-PMA and BM-PMA, instead of just PMA, where appropriate in this and similar tables.

**Response:**  
ACCEPT IN PRINCIPLE.

---

**Comment #153**

**Comment Type:** TR  
**Comment Status:** A  
**Response Status:** C  

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

**Suggested Remedy:**  
change the content of row SP1 and SP6 in the column of 113.4375Gb/s PMD lane to N/A

**Response:**  
ACCEPT.

---

**Comment #311**

**Comment Type:** TR  
**Comment Status:** A  
**Response Status:** C  

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

**Response:**  
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.

---

**Comment #530**

**Comment Type:** T  
**Comment Status:** A  
**Response Status:** C  

The comment refers to Table 116u3. The SM_PMA and BM_PMA introduce a new case of optional PMA implementation. For instance 200GBASE-KR2 PHY cannot implement SM_PMA without implementing 200GAUI-1 C2C interface. 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 116u3a, Table 116u4, Table 169u2

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

**Response:**  
ACCEPT IN PRINCIPLE. Resolve using the response to comment #312.
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

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

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

200/400G BASE-R BM-PMA and 200/400G BASE-R-SM-PMA are noted as optional in Tables 116-3, 116-4, and 116-4a, 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 200GBASE-R BM-PMA is mandatory, all AUIs are optional, and 200GBASE R BM PMA is "C" / conditional if either 200GAUI-1 is implemented.

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

For 100Gb/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-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 178-2 to 200GBASE-R BM-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 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 179-2 to 200GBASE-R SM-PMA to Conditional. Add note "c" A 200GBASE-R SM PMA must be implemented if a 200GAUI-2 C2C is implemented.

Modify entry in Table 180-1 to 200GBASE-R BM-PMA to Conditional. Add note "c" A 200GBASE-R BM PMA must be implemented if a 200GAUI-2 C2C/C2M is implemented.

Modify entry in Table 180-2 to 200GBASE-R BM-PMA to Conditional. Add note "c" A 200GBASE-R BM PMA must be implemented if a 200GAUI-1 C2C/C2M 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-1 C2C/C2M is implemented.

Modify entry in Table 181-2 to 200GBASE-R BM-PMA to Conditional. Add note "c" A 200GBASE-R BM PMA must be implemented if a 200GAUI-2 C2C/C2M is implemented.

Modify entry in Table 182-1 to 200GBASE-R BM-PMA to Conditional. Add note "c" A 200GBASE-R BM PMA must be implemented if a 200GAUI-2 C2C/C2M is implemented.

Modify entry in Table 182-2 to 200GBASE-R BM-PMA to Conditional. Add note "c" A 200GBASE-R BM PMA must be implemented if a 200GAUI-4 C2C/C2M is implemented.

**Response**

ACCEPT IN PRINCIPLE. Resolve using the response to comment #317.

---

**Comment Type** TR  **Response Status** C  **Conditional PMA (bucket)**

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

**Comment Status** A  **Response Status** C  **Conditional PMA (bucket)**

**Suggested Remedy**

there is no PMD called 400GBASE-LR4

**Response**

ACCEPT.

---

**Comment Type** TR  **Response Status** C  **PMA introduction (bucket)**

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

**Comment Status** A  **Response Status** C  **PMA introduction (bucket)**

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 116.2 Summary of 200GbE and 400 GbE sublayers was made.

**Suggested Remedy**

Modify last sentence of 116.2.4 and add additional text

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) is specified in Clause 176.

Note that "PMA" is used as a general term to represent both types of PMAs for each speed.

**Response**

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.

ACCEPT IN PRINCIPLE.

The following presentation was reviewed by the 802.3dj task force at the IEEE 802.3 May Interim meeting:
https://www.ieee802.org/3/dj/public/24_05/ran_3dj_05_2405.pdf
Implement the proposal on slides 7 to 10 of ran_3dj_05_2405 with editorial license.

[Editor's note: CC]

The comment refers to Table 116û8.
There is an additional logical skew present in the 200GBASE-R and 400GBASE-R 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

Response
ACCEPT IN PRINCIPLE.

The motion explicitly calls out slide 10 of https://www.ieee802.org/3/dj/public/23_07/he_3dj_02a_2307.pdf, which lays out how skew be specified given the resulting systematic and reversible skew.

This consideration is applicable only to PHYs that include the following SM-PMA types:
400GBASE-R 16:2 and 2:16
200GBASE-R 8:1 and 1:8
Provide appropriate text in 116.5, explaining that for the PHYs summarized above, the skew specified in Table 116-8 excludes the intentional skew used to create the four codeword interleaving.

Implement with editorial license.

A new footnote has appeared æAt the PCS receive input, 1 UI is equivalent to 1 bit.æ attached to an unchanged number. There is no equivalent footnote for Table 116-8. In 802.3, æbitæ 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 were kept, it should say æ1 bit on a PCS laneæ or similar.

Suggested Remedy
Delete footnote f

ACCEPT.
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.

Response: 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.

Extranious "either":

Suggested Remedy: remove the word "either"

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

Table 116-1 and Table 116-2 include the 200Gb/s per lane PMDs which require the symbol muxing PMA. This bit muxing PMA would only be used for lower speed AUIs. Saying it supports any of the PMDs in the tables is confusing.

Suggested Remedy: Change to "The 200GBASE-R PMA(s) can support any of the two, or four lane 200Gb/s PMDs in Table 116-1 and the 400GBASE-R PMA(s) can support any of the four, or 8 lane 400Gb/s PMDs in Table 116-2." As a less preferred approach PMD's could be changed to PHY's in the original sentence and an additional sentence could be added saying "The single lane 200Gb/s PMDs in Table 116-1 and the two lane 400Gb/s in table 115-2 require the symbol-muxing PMAs described in clause 176."

Response: ACCEPT IN PRINCIPLE. 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 (200GBASE 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 400Gb/s PMDs in 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 comments

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

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

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

same as the previous comment on 800GBASE-CR4

**SuggestedRemedy**

make the description consistent

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

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

In Table 169-4, the delay constraints on 800GBASE-R BM-PMA and 800GBASE-R SM-PMA are missing

**SuggestedRemedy**

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

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

REJECT.

800GBASE-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 Type** TR  **Comment Status** R  **PHY descriptions (bucket)**

In Table 169-3, Phy type and clause correlation was marked incorrectly for the columns of 8000GBASE-DR8 PMD and 800GBASE-DR8-2 PMD

**SuggestedRemedy**

remove the unnecessary M in the following rows for 800GBASE-DR8 PMD: 800GBASE-DR4 and 800GBASE-DR8-2 PMD: 800GBASE-DR4, and 800GBASE-LR4.

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

ACCEPT.

---

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

In Table 116-6, 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

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

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.
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-ER1-20 and 800GBASE-ER1 are both defined as using 800GBASE-R encoding, but per 802.3zd-2024, 1.4.184e - "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." 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 800GBASE-ER1-20 in Table 169-1 to reflect new family name.
- Modify description of entry for 800GBASE-ER1 in Table 169-1 to reflect new family name.

Response
- ACCEPT IN PRINCIPLE.

This table lists ALL 800 Gb/s Ethernet PHY types (i.e., 800GBASE), not specifically 800GBASE-R PHY types. The description for 800GBASE-ER1 and 800GBASE-ER1-20 is deceiving and should be updated in line with the definitions in Clause 1. Table 169-3a, lists 800GBASE optical coherent PHY types (not specifically 800GBASE-R), so a separate nomenclature table is not required for 800GBASE-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:
- 800GBASE-ER1-20 | 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 20 km (see Clause 187)
- 800GBASE-ER1 | 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 Clause 187)

Implement with editorial license.

Huber, Thomas
Nokia

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

Suggested Remedy
- Change 800GBASE-R to 800GBASE-ER1 in the last two rows of the table.

Response
- ACCEPT IN PRINCIPLE.
- Resolve using the response to comment #315.
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

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.

**SuggestedRemedy**

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 BM-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, noted as stated above.

Modify entry in Table 178-3 to 800GBASE-R BM PMA to Conditional. Add note "c" A 800GBASE-R BM PMA must be implemented if a 800GAUI-8 C2C is implemented. Modify entry in Table 179-3 to 800GBASE-R BM SM PMA to Conditional. Add note "c" A 800GBASE-R BM SM PMA must be implemented if a 800GAUI-4 C2C2C is implemented. Modify entry in Table 180-3 to 800GBASE-R BM PMA to Conditional. Add note "c" A 800GBASE-R BM PMA must be implemented if a 800GAUI-8 C2C2C2 is implemented. Modify entry in Table 181-3 to 800GBASE-R BM PMA to Conditional. Add note "c" A 800GBASE-R BM PMA must be implemented if a 800GAUI-8 C2C2C2 is implemented. Modify entry in Table 182-3 to 800GBASE-R BM PMA to Conditional. Add note "c" A 800GBASE-R BM PMA must be implemented if a 800GAUI-8 C2C2C2 is implemented. Modify entry in Table 183-3 to 800GBASE-R BM PMA to Conditional. Add note "c" A 800GBASE-R BM PMA must be implemented if a 800GAUI-8 C2C2C2 is implemented.

**Response**

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 PMA clauses for guidance. For each new PMD (Clauses 178, 179, 180 to 183, 185, 186), update the PMA 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 800BASE-R SM-PMA.
Comment Type \hspace{1cm} T \hspace{1cm} Comment Status \hspace{1cm} A

There are errors in Table 169-3. 800GBASE-DR8-PMD is not needed for 800GBASE-DR4 or 800GBASE-FR4-500. 800GBASE-DR8-2 PMD is not needed for 800GBASE-DR4-2, 800GBASE-FR4, or 800GBASE-LR4.

SuggestedRemedy
Delete the offending "M"s

Response \hspace{1cm} Response Status \hspace{1cm} C
ACCEPT.

Comment Type \hspace{1cm} TR

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

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"

Response \hspace{1cm} Response Status \hspace{1cm} C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #317.
[Editor's note: Changed subclause from 169.1.3 to 169.1.4]
In support of 200 Gb/s per lane signaling - 800GBASE-R BM-PMA, Clause 176 was developed. No addition was made to 169.2 Summary of 800 GbE architecture.

**SuggestedRemedy**

Modify 169.2.4 to read:

The 800GBASE-R PMA, which supports bit multiplexing, is specified in Clause 173.

The 800GBASE-R PMA, which supports symbol multiplexing, is specified in Clause 176.

Note that "PMA" is used as a general term to represent both types of PMAs.

**Response**

ACCEP 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 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 that uses symbol multiplexing (SM-PMA) is specified in Clause 176.

Implement with editorial license.

**Comment**

There is no inter-sublayer interface for the PMA sublayer shown in the figure 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**

A similar diagram is needed for 800GBASE-ER1 and 800GBASE-ER1-20 PHYs.

**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).

**Response**

ACCEP IN PRINCIPLE.

A similar diagram for 800GBASE-ER1 and 800GBASE-ER1-20 is provided in Clause 187 which specifies both of these PMD types. No other 800GBASE PMD is of this form so it is not necessary to show a common diagram in Clause 169.

However, some clarification for non-800GBASE-R PHY types would be helpful.

In 169.3 add text pointing out that service interfaces used by PMDs not part of 800GBASE-R family are defined and illustrated in the PMD clauses.

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:** A  |  **P**122  |  **L**54  |  **#**321  
D'Ambrosia, John  |  Futurewei, U.S. Subsidiary of Huawei  

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.

**Response:**  |  **Response Status:** C  
ACCEPT IN PRINCIPLE.  
Resolve using the response to comment #78.

**Comment Type:** TR  |  **Comment Status:** A  |  **P**123  |  **L**5  |  **#**332  
Rechtman, Zvi  |  Nvidia  

The comment refers to Table 16904.  
The Inner-FEC delay appears to be missing from the table

**Suggested Remedy:**
Add 800GBASE-R inner FEC (values are TBDs)

**Response:**  |  **Response Status:** C  
ACCEPT IN PRINCIPLE.  
Implement the suggested remedy with editorial license.

**Comment Type:** T  |  **Comment Status:** A  |  **P**135  |  **L**12  |  **#**361  
Slavick, Jeff  |  Broadcom  

The title of Clause 173 does include BM.

**Suggested Remedy:**
Remove the BM- from Table 171-1 for the Clause 173 entry and footnote A

**Response:**  |  **Response Status:** C  
REJECT.  
The term BM-PMA is used in Table 171-1, because this table includes reference to both BM and SM PMAs, and the convention we agreed on was in such cases to call out both PMAs explicitly. The same convention is used in tables 178-1, 179-1, 180-1, 181-1, and 183-1.  
This is explained in 173.1.1 as follows:  
"When necessary for disambiguation, to differentiate the bit-multiplexing PMA (BM-PMA) types defined in this clause from the symbol-multiplexing PMA (SM-PMA) types defined in Clause 176, the term BM-PMA is used. Within this clause the term PMA refers specifically to the BM-PMA."

---

**Comment Type:** T  |  **Comment Status:** A  |  **P**137  |  **L**41  |  **#**386  
Nicholl, Gary  |  Cisco  

There is an issue with subclause 171.3.3 generated by 802.3df. There is an incorrect reference of "171.6.2" in the following bullets:

- An additional signal TXRD indicates the state of the rx_rm_degraded variable (see 171.6.2) as detected by the PHY 800GXS in the transmit direction
- An additional signal TXLD indicates the state of the FEC_degraded_SER variable (see 171.6.2) as detected by the PHY 800GXS in the transmit direction

**Suggested Remedy:**
Import subclause 171.3.3 and correct the two bullets as follows:

- An additional signal TXRD indicates the state of the rx_rm_degraded variable (see 172.2.6.2.2) as detected by the PHY 800GXS in the transmit direction
- An additional signal TXLD indicates the state of the FEC_degraded_SER variable (see 172.2.6.2.2) as detected by the PHY 800GXS in the transmit direction.

**Response:**  |  **Response Status:** C  
ACCEPT.

**Comment Type:** T  |  **Comment Status:** A  |  **P**141  |  **L**47  |  **#**385  
Nicholl, Gary  |  Cisco  

There 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.

**Response:**  |  **Response Status:** C  
ACCEPT IN PRINCIPLE.  
Delete the sentence below the editor's note, and remove the Editor's note.
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

# 79
Cl 171 SC 171.8 P 144 L 23 # 79
Huber, Thomas Nokia
Comment Type T Comment Status R (bucket)
In tables 171-3 and 171-5, it is not clear what has changed in the rows that are shown.

SuggestedRemedy
Indicate the changes with revision marks

Response Response Status C 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.

# 462
Cl 171 SC 171.8 P 145 L 6 # 462
Slavick, Jeff Broadcom
Comment Type T Comment Status R (withdrawn)
The MDIO mapping table is different from Clause 175, it should use the new form that Clause 175 is using.

SuggestedRemedy
Have Tables 171-5a through 171-5d use the same format as Clause 175

Response Response Status Z REJECT.
This comment was WITHDRAWN by the commenter.

# 159
Cl 174 SC 174 P 164 L 20 # 159
Mü, Guangcan Huawei Technologies Co., Ltd
Comment Type TR Comment Status A (bucket)
In Table 174-4, the notes for 1.6TBASE-KR8 and 1.6TBASE-CR8 says includes the medium in one direction. No length of the medium was provided, nor any explicit delay due to the medium was provided. While In Table 169-4, a definitive of 14ns allocated for one direction through cable medium was provided for 800BASE-CR4. One would assume 1.6TBASE-CR8 would be consistent with 800BASE-CR4. The same problem applies to 1.6TBASE-KR8.

SuggestedRemedy
Put in explicit allocation of delay constraints for the medium used in 1.6 BASE-CR8 and 1.6TBASE-KR8. Align with that of 800BASE-CR4 and 800BASE-KR4, if technically feasibly.

Response Response Status C ACCEPT IN PRINCIPLE.
Use the same text used for 800BASE-KR8/CR8 in IEEE Std 802.3df-2024.
For the 800GBase-KR4 row change the text in the note column to:
"Includes allocation of 14 ns for one direction through backplane medium. See 178.6."
For 800GBase-CR4 row change the text in the note column to:
"Includes allocation of 14 ns for one direction through backplane medium. See 179.6."

# 130
Cl 174 SC 174.1.2 P 155 L 47 # 130
Brown, Matt Alphawave Semi
Comment Type T Comment Status A (bucket)
List of interfaces
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 and 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.

SuggestedRemedy
Delete the paragraph and lists from page 155 line 47 to page 156 line 12.

Response Response Status C ACCEPT IN PRINCIPLE.
Retain the first sentence:
"While this specification defines interfaces in terms of bits, octets, and frames, implementations may choose other data-path widths for implementation convenience."
Add a future-proof exception and delete the lettered-list of interfaces. Implement with editorial license.
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.

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

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

https://www.ieee802.org/3/dj/public/24_05/ran_3dj_04a_2405.pdf

Implement the following with editorial license.

Update Annex 174 as proposed on slides 7 to 13 of ran_3dj_04a_2405 excluding option A in slides 11, 12, and 13.

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

[Editor's note: CC many]

---

174A.2 "Frame loss ratio for RS to RS link" 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.

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #205.

---

174A.3 "Frame loss ratio for an xMII Extender" 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.

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #205.
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:** TR
**Comment Status:** A
**Cl 174A.5**
**BER/FLR**

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.

**Response Status:** C

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #205.

---

**Comment Type:** T
**Comment Status:** A
**Cl 175**
**SC 175**
**timesync (bucket1p)**

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.

**Response Status:** C

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

---

**Comment Type:** T
**Comment Status:** R
**Cl 175**
**SC 175.2.4.2**
**timesync (bucket)**

A note that modifying the data stream could affect TimeSync would be useful.

**Suggested Remedy:**
Add the following note:
"NOTE -- Insertion or removal of characters may affect protocols like times synchronization (see 90.4.1.2)"

**Response Status:** C

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.

---

This comment is related to the calculation of the path data delay values in Clause 90, and points out that Subclause 90.7.1 is not clear on how the path data delays values are calculated for PCSs with more than one FEC engine and interleaved FEC codewords. This applies to the 200GbE/400GbE PCS (Clause 119), the 800GbE PCS (Clause 172) as well as the new 1.6TbE PCS being added by this project (Clause 175). As pointed out in the suggested remedy it would be better to address this with a maintenance request that equally applies to all PCS clauses with multiple interleaved FEC codewords and all of their related PHYs (many of which are out of scope for 802.3dj).
## 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: Cl 175 SC 175.2.4.4 P 173 L 41 # 363

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

The last sentence is giving the transcoded blocks sent to each flow a name. So it's not really making 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>.

**Response**

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

Implement the following with editorial license.

### Comment: Cl 175 SC 175.2.4.5 P 173 L 50 # 331

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

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!)

**Response**

**Response Type:** T  
**Response Status:** C  
**Comment Status:** (bucket)

Resolve using the response to comment #454.

---

### Comment: Cl 175 SC 175.2.4.5 P 174 L 3 # 377

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

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.

**Response**

**Response Type:** T  
**Response Status:** C  
**Comment Status:** (bucket)

Resolve using the response to comment #454.
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**: R  **bucket**

**Comment**: 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".

**Response**

REJECT.
The draft is correct as written, and the proposed change does not improve clarity.

---

**Comment Type**: T  **Comment Status**: A  **bucket**

**Comment**: 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: "NOTEa 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 submitted with a corresponding text file containing the 1.6TBASE-R AM values.

**Response**

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

---

**Comment Type**: T  **Comment Status**: A  **bucket**

**Comment**: 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 alignment marker group up.

**Suggested Remedy**

Change:

6The 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:

To:

6The 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:

**Response**

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

---

**Comment Type**: T  **Comment Status**: A  **bucket**

**Comment**: 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:

6Note 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. 6

To:

6Note 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.

**Response**

ACCEPT IN PRINCIPLE.
Implement the 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: T
Comment Status: A

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."

Response

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Comment Type: T
Comment Status: A

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."

Response

ACCEPT IN PRINCIPLE.

Implement with editorial license.

Comment Type: T
Comment Status: A

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

Response

ACCEPT IN PRINCIPLE.


Slavick, Jeff
Broadcom

Comment Type: T
Comment Status: A

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."

Response

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Opsasnick, Eugene
Broadcom

Comment Type: T
Comment Status: A

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."

Response

ACCEPT IN PRINCIPLE.

Implement with editorial license.

Comment Type: T
Comment Status: A

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

Response

ACCEPT IN PRINCIPLE.

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.

Response

REJECT.

As mentioned in the suggested remedy, it would be preferable to make any necessary updates to Clause 90/Annex 90A. It may also be beneficial to add appropriate references to Clause 90/Annex 90A in the Physical Layer clause tables in all the PMD subclauses, to make it clear that Clause 90/Annex 90A are optional for the associated PHY.

There is no consensus to make a change at this time.

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 be included since C2M LT session specifies precoding as one of the options.

Suggested Remedy

Add C2M link into the statement: "The 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 xAUI-n C2/C2M link."

Response

ACCEPT IN PRINCIPLE.

Background and proposed changes are provided on slides 4 to 10 in the following presentation:

Implement the proposed text on slide 4 of brown_3dj_02_2406. Implement with editorial license.

---

Is respectively necessary here? X is just a list of different rates.

Suggested Remedy

remove the ", respectively,"

Response

ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

---

Is respectively necessary here? X is just a list of different rates.

Suggested Remedy

remove the ", respectively"

Response

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 comment

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

Is respectively necessary here? X is just a list of different rates.

**Suggested Remedy**

- remove the ", respsectively"

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

ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

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

The comment refers to Figure 176.02. 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 176.09

**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"

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

REJECT.

The function in Fig 176-2 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 176-9, 176-11 and 176-13.

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 × 544 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.

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

- test pattern generate is overlapping with the IS_SIGNAL.request line in Figure 176-2

**Suggested Remedy**

- Move "test pattern generate" to not overlap with the inst.IS_SIGNAL.request line

Same in Figure 176-9,10,13,14,15,19,20,24,25,26

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

ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

---

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

- test pattern generate is overlapping with the IS_SIGNAL.request line in Figure 176-2

**Suggested Remedy**

- Move "test pattern generate" to not overlap with the inst.IS_SIGNAL.request/indication line

Same in Figure 176-9,10,13,14,15,19,20,24,25,26

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

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: T  Comment Status: A  Deskew (logic)

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 all 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.

Response  Response Status: C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #368.

Comment Type: T  Comment Status: A  Deskew (logic)

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).

Response  Response Status: C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #368.

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
therefore no changes to the deskew function are required.

For 200GBASE-R and 400GBASE-R resolve using the response to comment #368.

---

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

**Response**

**Response Status:** C

ACCEPT IN PRINCIPLE.

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

---

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

**Response**

**Response Status:** C

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.

Response
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.

The sentence "This is equivalent to adding a delay of 2 RS-FEC codewords to the odd PCS lanes (2 codewords × 544 symbols per codeword / 8 PCS lanes = 136 symbols)." can be misinterpreted:
136 symbol delay x 4 odd PCS lanes = 544 symbols delay in total (not 2 RS-FEC codewords delay)
Suggested Remedy
Remove "This is equivalent to adding a delay of 2 RS-FEC codewords to the odd PCS lanes (2 codewords × 544 symbols per codeword / 8 PCS lanes = 136 symbols)."
Modify: "Adding the two codeword delay to odd numbered lanes enables the multiplexing of four consecutive RSFEC symbols from four different codewords at the output of the 8:1 symbol multiplexer."
To: "Adding the 136 symbol delay to odd numbered lanes enables the multiplexing of four consecutive RSFEC symbols from four different codewords at the output of the 8:1 symbol multiplexer."

Response
REJECT.
The first line of subclause 176.5.1.3.4 clearly specifies that the odd lanes are delayed by 136 RS-FEC symbols, and the subsequent line describes mathematically that this (136 symbol delay) is equivalent to adding a delay of 2 codewords to the odd lanes by showing that "2 codewords × 544 symbols per codeword / 8 PCS lanes = 136 symbols". There is little room left for misinterpretation, since the delay in symbols is stated upfront.

Add an explanation for A/B', e.g. "A/B'are the symbols from previous 2 CWs that are delayed"
Suggested Remedy
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 536

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

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 and A’, B’ symbols. This could make it easier to understand the drawings and the roles of the symbols in each context.

**Response Status:** C

- **Accept in Principle.**
- **Resolve using the response to comment # 293**

### Comment 595

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

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.

**Response Status:** C

- **Accept in Principle.**
- **Update Fig 176-6 to clarify the order of transmission on the output lane, with editorial license.**

### Comment 291

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

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.

**Response Status:** C

- **Accept in Principle.**
- **Update Fig 176-6 to clarify the order of transmission on the output lane, with editorial license.**

### Comment 251

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

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.

**Response Status:** C

- **Accept in Principle.**
- **Update Fig 176-6 to clarify the order of transmission on the output lane, with editorial license.**

### Comment 255

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

It's a multiplexor or a multiplexing function.

**Suggested Remedy:**

- **Add the word function after multiplexing.**

**Response Status:** C

- **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 176 SC 176.5.1.5

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<td>Detailed functions and state diagrams have no content</td>
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**Response**

**Response Status** C

**Accept in Principle.**

Implement with editorial license and discretion.

#### Comment 176 SC 176.5.1.6.1

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<tr>
<td>The Variables state that these all of them, not inheriting Cl119 functions except for some replacements.</td>
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**Response**

**Response Status** C

**Accept in Principle.**

Implement with editorial license and discretion.

#### Comment 176 SC 176.5.1.6.4

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<tr>
<td>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</td>
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**Response**

**Response Status** C

**Accept in Principle.**

Implement suggested remedy with editorial license.

#### Comment 176 SC 176.5.1.6.5

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<tr>
<td>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</td>
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**Response**

**Response Status** C

**Accept in Principle.**

Implement suggested remedy with editorial license.
Comment Type: E  Comment Status: A  (editorial)

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

Response

ACCEPT IN PRINCIPLE.
Implement with editorial license and discretion.

Comment Type: T  Comment Status: A  (bucket)

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

Response

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 Type: T  Comment Status: R  (bucket)

Should there be an arc from ALIGNMENT_FAIL to LOSS_OF_ALIGNMENT?

Suggested Remedy

If so, add the arc

Response

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.
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 176 SC 176.6  P213  L1  # 500

Comment Type E Comment Status A (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

SuggestedRemedy
Consider merging subclauses 176.5 and 176.6

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

Cl 176 SC 176.6.1  P213  L4  # 502

Comment Type E Comment Status A (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)

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

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

Cl 176 SC 176.6.1  P213  L5  # 50

Huber, Thomas  
Nokia

Comment Type T Comment Status A Reorg

The 800G 32:4 PMA, 400G 16:2 PMA and the 200G 8:1 PMA are basically the same, other than the numbers of lanes. The 1.6T 16:8 is different since it has 40b deskew and 4-symbol interleaving. All of the PMAs with the same number of lanes on both sides are essentially the same. It would simplify maintenance and likely reader understanding as well if the number of lanes were parameterized as m and n

SuggestedRemedy
Reorganize 176.5 through 176.8 into 3 clauses: one for 200/400/800 m:n PMAs, one for 1.6T m:n PMAs, and one for 200/400/800/1.6T m:m PMAs, and use a single set of text and figures with the parameters m and n for the number of lanes. Include a table showing PHY rates and the values of m an n (e.g. with columns PHY, m, and n, and rows 200GBASE-R, 8, 1; 400GBASE-R, 16, 2; etc.).

Response
ACCEPT IN PRINCIPLE.
Reorganize the Clause to reduce repetition of text and figures, and make the state diagrams more generic across the SM-PMAs.
Implement with editorial license.

Cl 176 SC 176.6.1  P214  L53  # 39

Rechtman, Zvi  
Nvidia

Comment Type TR Comment Status R 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

SuggestedRemedy
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"

Response
REJECT.
Resolve using the response to comment #533.
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** A  **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

**Response**  

**Response Status** C  

ACCEPT IN PRINCIPLE.

Resolve using the response to comment # 80.

---

**Comment Type** T  **Comment Status** A  **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.

**Response**  

**Response Status** C  

ACCEPT IN PRINCIPLE.

Update Fig 176-12 to clarify the order of transmission on the output lane, with editorial license.

---

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

Table 176-7 includes two references to 400GBASE-R, these should be replaced with 800GBASE-R

**Suggested Remedy**

Replace the text "400GBASE-R" with "800GBASE-R" in Table 176-7.

**Response**  

**Response Status** C  

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:** A

**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

**Response**
Accept in principle.
Resolve using the response to comment #593.

---

**Comment Type:** T
**Comment Status:** A

**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.

**Response**
Accept in principle.
Update Figure 176-18 to clarify the order of transmission on the output lane, with editorial license.

---

**Comment Type:** E
**Comment Status:** A

**test pattern check is overlapping with IS_SIGNAL.request**

**Suggested Remedy**
Move "test pattern check" to no overlap with PMASIGNAL.request in Figure 176-21

**Response**
Accept in principle.
Implement with editorial license and discretion.

---

**Comment Type:** TR
**Comment Status:** A

**The text currently refers to xAUI-n C2C. However, the adopted PMA baseline proposal stated that the Precoding capability in all physically instantiated interfaces is Tx:required, Rx:optional/E6 (per ran_3dj_01a_2303 slide 10). This specification should also encompass xAUI-n C2M.**

**Suggested Remedy:**
Add xAUI-n C2M

**Response**
Accept in principle.
Resolve using the response to comment #21

---

**Comment Type:** TR
**Comment Status:** A

**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 precoderTx_out_enable_i and precoderRx_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.”

**Response**
Accept in principle.
Resolve using the response to comment #21
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 defined the skew and skew relationships through the PHY sublayer stack. A presented supporting this will be provided.

**Response**

REJECT.

This comment was WITHDRAWN by the commenter.

---

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.

**Response**

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.]
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

Simms, William  
NVIDIA

Comment Type: E  Comment Status: A  (editorial)

3 states of Coefficient select echo are undefined

Suggested Remedy:

- note in table 176A-3 that 010, 011, 100 are undefined/invalid

Response: C

Accept in principle.

Implement with editorial license and discretion.

Law, David  
HPE

Comment Type: TR  Comment Status: A  ILT General

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 Annex.

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.

Response: C

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.

In Annex 176A (and other clauses where appropriate), replace "segment" with "section" and "link" with "path".
Comment Type: T  Comment Status: R  ILT Frame (bucket)

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 176A-1 '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.'.

Response  Response Status: C

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: R  ILT Frame (common)

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.’.

Response  Response Status: C

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.
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**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

**Type**: ILT Pattern (Bucket)

**Type**: ILT Pattern (common)

---

**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  
**Comment Status**: A/accepted  
**Response Status**: C/closed

---

- **Comment**: "The default identifier for each lane is its lane number (e.g., the default value for identifier_0 is 0 which selects polynomial_0)"
  
- **Suggested Remedy**: Change to "The default identifier for each lane is the same as that shown in Table 176A-1".
  
- **Response**: 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"

---

- **Comment**: The default mapping provided in Table 176A-1 can be used instead.
  
- **Suggested Remedy**: Add "while training is in progress while this mode is selected" after "is not stopped or reset".
  
- **Response**: Implement the following with editorial license. Add "while training is in progress while this mode is selected" after "is not stopped or reset".

---

- **Comment**: 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 precode as an option for a training pattern.
  
- **Response**: Resolve using the response to comment #358

---

**Type**: TR/technical required  ER/editorial required  
**Comment Status**: A/accepted  
**Response Status**: C/closed

---

**Comment**: 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.

**Response**

**Response Status**: C/closed

---

**Comment**: These three variations are produced as described for the PRBS13 free-running function in 176A.2.3.2

**Suggested Remedy**: Change to the following:

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

**Response**

**Response Status**: C/closed
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:** A  **ILT Pattern (common)**

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.

**Suggested Remedy:**
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

**Response**

**Response Status:** C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #358

---

**Comment Type:** T  **Comment Status:** A  **ILT Frame (common)**

The PRBS gen should "stop" if trainng stops.

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

**Response**

**Response Status:** C

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:** A  **ILT Pattern (common)**

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. The Zero pad is really part of the Frame Marker ensuring there is a distinct edge ahead of 16 UI run 3's for the start of the frame marker.

**Suggested Remedy:**
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.

**Response**

**Response Status:** C

REJECT.

Resolve using the response to comment #358.
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.3.1 P553 L45 # 499
Slavick, Jeff
Broadcom
Comment Type T Comment Status A ILT Coefficients (Bucket)
Remove the specificity of how many presets there are.

Suggested Remedy

Change:
ôThe initial condition request bits are used to select one of the five predefined transmitter
equalizer configurations (presets) specified in the AUI or PMD clauses. ô
To:
ôThe initial condition request bits are used to select a predefined transmitter equalizer
configurations (presets) specified in the AUI or PMD clauses. ô

Response Response Status C
Accept in principle.
Implement the following with editorial license.
Change: "The initial condition request bits are used to select one of the five predefined
transmitter equalizer configurations (presets) specified in the AUI or PMD clauses," to:
"The initial condition request bits are used to select one of the up to five predefined
transmitter equalizer configurations (presets) specified in the AUI or PMD clauses."

Cl 176A SC 176A.4 P555 L10 # 549
Rechtman, Zvi
Nvidia
Comment Type T Comment Status A ILT Frame (Bucket)
The comment refers to Table 176A03uStatus 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

Response Response Status C
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 A ILT Frame (common)
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

Response Response Status C
Accept in principle.
Resolve using the response to comment #358.

Cl 176A SC 176A.4 P555 L27 # 501
Slavick, Jeff
Broadcom
Comment Type T Comment Status A ILT Frame (Bucket)
You have self generated data you're sending but you don't have your self setup to send
mission data yet.

Suggested Remedy

Remove the "No data is available," from the option 1 of Extend training bit

Response Response Status C
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**: T  
**Comment Status**: A  
**ILT Frame (Bucket)**

176A.4.3 'Receiver frame lock' says that 'When the receiver frame lock bit is set to 1, the receiver is indicating that it has identified training frame marker positions and is in a state where the response time requirements specified in 176A.10 are met.' It then goes on to say 'Receiver frame lock ... is not set to 1 until training and local_tf_lock are both true.'

176A.10 is 'Variables, functions, timers, counters, and state diagrams', so I wonder if the reference should be to 176A.8 'Handshake timing'? In addition, I don't believe the variables training and local_tf_lock are conditioned on the response time requirements specified in 176A.10 being met, at least I didn't see it in their descriptions.

**Suggested Remedy**

In 176A.4.3 change the text '... response time requirements specified in 176A.10 are met.' to read '... response time requirements specified in 176A.8 are met.' and the text '... and is not set to 1 until training and local_tf_lock are both true.' To read '... and is not set to 1 until training and local_tf_lock are both true and the response time requirements specified in 176A.10 can be met.'

**Response**

**Response Status**: C

ACCEPT IN PRINCIPLE.

Implement the following with editorial license.

Change: '... response time requirements specified in 176A.10 are met.'
To: '... response time requirements specified in 176A.8 are met.'

Change: '... and is not set to 1 until training and local_tf_lock are both true.'
To: '... and is not set to 1 until training and local_tf_lock are both true and the response time requirements specified in 176A.8 can be met.'

---

176A.4.8 'Coefficient status' says that '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.'.

**Suggested Remedy**

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).'.

**Response**

**Response Status**: C

ACCEPT.

---

176A.4.8 'Coefficient status' says '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).'.

**Suggested Remedy**

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.' in 176A.4.8 should be changed to just read 'The acknowledge reflects the value of coef_sts generated by the Coefficient update state diagram'.

**Response**

**Response Status**: C

ACCEPT IN PRINCIPLE.

This comment appears to address the same concern expressed in comment #564. Resolve using the response to comment #564.
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**: E  **Comment Status**: A (editorial)

**Should the status field name be uniquified? The field name in the text of the table and text sections below the table do not clearly identify text as a field.**

**Suggested Remedy**

Change Receiver ready to RECEIVER_READY or at maybe receiver_ready and use the same in the text below the table 176A-3. Status field structure. Pertains to all field names.

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

**Comment Status**: A  
**Response Status**: C

**Simms, William**  
NVIDIA

---

**Comment Type**: TR  **Comment Status**: A (editorial)

"When the interface control state diagram (Figure 176A6) is in the TRAIN_LOCAL state, the device may request its link partner to..."

It is important to also note at which states requests from the link partner should be processed, and what happens in the other states - this may not be obvious.

**Suggested Remedy**

Insert the following paragraphs after the first one:

When the interface control state diagram is in either the TRAIN_LOCAL or TRAIN_REMOTE state, the device shall respond to requests received from the link partner.

When the interface control state diagram is in any state other than TRAIN_LOCAL or TRAIN_REMOTE, the device shall not send any requests to the link partner and shall ignore requests from the link partner.

**Response**  
ACCEPT.

---

**Comment Type**: T  **Comment Status**: A

**ILT Coefficients (Bucket)**

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.

**Response**  
ACCEPT IN PRINCIPLE.

It was clarified that the comment addresses the case where a specification of a PMD or AUI does not include a specific preset. Implement the suggested remedy with editorial license.
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.

**SuggestedRemedy**

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}.

ACCEPT IN PRINCIPLE.

Annex 176A is intended to be the specification for link training for 200 Gb/s per lane PMDs/AUIs and potentially higher signaling rate PMDs/AUIs.

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.

Add informative notes where content is identical to content in a particular subclause in Clause 136 with editorial license.

---

176A.6.4 says that 'The variables coef_req, coef_sts, and k are defined in 176A.10.3.1.', however, 176A.10.3.1 ‘Variables’ uses all lowercase for the coef_sts values (e.g., updated, coefficient at limit and equalization limit) and coef req (e.g. decrement, increment) whereas 176A.10.3.1 uses all uppercase for the coef_sts values (e.g., UPDATED, COEFFICIENT AT LIMIT AND EQUALIZATION LIMIT) and coef_req (e.g., DECREMENT, INCREMENT).

**SuggestedRemedy**

The formatting of the variable values defined in 176A.10.3.1 ‘Variables’ and used in 176A.6.4 should match.

**Response**

ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

---

It took me longer than usual to realize the algorithm continues on page 559

**SuggestedRemedy**

Maybe put a ‘---continued---’ at the last line of page 558. Disregard if this is inconsistent with IEEE style.

**Response**

ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.
"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.

Suggested Remedy:
Change to "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 20 ms. It is recommended that the average response time is less than 2 ms."

Response
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.

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

Rephrase the text as necessary to make it a good introduction to the control function (e.g., explain what "RTS" stands for).

Response
ACCEPT IN PRINCIPLE.

Add the local_pattern option to the data selector.
Add a Local pattern box as an input to the data selector.

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.

Suggested Remedy:
Reverse the direction of both arrows.

Response
ACCEPT.

Add the local_pattern select value for when tx_mode = local_pattern.
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

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.

Response
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.

Suggested Remedy
Suggest a description of what happens when the tx_disable variable is set to false is added to the variable description.

Response
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."

Response
ACCEPT IN PRINCIPLE.
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."

Suggested Remedy
Either
[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.'.
or
[b] Change [1] 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.'.

Response
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."

Suggested Remedy
Suggest a description of what happens when the tx_disable variable is set to false is added to the variable description.

Response
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."

Response
ACCEPT IN PRINCIPLE.
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."
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

571

Cl 176A SC 176A.10.3

Comment Type: T  Comment Status: A  ILT Diagrams (bucket)

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.

Suggested Remedy

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 ...".

Response

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 independently for each of its interfaces (see 176A.9)." 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, timers and counters).

Change the title of Figure 176A-6 from "Interface control state diagram" to Figure 176A-6 from "Training control state diagram".

572

Cl 176A SC 176A.10.3.1

Comment Type: T  Comment Status: A  ILT Diagrams (bucket)

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.

Response

ACCEPT IN PRINCIPLE.

Resolve using the responses to comments #566, #567 and #571.

573

Cl 176A SC 176A.10.3.1

Comment Type: T  Comment Status: A  ILT Diagrams (Bucket)

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 ...'.

Response

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

<table>
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<th>SC 176A.10.3.3</th>
<th>P 566</th>
<th>L 21</th>
<th># 569</th>
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<td>HPE</td>
<td>Comment Type T</td>
<td>Comment Status A</td>
<td>ILT Diagrams (common)</td>
<td></td>
</tr>
</tbody>
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| 176A.10.3.3 Timers' is a subclause of 176A.10.3 'Per-lane variables, functions, timers and counters', yet the three times listed, quiet_timer, propagation_timer and recovery_timer are all used by the 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, and the set of associated variables, functions, counters and timers defined in this subclause, independently for each of its interfaces(see 176A.9). As a result, it seems these timers should be moved to 176A.10.2.3 'Timers' and the descriptions should be updated to reflect that they operate on a per-interface basis.

Suggested Remedy
[1] Move the quiet_timer, propagation_timer and recovery_timer definitions to 176A.10.2.3 'Timers' and delete 176A.10.3.3 'Timers'.
[2] Change the text '... the interface control state diagram on a lane enters the ...' in the description of quiet_timer, propagation_timer and recovery_timer to read '... the interface control state diagram on an interface enters the ...'.

Response
Response Status C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #571.

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<th>SC 176A.10.4</th>
<th>P 566</th>
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<td>Comment Type T</td>
<td>Comment Status A</td>
<td>ILT Diagrams (common)</td>
<td></td>
</tr>
</tbody>
</table>
| 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.'.

Response
Response Status C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #571.

<table>
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<th>SC 176A.10.4</th>
<th>P 566</th>
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<td>Broadcom</td>
<td>Comment Type T</td>
<td>Comment Status A</td>
<td>ILT Diagrams (common)</td>
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</table>
| 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.

Response
Response Status C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #457.

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
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)."

**Response Status C**

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 PMD or AUI shall inform the adjacent PMA that all subsequently received data on the corresponding lane includes precoding (see 176.9.1.2)."

**Comment Type TR**

Cl 176A SC 176A.10.4 P 568 L 54 # 542

Law, David
HPE

**Comment Status A**

**Response Status C**

There is a spurious '<' within the transition condition from the state TRAIN LOCAL to the state TRAIN REMOTE.

**Suggested Remedy**

Suggest that 'local_tf_lock< local_rx_ready' should read 'local_tf_lock * local_rx_ready'.

**Response Status C**

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: `recovery_event_count`. This counter increments each time the control state diagram transitions into the RECOVERY state.

**Effects on the state diagram:**

The `recovery_event_count` should be initialized to 0 in the SEND_TRAINING state. Upon entering the RECOVERY state, the `recovery_event_count` 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 `recovery_timer_done` to `recovery_timer_done + (max_recovery_events != 0) * (recovery_event_count >= max_recovery_events)`.

**Comment Status** A

**Response Status** C

**ILT Diagrams (common)**

Law, David
HPE

**Comment Type** E

**Comment Status** A

**ILT Diagrams (Bucket)**

The CRG reviewed slides 34 and 35 in the following presentation:


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."

**Suggested Remedy**

Change the transition condition ' (!mr_training_enabled + segment_ready) * ...' to read ' (!mr_training_enable + segment_ready) * ...'.

**Response**

**Response Status** C

**ACCEPT.**

**Comment Type** E

**Comment Status** A

**ILT Diagrams (common)**

Law, David
HPE

**Comment Type** E

**Comment Status** A

**ILT Diagrams (Bucket)**

Subclause 176A.10.1 'State diagram conventions' says that 'The notation used in the state diagrams follows the conventions of 21.5.'. Subclause 21.5.3 'State transitions' says 'The following terms are valid transition qualifiers:' and item d) says 'An unconditional transition: UCT'. As a result, it is not necessary to expand UCT on its first use in Annex 176A.

**Suggested Remedy**

Change the text 'UCT (unconditional transition)' to read 'UCT'.

**Response**

**Response Status** C

**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: T  Comment Status: A  ILT Diagrams (common)
The UPDATE_IC function is called in the OUT_OF_SYNC state of the Figure 176A.6.2 Coefficient update state diagram. The UPDATE_IC function uses the ic_req variable to set the coefficients (see 176A.6.2), and the ic_req variable is derived from the 'initial condition request' bits from the control field of the received training frames (see 176A.10.3.1).

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.

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.

Response  Response Status: C  ACCEPT IN PRINCIPLE.

Slides 12 through 14 of the following presentation, prepared by the editorial team, was reviewed by the CRG.


Implement the proposal on slides 13 and 14 of brown_3dj_02a_2406 with editorial license.
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response Status</th>
<th>Response</th>
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<td>Change &quot;106.255 \pm 50 ppm&quot; to &quot;106.25 \pm 50 ppm&quot;</td>
<td>C</td>
<td>Accept in principle. Resolve using the response to comment #361.</td>
</tr>
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<td>Accept.</td>
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<tr>
<td>TR</td>
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<td>The value of '106.255 +/- 50 ppm' is not correct.</td>
<td>C</td>
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<td>C</td>
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<tr>
<td>TR</td>
<td>A</td>
<td>Replace TBD with 62 GHz</td>
<td>C</td>
<td>Accept in principle. Resolve using the response to comment #60.</td>
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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

---

**Comment 426**

**Cl 176D**  SC 176D.3.4.4  P603  L30  #426

**Comment Status:** A

**Author:** Li, Tobey  MediaTek

**Comment Type:** TR

**Suggested Remedy:**

Insertion loss at 26.5625 GHz

Nyquest frequency in Table 176D.4 is incorrect

**Response:**

Change "26.5625 GHz" to "53.125 GHz"

**Response Status:** C

**Comment Status:** A

---

**Comment 451**

**Cl 176D**  SC 176D.3.4.4  P603  L31  #451

**Comment Status:** A

**Author:** Simms, William  NVIDIA

**Comment Type:** TR

**Suggested Remedy:**

Nyquest frequency in Table 176D.4 is incorrect

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

**Response:**

Change to 53.125GHz

**Response Status:** C

**Comment Status:** A

---

**Comment 427**

**Cl 176D**  SC 176D.3.4.5  P604  L34  #427

**Comment Status:** A

**Author:** Li, Tobey  MediaTek

**Comment Type:** TR

**Suggested Remedy:**

COM values in Table 176D.5 are TBD

**Response:**

Replace TBD with 3 dB in Table 176D.5 and in line 38 of page 604

**Response Status:** C

**Comment Status:** A

---

**Comment 429**

**Cl 176D**  SC 176D.4  P604  L24  #429

**Comment Status:** A

**Author:** Li, Tobey  MediaTek

**Comment Type:** TR

**Suggested Remedy:**

Table reference is missing

**Response:**

Add reference of ERL to 176D.4.3.
Add reference of differential-mode to common-mode return loss to 176D.4.4.

**Response Status:** C

**Comment Status:** A

---

**Comment 430**

**Cl 176D**  SC 176D.4  P604  L24  #430

**Comment Status:** A

**Author:** Li, Tobey  MediaTek

**Comment Type:** TR

**Suggested Remedy:**

Reference to test procedure is missing

**Response:**

Add reference to 176D.3.4.4

**Response Status:** C

**Comment Status:** A

---
Cl 176D  SC 176D.4.1  P604  L50  # [141]
Ghiasi, Ali
Ghiasi Quantum/Marvell
Comment Type  T  Comment Status  A
Comment
Missing TBDs
SuggestedRemedy
Ro= 50 ohms
Rdr=50 ohms
RDI=50 ohms
Receiver 3 dB BW=0.55*106.25=58.4375 GHz
Response  Response Status  C
ACCEPT IN PRINCIPLE.
Resolve using the response to comments #403, #396, and #36.

Cl 176D  SC 176D.4.1  P605  L10  # [142]
Ghiasi, Ali
Ghiasi Quantum/Marvell
Comment Type  T  Comment Status  A
Transmitter equalizer coefficients
SuggestedRemedy
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
Response  Response Status  C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #37.

Cl 176D  SC 176D.4.1  P605  L16  # [122]
Sakai, Toshiaki
Socionext
Comment Type  T  Comment Status  A
COM pkg tau (bucket)
COM reference package parameter value. (transmission line parameter tau)
In "Table 176D06" 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, llim_3dj_01a_2311.pdf (page8-9), the value is 6.141e-3. The value should be 6.141e-3 ns/mm.
SuggestedRemedy
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.
Response  Response Status  C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #118.

Cl 176D  SC 176D.4.1  P605  L26  # [123]
Sakai, Toshiaki
Socionext
Comment Type  T  Comment Status  A
COM pkg tau (bucket)
COM reference package parameter value. (transmission line parameter tau)
In "Table 176D06" 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, llim_3dj_01a_2311.pdf (page8-9), the value is 6.141e-3. The value should be 6.141e-3 ns/mm.
SuggestedRemedy
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.
Response  Response Status  C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #118.

Cl 176D  SC 176D.4.1  P605  L35  # [131]
Li, Tobey
MediaTek
Comment Type  TR  Comment Status  A
R_0
Single-ended reference resistance R0 value in Table 176D06 is TBD
SuggestedRemedy
Replace TBD with 50 Ohm
Response  Response Status  C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #403.
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** A  **P** 605  **L** 50  **#** 432

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

**Suggested Remedy**
Replace TBD with 0.58*fb

**Response** Response Status C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #36.

**Comment Type** T  **Comment Status** A  **P** 605  **L** 52  **#** 144

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

**Response** Response Status C
ACCEPT IN PRINCIPLE.
Resolve using the response to comments #504 and #279.

**Comment Type** TR  **Comment Status** A  **P** 606  **L** 33  **#** 433

Zero 2 frequency and pole 3 frequency of Continuous time filter are inconsistent with Table 178013

**Suggested Remedy**
Replace zero 2 frequency with fb/80
Change pole 3 frequency from "fb" to "fb/80"

**Response** Response Status C
ACCEPT IN PRINCIPLE.

There are several comments on this topic. The editorial team prepared a proposal in slide 15 of https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01b_2406.pdf.

Use the CTLE parameters from Table 178-13 (which are identical to those in Table 179-16), without change, in Table 176D-6 and C2M (Table 176E-7 and COM parameters table).

Remove fLF from Table 176D-7.

Implement with editorial license.

**Comment Type** T  **Comment Status** A  **P** 606  **L** 40  **#** 434

Transmitter differential peak output in Table 176Dû7 is TBD

**Suggested Remedy**
Replace Av with 0.413 V
Replace Afe with 0.413 V
Replace Ane with 0.608 V

**Response** Response Status C
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_06/lusted_3dj_01a_2406.pdf

Use the values from slide 4 of the presentation, A_v=A_fe=0.413 and A_ne=0.45, to replace TBD values in Table 176D-7.

Add the editor's note on slide 5 of the presentation.
<table>
<thead>
<tr>
<th>Cl 176D</th>
<th>SC 176D.4.1</th>
<th>P 606</th>
<th>L 49</th>
<th># 135</th>
</tr>
</thead>
<tbody>
<tr>
<td>Li, Tobey</td>
<td>MediaTek</td>
<td><strong>Comment Type</strong>: TR <strong>Comment Status</strong>: A <strong>Suggested Remedy</strong>: Transmitter transition time Tr value in Table 176D.7 is TBD. Replace TBD with Tr = 4 ps. <strong>Response</strong>: ACCEPT IN PRINCIPLE. Resolve using the response to comment #39.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cl 176D</th>
<th>SC 176D.4.2</th>
<th>P 607</th>
<th>L 31</th>
<th># 133</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dudek, Mike</td>
<td>Marvell</td>
<td><strong>Comment Type</strong>: T <strong>Comment Status</strong>: A <strong>Comment</strong>: An insertion loss of only 20dB is less than desirable and the equation is TBD. We shouldn't specify the loss at this time. <strong>Suggested Remedy</strong>: Change 20dB to TBD. <strong>Response</strong>: ACCEPT IN PRINCIPLE. 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_01a_2401.pdf">https://www.ieee802.org/3/dj/public/24_01/ran_3dj_01a_2401.pdf</a> states explicitly that the interconnect length is TBD. Implement suggested remedy with editorial license.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cl 176E</th>
<th>SC 176E.2</th>
<th>P 615</th>
<th>L 33</th>
<th># 130</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghiasi, Ali</td>
<td>Ghiasi Quantum/Marvell</td>
<td><strong>Comment Type</strong>: T <strong>Comment Status</strong>: R <strong>Comment</strong>: Loss budgets are TBD. <strong>Suggested Remedy</strong>: See Ghiasi C2M May-24 Contribution for background on the numbers. ILDD=28 dB, Connector with one via = 3 dB, Module ILDD = 3.6 dB, Host ILDD=21.4 dB. <strong>Response</strong>: REJECT. The comment is against Figure 176E.2. The following presentation was reviewed by the task force in the May 2024 interim meeting: <a href="https://www.ieee802.org/3/dj/public/24_05/ghiasi_3dj_02a_2405.pdf">https://www.ieee802.org/3/dj/public/24_05/ghiasi_3dj_02a_2405.pdf</a>. The comment addresses several open TBDs and the suggested remedy is reasonable, but consensus is not obvious. The editorial team prepared a proposal in slide 25 of <a href="https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01b_2406.pdf">https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01b_2406.pdf</a>. Comment #73 suggests 33 dB for the Channel ILDD. There is no consensus for adopting values. More work toward consensus loss budget for C2M in conjunction with reference receiver parameters is encouraged.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cl 176E</th>
<th>SC 176E.2</th>
<th>P 615</th>
<th>L 23</th>
<th># 129</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghiasi, Ali</td>
<td>Ghiasi Quantum/Marvell</td>
<td><strong>Comment Type</strong>: T <strong>Comment Status</strong>: A <strong>Comment</strong>: Figure depicts loss should be bump-bump. <strong>Suggested Remedy</strong>: ...application and the associated ILDD bump-bump budget at 53.125 GHz. To make it more clear Host C2M Component should be changed to Host C2M Device and Module C2M Device. <strong>Response</strong>: 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. Add an editor's note stating that the losses in the diagram are intended to be die to die, and contributions are encouraged.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TYPE: TR/technical required ER/editorial required G/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
Comment Type: TR
Comment Status: A

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.

Response

Accept in principle.

The CRG reviewed the editorial team’s notes on slides 32-34 of https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01d_2406.pdf.

Implement the proposed changes on slides 6 and 8 of https://www.ieee802.org/3/dj/public/24_05/ran_3dj_02_2405.pdf, except that for jitter values use the values adopted by comment #204.

In the methodology subclause 176E.5, delete the current content and point to the relevant subclauses of 179.9.4.

Implement with editorial license.

The following straw poll was taken:

Straw poll #E-5 (decision)

I would support implementing the proposed changes on slides 6 and 8 of ran_3dj_02_2405 except that for jitter values use the values adopted by comment #204.

Y: 17 N: 14 A: 9

Comment Type: T
Comment Status: A

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 filer?

Response

Accept in principle.

Resolve using the response to comment #60.

[Banner note: changed line from 33 to 13]

Comment Type: T
Comment Status: A

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

Response

Accept in principle.

Comments #186 through #189 suggest using the CR methodology for transmitter and receiver specifications. Based on resolution of these comments, the output specifications have been changed and do not include the VEC and EH parameters.

Resolve using the response to comment #186.
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.

**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."

**Response:**
REJECT.
Resolve using the response to comment #227.

**Module 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.3.4.

**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 lower insertion loss assumed for the module output test.

A detailed proposal will be provided.

**Response:**
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186.

**Propose to use 0.55*Baudrate=58.4375 GHz**

**Response:**
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #60.
### Comment #188

**Comment Type:** TR  **Comment Status:** A  **C2M input**

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.

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

ACCEPT IN PRINCIPLE.


Implement the proposed changes on slides 6-8 of [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), with the following exceptions:

- On slide 6, the host input test calibration (based on Figure 11-10b) on bottom left should not use the frequency-dependent attenuator. Instead, a mathematical channel representing the maximum host channel is to be used, with details TBD.
- On slide 7, use TBD instead of 35 dB for module input test 1 and test 2 and for host input test calibration.

Implement with editorial license.

---

### Comment #189

**Comment Type:** TR  **Comment Status:** A  **C2M input**

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.

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

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #188.

---

### Comment #130

**Comment Type:** TR  **Comment Status:** R  **Channel ILdd**

The IL_dd for AUI C2M channel is a TBD

**Suggested Remedy:**


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

REJECT.

Resolve using the response to comment #130.
Comment Type: T
Comment Status: R

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

Response:
REJECT.

[Editor's note: changed page from 621 to 632]

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

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

Resolve using the response to comment #130

---

Comment Type: TR
Comment Status: A

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:

\begin{align*}
    f_r &= 0.58 \\
    c(-3) &= 0 \\
    c(-2) &= 0 \text{ min, } 0.12 \text{ max} \\
    c(-1) &= -0.4 \text{ min, } 0 \text{ 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 \\
\end{align*}

additionally, set MLSE = 0 (not enabled)

Response:
ACCEPT IN PRINCIPLE.

[Editor's note: Page/line changed from 605/50 to 632/48]

There are several comments on this topic. The editorial team prepared a proposal in slide 13 of

Add a COM table in 176E.4.2 which will replace the reference to Table 176D-7. Use the values in Table 176D-7 with the exception of DER0=2e-5, and the additional values and editor's note on slides 3, 4, and 5 of https://www.ieee802.org/3/dj/public/24_06/lusted_3dj_01a_2406.pdf.

---
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

Implement with editorial license.

<table>
<thead>
<tr>
<th>Cl 176E SC 176E.5 P633 L12</th>
<th># 203</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ran, Ade</td>
<td>Cisco</td>
</tr>
</tbody>
</table>

Comment Type TR  Comment Status A  C2M output
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.

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

A detailed proposal will be provided.

Response Response Status C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #186.

<table>
<thead>
<tr>
<th>Cl 176E SC 176E.5.2 P633 L33</th>
<th># 522</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dawe, Piers</td>
<td>Nvidia</td>
</tr>
</tbody>
</table>

Comment Type T  Comment Status A  C2M output
decision-feedback equalizer? The table mentions "feed-forward coefficient"

SuggestedRemedy
Update this text

Response Response Status C
ACCEPT IN PRINCIPLE.
Comments #186 through #189 suggest using the CR methodology for transmitter and receiver specifications. Based on resolution of these comments, the text subject of this comment will no longer be in the the next draft.

Resolve using the response to comment #186.

<table>
<thead>
<tr>
<th>Cl 176E SC 176E.5.2 P633 L39</th>
<th># 365</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghiasi, Ali</td>
<td>Ghiasi Quantum/Marvell</td>
</tr>
</tbody>
</table>

Comment Type T  Comment Status R  (bucket)
Eye opening reference receiver parameters will be different between TP1d and TP4a measurement

SuggestedRemedy
Given that number of module plug implementation will have COC or even if there is package it will be core-less ~8 mm so there is no need to add package after HCB given the loss of the HCB and plug boards are similar.
At TP4a this is just the output of the module should be tested with synthetic - short trace - long trace
recommendation is to measure at the ASIC ball otherwise we would need at least 2 test cases with Package A and 2 with Package B

Response Response Status C
REJECT.
The suggested remedy does not propose an actionable (within the draft) remedy.

<table>
<thead>
<tr>
<th>Cl 176E SC 176E.5.2 P633 L39</th>
<th># 365</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healey, Adam</td>
<td>Broadcom Inc.</td>
</tr>
</tbody>
</table>

Comment Type T  Comment Status A  C2M output
The title of Table 176E-7 suggests that it should contain reference receiver parameters.
Many of the parameters in the table are not relevant to a reference receiver or an eye diagram measurement. It is understood that this may become moot if a different test method is adopted, but until this decision is made the table can be trimmed down to remove "TBDs" that will never need to be defined.

SuggestedRemedy
Remove parameters "maximum start frequency", "maximum frequency step", all "transmitter" parameters including "number of signal levels" and "level separation mismatch ratio", "number of samples per unit interval", and "target detector error ratio". It is also questionable whether device termination and package model parameters are needed (they were not used in Annex 120G).

Response Response Status C
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 has been replaced by a COM parameters table.

Resolve using the response to comment #186.
### 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>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Comment</th>
<th>Response</th>
<th>Response Status</th>
<th>Comment Status</th>
<th>Comment</th>
<th>Response</th>
<th>Response Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>176E</td>
<td>176E.5.2</td>
<td>634</td>
<td>6</td>
<td>39</td>
<td>TR</td>
<td>A</td>
<td>Receiver 3 dB bandwidth fr value in Table 176Eû7 is TBD</td>
<td>Replace TBD with 0.58*fb</td>
<td>A</td>
<td>C</td>
<td>A</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>176E</td>
<td>176E.5.2</td>
<td>634</td>
<td>8</td>
<td>138</td>
<td>T</td>
<td>A</td>
<td>Transmitter equalizer coefficients</td>
<td>Given little benefit of TX FFE C(-3) - NA</td>
<td>C(0)=0.65</td>
<td>C(-1)= -0.3:0.02:0</td>
<td>C(1)= -0.14:0.02:0.14</td>
<td>C(-2)=0:0.02:0.14</td>
<td>C(1)= -0.14:0.02:0.14</td>
</tr>
<tr>
<td>176E</td>
<td>176E.5.2</td>
<td>634</td>
<td>8</td>
<td>440</td>
<td>TR</td>
<td>A</td>
<td>Pole &amp; zero frequency values of continuous time filter are TBD</td>
<td>Replace zero 1 frequency, fz1, with fb/2.5 GHz</td>
<td>Replace zero 2 frequency, fz2, with fb/80 GHz</td>
<td>Replace pole 1 frequency, fp1, with fb/2.5 GHz</td>
<td>Replace pole 2 frequency, fp2, with fb GHz</td>
<td>Replace pole 3 frequency, fp3, with fb/80 GHz</td>
<td>ACCEPT IN PRINCIPLE.</td>
</tr>
<tr>
<td>176E</td>
<td>176E.5.2</td>
<td>634</td>
<td>34</td>
<td>65</td>
<td>TR</td>
<td>A</td>
<td>There shouldn't be any Tx parameters in a specification for a reference receiver.</td>
<td>Delete the rows for transmitter termination resistance, transmitter equalizer coefficients, transmitter differential peak output voltage, transition time, transmitter signal to noise ratio, RLM.</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td>Resolve using the response to comment #39.</td>
<td>C</td>
<td>A</td>
<td>C</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
### Comment 139

**Comment Type:** T  
**Comment Status:** A  

**Suggested Remedy:**
- Jitter and noise parameters are TBD

**Response:**
- C2M output
- See Ghiasi C2M May-24 Contribution for background on the numbers
- Eta0 = 1.25E-8
- Transmitter SNR = NA for reference receiver but may use 33 dB for COM code
- Transmitter Sigma = NA for reference receiver but may use 0.01 UI for COM code
- Transmitter dual-Dirac jitter = NA for reference receiver but may use 0.02 UI for COM code
- Transmitter RLM = NA for reference receiver but may use 95% for COM code

Resolve using the response to comment #186.

### Comment 140

**Comment Type:** TR  
**Comment Status:** A  

**Suggested Remedy:**
- Reference equalizer is TBD

**Response:**
- C2M output
- Propose to use fix 25 tap FFE with 1T DFE
- Max # of pre-cursor taps = 6
- DFE max tap weight = 0.75

Resolve using the response to comments #72 and #279.

### Comment 141

**Comment Type:** TR  
**Comment Status:** A  

**Suggested Remedy:**
- 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.

**Response:**
- C2M output
- 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.

Resolve using the response to comment #186.

### Comment 142

**Comment Type:** T  
**Comment Status:** A  

**Suggested Remedy:**
- 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.

**Response:**
- C2M output
- 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.

Resolve using the response to comments #72 and #279.

### Comment 143

**Comment Type:** TR  
**Comment Status:** A  

**Suggested Remedy:**
- 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.

**Response:**
- C2M output
- 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.

Resolve using the response to comments #72 and #279.
Comment:

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"

Response:

ACCEPT.

Comment:

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"

Response:

ACCEPT.

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.

Response:

ACCEPT IN PRINCIPLE.

Remove footnote in Figure 177-2.

Suggested Remedy:

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

Response:

ACCEPT IN PRINCIPLE.

Resolve using the response to comment # 83.

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.

Response:

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 three parallel delay lines (numbered 0 to 2), as illustrated in Figure 177-3. Each delay operator ôDö 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/1.6TbE.

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

Response

ACCEPT IN PRINCIPLE.

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

Response

ACCEPT IN PRINCIPLE.

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

Response

ACCEPT IN PRINCIPLE.

This is consistent with the adopted baseline. It is correct as documented.
### 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>
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<td>252</td>
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**Comment Type:** T  **Comment Status:** Cl  **CI (bucket):**

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.

**Response**  
REJECT.

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

<table>
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**Comment Type:** T  **Comment Status:** A  **CI (bucket):**

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.

Response**  
ACCEPt IN PRINCIPLE.  
Implement the suggest remedy with editorial license.

<table>
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</table>

**Comment Type:** T  **Comment Status:** A  **CI - Editorial (bucket):**

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 would it not?

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.

Response**  
REJECT.

This comment was WITHDRAWN by the commenter.
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** T  **Comment Status** R  **Circular Shift (bucket)**

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.

**Response**  
REJECT.

This comment was WITHDRAWN by the commenter.

---

**Comment Type** T  **Comment Status** A  **inner FEC code (bucket)**

The generation matrix $G(60,8)$ for the Hamming(68,60) encoder is given in Table 177-1 is not accurate. The generation matrix for the Hamming(68,60) should be with 60 rows and 68 columns, where the most-left 60 columns is the indentity matrix.

**Suggested Remedy**

Suggest to change the sentence to "The generator matrix of the Hamming(68,60) code is $G=[I_{60} ; G_{(60x8)}], where $I_{60}$ is the 60x60 identity matrix, and $G_{(60x8)}$ is a 60x8 matrix used to generate the 8 parity bits given in Table 177-1."

**Response**  
ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

---

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

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 119-6 and Figure 119-8).

**Suggested Remedy**

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

**Response**  
ACCEPT IN PRINCIPLE.

Implement the suggest remedy with editorial license.

---

**Comment Type** T  **Comment Status** A  **inner FEC code (bucket)**

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.

**Response**  
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/huang_3dj_01a_2405.pdf

Implement the suggested remedy with editorial license.
Phase of inner FEC pad bits 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.

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

It is not declared when the first pad insertion should happen.

Suggested Remedy
Indicate in the text that the first pad insertion will happen right at the beginning of CWs, same as in the test vectors.

Response
ACCEPT IN PRINCIPLE.

It does not indicate when the first pad insertion should happen.

Suggested Remedy
Indicate in the text that the first pad insertion will happen right at the beginning of CWs, same as in the test vectors.

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

"Pad frame sequence" naming does not convey purpose in alignment. Suggest to call this field "Frame Alignment Sequence" instead.

Suggested Remedy
Pad Frame Alignment Sequence

Response
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:** T  **Comment Status:** A  **pad insertion (bucket)**

The details of how to use the IBSF are beyond the scope of this standard. Does it 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.

**Response**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

---

**Comment Type:** TR  **Comment Status:** A  **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.

**Response**

ACCEPT IN PRINCIPLE.

Implement using response to comment #547.

---

**Comment Type:** T  **Comment Status:** A  **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.

**Response**

ACCEPT IN PRINCIPLE.

Resolve using response to comment #547.

---

**Comment Type:** T  **Comment Status:** A  **precoding**

Pre-coding was shown on riani_3dj_01a_2303 FECI baseline that when was adopted, and pre-coding is essential for FECI PMDs.

**Suggested Remedy:**

Please insert text for pre-coder in this sub-clause. 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. See Ghiasi/Riani May-24 presentation on the need for pre-coder

**Response**

ACCEPT IN PRINCIPLE.

Resolve using response to comment #547.

---

**Comment Type:** T  **Comment Status:** A  **Precoding**

According to figure 177-2, the first process the receiver performs is PAM4 decoding (or soft-decision decoding).

**Suggested Remedy:**

Add a subclause for the decoding process.

**Response**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #547.

---

**Comment Type:** T  **Comment Status:** A  **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.

**Response**

ACCEPT IN PRINCIPLE.

Resolve using response to comment #547.

---

**Comment Type:** T  **Comment Status:** A  **precoding**

Pre-coding was shown on riani_3dj_01a_2303 FECI baseline that when was adopted, and pre-coding is essential for FECI PMDs.

**Suggested Remedy:**

Please insert text for pre-coder in this sub-clause. 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. See Ghiasi/Riani May-24 presentation on the need for pre-coder

**Response**

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)."

Response
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.

Response
Implement the suggested remedy with editorial license.

Defining how a miscorrected codeword can occur could be phrased more clearly.

Suggested Remedy
Change:
"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."

Response
Implement the suggested remedy with editorial license.
In Figure 177-8, the input variable of state FS_LOCK_INIT is not correct. It would cause a FS lock error.

**Suggested Remedy**

FS_LOCK_INIT state should be entered after all the 8 flows obtain their inner FEC codeword boundaries and inner FEC flow 0 is identified, when fs_lock is false.

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.'

(See page 258 lines 48-50)

**Response**

RESPONSE STATUS C

ACCEPT IN PRINCIPLE.

Background and proposed changes are provided on slides 4 and 5 in the following presentation:


Implement the proposed changes shown on slide 5 of nicholl_3dj_01_2406, with editorial license.

**Comment Type:** TR / Technical Required

**Comment Status:** A / Accepted

**Inner FEC Sync (bucket1p)**

Slavick, Jeff

Broadcom

Counts automagically have a _done variable created for them, so no need to define fc_cnt_done

**Suggested Remedy**

Remove fc_cnt_done definition

**Response**

RESPONSE STATUS Z

REJECT.

This comment was WITHDRAWN by the commenter.

---

**Comment Type:** TR / Technical Required

**Comment Status:** A / Accepted

**Inner FEC Sync (bucket)**

Slavick, Jeff

Broadcom

Counts the number of inner FEC codewords considered uncorrectable by inner FEC decoder

**Suggested Remedy**

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

**Response**

RESPONSE STATUS C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment # 183.

---

**Comment Type:** E / Editorial

**Comment Status:** A / Accepted

In Figure 177-8 the wrong character is showing up for the <= symbol

**Suggested Remedy**

Fix <= symbol in Figure 177-8

**Response**

RESPONSE STATUS C

ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.
Comment Type: T  Comment Status: R  Skew (common)
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.

SuggestedRemedy
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.

Response  Response Status: Z  REJECT.
This comment was WITHDRAWN by the commenter.

Comment Type: E  Comment Status: A  (editorial)
Table 178-4 "120F-1.6TAUI-16 C2C"
SuggestedRemedy
change to "120F-1.6TAUI-16 C2C"
Response  Response Status: C  ACCEPT IN PRINCIPLE.
Implement with editorial license and discretion.
<table>
<thead>
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</table>

**Comment Type:** TR

**Comment Status:** A

**B-T filter BW**

The Bessel-Thomson filter should track fr. Between 0.5 fb and 0.6 fb have been shown in presentations.

**Suggested Remedy**

change TBD to 67GHz

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

The comment addresses an open TBD and the suggested remedy is reasonable.

There are several comments on this topic. The editorial team prepared a proposal in slide 4 of [https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01_2406.pdf](https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01_2406.pdf).

Use 60 GHz for signal measurements in 178, 179, 176D, 176E. Replace all TBDs and the "40 GHz" that wasn't adopted.

<table>
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**Comment Type:** TR

**Comment Status:** A

**B-T filter BW**

3dB BW is TBD

**Suggested Remedy**

Change it to 65 GHz.

Rational, considering the common and cost effective 1.85mm connector BW, and associated ~7% measurement error, give rise to this number.

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #60.

<table>
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**Comment Type:** TR

**Comment Status:** A

**B-T filter BW**

Transmitter measurement bandwidth is TBD

**Suggested Remedy**

Replace TBD with 62 GHz

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #60.

<table>
<thead>
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**Comment Type:** TR

**Comment Status:** A

**dERL (min) is TBD**

**Suggested Remedy**

Replace TBD with 62 GHz

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #29.

<table>
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**Comment Type:** TR

**Comment Status:** A

**Output jitter (max) TBD**

**Suggested Remedy**

reapole TBDs with:

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<th>J2.7u</th>
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See [lim_3dj_01_2403a](https://example.com), [lim_3dj_01_2405](https://example.com), and [1], [2], [3]

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #204.

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<tr>
<td>Mellitz, Richard</td>
<td>Samtec</td>
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<td></td>
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**Comment Type:** TR

**Comment Status:** A

**scale ERL parameter form 0.3ck**

in table 178-7 change TBD's as follows

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<th>Tr</th>
<th>x 0 GHz</th>
<th>?x 0.618</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.005 ns</td>
<td>N 400 UI</td>
<td></td>
</tr>
</tbody>
</table>

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #29.
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 178 SC 178.9.2.2 P 278 L 26 # 237
Li, Mike Intel
Comment Type TR Comment Status A
Tr is TBD
SuggestedRemedy replace it with 0.005 ns, see lim_3dj_01_2403a
Response Response Status C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #29.

Cl 178 SC 178.9.2.2 P 278 L 26 # 238
Li, Mike Intel
Comment Type TR Comment Status A
Betax is TBD
SuggestedRemedy replace it with 0 GHz, see lim_3dj_01_2403a
Response Response Status C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #29.

Cl 178 SC 178.9.2.2 P 278 L 26 # 239
Li, Mike Intel
Comment Type TR Comment Status A
Rox is TBD
SuggestedRemedy replace it with 0.618, see lim_3dj_01_2403a
Response Response Status C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #29.

Cl 178 SC 178.9.2.2 P 278 L 26 # 240
Li, Mike Intel
Comment Type TR Comment Status A
N is TBD
SuggestedRemedy replace it with 400, see lim_3dj_01_2403a
Response Response Status C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #29.

There are several comments on this topic. The editorial team prepared a proposal in slide 5 of https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01_2406.pdf.

For the ERL tables in the following subclauses:
178.9.2.2, 178.9.2.1.2, 178.10.3, 179.9.4.8, 179.11.3, 179B.4.2
And the corresponding tables in annex 176D and annex 176E, use the following values:
Tr = 0.005 ns
beta_x = 0
rho_x = 0.618
N = 400 UI

Additionally, use the following values:
178.9.2.2: N=400, min dERL=-3 dB
178.9.2.1.2: N=400
178.10.3: N=7000, min ERL=11 dB
179.9.4.8: N=1600
179B.4.2: N=1600, tw=1, DER0=2e-5
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:** A  **Cl:** 178  **SC:** 178.9.2.2  **P:** 278  **L:** 32  **#**: 241

**Li, Mike**  Intel

- **Comment:** Nbx is TBD
- **Suggested Remedy:** replace it with 44, see lim_3dj_01_2403a, lim_3dj_01_2405
- **Response:** Accept in principle. Resolve using the response to comment #29.

---

**Comment Type:** TR  **Comment Status:** A  **Cl:** 178  **SC:** 178.9.3  **P:** 280  **L:** 9  **#**: 244

**Li, Mike**  Intel

- **Comment:** dERL is TBD
- **Suggested Remedy:** replace it with -3dB, see lim_3dj_01_2403a
- **Response:** Accept in principle. Resolve using the response to comment #29.

---

**Comment Type:** TR  **Comment Status:** A  **Cl:** 178  **SC:** 178.9.3.3  **P:** 281  **L:** 40  **#**: 245

**Li, Mike**  Intel

- **Comment:** 3dB BW is TBD
- **Suggested Remedy:** Change it to 67GHz. Rational, considering the common and cost effective 1.85mm connector BW, and associated ~7% measurement error, give rise to this number.
- **Response:** Accept in principle. Resolve using the response to comment #60.

---

**Comment Type:** TR  **Comment Status:** A  **Cl:** 178  **SC:** 178.9.3.3  **P:** 282  **L:** 12  **#**: 246

**Mellitz, Richard**  Samtec

- **Comment:** The Bessel-Thomson filter should track fr which between 0.5 and 0.6 has been shown in presentations.
- **Suggested Remedy:** change TBD to 67GHz
- **Response:** Accept in principle. Resolve using the response to comment #60.

---

**Comment Type:** TR  **Comment Status:** A  **Cl:** 178  **SC:** 178.9.3.3  **P:** 282  **L:** 16  **#**: 400

**Li, Tobey**  MediaTek

- **Comment:** FEC symbol error ratio is not aligned with DER value
- **Suggested Remedy:** change it to 2e-3
- **Response:** Accept in principle.

---

**Comment Type:** TR  **Comment Status:** A  **Cl:** 178  **SC:** 178.9.3.3  **P:** 282  **L:** 16  **#**: 400

**Li, Tobey**  MediaTek

- **Comment:** COM values in Table 178u10 are TBD
- **Suggested Remedy:** Replace TBD with 3 dB
- **Response:** Accept in principle. Resolve using the response to comment #250.

---

**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

**TYPE:** TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general

**Page:** 72 of 129

**Date:** 6/12/2024 1:37:22 PM
## 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>
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<th>Cl</th>
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<th>Comment Status</th>
<th>P</th>
<th>L</th>
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<td>TR</td>
<td>A</td>
<td>282</td>
<td>16</td>
<td>249</td>
</tr>
<tr>
<td>Li, Mike</td>
<td>Intel</td>
<td>Comment Type TR</td>
<td>Comment Status A</td>
<td>COM</td>
<td></td>
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<tr>
<td>SuggestedRemedy</td>
<td></td>
<td>Replaced both with 3 dB, see lim_3dj_01_2405</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Response</td>
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<td>ACCEPT IN PRINCIPLE.</td>
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<td>Resolve using the response to comment #250.</td>
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<td>178.9.3.4</td>
<td>TR</td>
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<td>MediaTek</td>
<td>Comment Type TR</td>
<td>Comment Status A</td>
<td>RX ITOL/JTOL (bucket)</td>
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</tr>
<tr>
<td>&quot;The test channel COM, calculated per items 3) through 7) in 93C.2, is at least 3 dB&quot;</td>
<td></td>
<td>The reference to the test channel COM is wrong.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>SuggestedRemedy</td>
<td></td>
<td>Change it to &quot;The test channel COM, calculated per item e) through h) in 178.9.3.3, is at least 3 dB&quot; to be correct</td>
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<tr>
<td>Response</td>
<td></td>
<td>ACCEPT IN PRINCIPLE.</td>
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<tr>
<td></td>
<td></td>
<td>Implement the suggested remedy with editorial license.</td>
<td></td>
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</tr>
<tr>
<td>Cl</td>
<td>178</td>
<td>178.10</td>
<td>TR</td>
<td>A</td>
<td>284</td>
<td>11</td>
</tr>
<tr>
<td>Li, Mike</td>
<td>Intel</td>
<td>Comment Type TR</td>
<td>Comment Status A</td>
<td>COM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Minimum COM in Table 178011 is TBD&quot;</td>
<td></td>
<td>The comment addresses an open TBD and the suggested remedy is reasonable.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>SuggestedRemedy</td>
<td></td>
<td>Replace TBD with 3 dB in Table 178-11 and in line 28 of page 284</td>
<td></td>
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<tr>
<td>Response</td>
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<td></td>
<td></td>
<td>Resolve using the response to comment #250.</td>
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</tbody>
</table>

### Mellitz, Richard

**Comment Type:** TR  **Comment Status:** A  **P:** 284  **L:** 11  **#:** 250

**SuggestedRemedy:**

Replace both with 3 dB, see lim_3dj_01_2405

**Response**

**Response Status:** C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #250.

**Response**

**Response Status:** C

Use the value 3 dB for minimum COM for channels and for test setup calibration in Annex 176D.

Use the value 3 dB for minimum COM for channels and for test setup calibration in Clauses 178 and 179.
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 178</th>
<th>SC 178.10</th>
<th>P 284</th>
<th>L 12</th>
<th># 84</th>
</tr>
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<tr>
<td>Mellitz, Richard</td>
<td>Samtec</td>
<td>Comment Type: TR</td>
<td>Comment Status: A</td>
<td>Channel ILdd (bucket)</td>
</tr>
<tr>
<td>reference is wrong and lldd should reflect tp0d to tp05d.</td>
<td></td>
<td></td>
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<table>
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<th>SC 178.10</th>
<th>P 284</th>
<th>L 14</th>
<th># 852</th>
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<tbody>
<tr>
<td>Li, Mike</td>
<td>Intel</td>
<td>Comment Type: TR</td>
<td>Comment Status: A</td>
<td>ERL</td>
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<tr>
<td>Channel ERL TBD</td>
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</tr>
<tr>
<td>SuggestedRemedy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>changed reference to 178.10.2 and TBD to 40 dB or eliminate the reference to lldd</td>
<td></td>
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<table>
<thead>
<tr>
<th>Cl 178</th>
<th>SC 178.10.1</th>
<th>P 285</th>
<th>L 18</th>
<th># 118</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sakai, Toshiaki</td>
<td>Socionext</td>
<td>Comment Type: T</td>
<td>Comment Status: A</td>
<td>COM pkg tau (bucket)</td>
</tr>
<tr>
<td>COM reference package parameter value. (transmission line parameter tau)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In &quot;Table 178012&quot; class A package model Transmission line parameter t(tau) value is 6.141e-4 ns/mm, but based on the adopted motion#10, lim_3dj_01a_2311.pdf (page8-9), the value is 6.141e-3. The value should be 6.141e-3 ns/mm.</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Cl 178</th>
<th>SC 178.10.1</th>
<th>P 285</th>
<th>L 19</th>
<th># 356</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healey, Adam</td>
<td>Broadcom Inc.</td>
<td>Comment Type: T</td>
<td>Comment Status: A</td>
<td>COM pkg tau (bucket)</td>
</tr>
<tr>
<td>In Table 178-12, the transmission line parameter &quot;tau&quot; is set to 6.141e-4. In the adopted baseline proposal li_3dj_01a_2311 (slides 8 and 9), the value is specified to be 6.141e-3.</td>
<td></td>
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<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Cl 178</th>
<th>SC 178.10.1</th>
<th>P 284</th>
<th>L 28</th>
<th># 853</th>
</tr>
</thead>
<tbody>
<tr>
<td>Li, Mike</td>
<td>Intel</td>
<td>Comment Type: TR</td>
<td>Comment Status: A</td>
<td>COM</td>
</tr>
<tr>
<td>COM TBD</td>
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<td></td>
</tr>
<tr>
<td>SuggestedRemedy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Replaced it with 3 dB, see lim_3dj_01_2405</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 |
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: A  COM pkg tau (bucket)

Suggested Remedy:
- Change the value in Table 178-12 (class B package) from 6.141e-4 ns/mm to 6.141e-3 ns/mm.
- Or simply delete this row, as the value in table 93A-3 is 6.141e-3 ns/mm.

Response:
- ACCEPT IN PRINCIPLE.
- Resolve using the response to comment #118.

Comment Type: TR  Comment Status: A  COM ref pkg (bucket)

Suggested Remedy:
- 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.

Response:
- ACCEPT.

Comment Type: TR  Comment Status: A  R_0

Suggested Remedy:
- Replace the reference resistance R_0 value in Table 178-13 with 50 Ohm.

Response:
- ACCEPT IN PRINCIPLE.
- The proposed value of 50 Ohm is in agreement with the reference impedance used for deriving the package models adopted by motions #9 and #10 of November 2023 (see https://www.ieee802.org/3/dj/public/23_11/lusted_3dj_02_2311.pdf).
- Any other value would require recalculation of the model parameters in Table 178-12, Table 179-15, and Table 176D-6, and would therefore not be adequate.

Response:
- ACCEPT IN PRINCIPLE.
- Resolve using the response to comment #178.

Additional comments and responses are included for other suggested remedies and changes, but the above are the primary comments related to the requested changes.
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 178  SC 178.10.1  P 285  L 40  # 396
Kocsis, Sam  Amphenol
Comment Type  T  Comment Status  A  COM R_d
Rd(t) = “TBD”

SuggestedRemedy

Change “TBD” to “92-ohm” to match majority of contributions to the Task Force, and better align with Zc definition in package

Response  Response Status  C

There are several comments on this topic. The CRG reviewed the editorial team’s notes on slide #8-10 of https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01c_2406.pdf.

Following straw poll #E-2 (see below) there is consensus to make the following change.
Change Rdt and Rdr in COM device parameters tables (Table 178-12, Table 179-15, Table 176D) from TBD to 46.25 Ohm.
Implement with editorial license.

For the record, there was consensus on having the reference impedance statements (178A.1.3, 178.9.1, 179.9.3, 179.11.1, and 176D.3.2) define a reference single-ended impedance of X Ohm for all frequency-domain specifications, e.g., insertion loss, return loss, and ERL, and adding a similar statement in 176E. The value of X was not decided. This response does not prescribe any changes in this regard.

The following straw polls were taken:

Straw poll #E-1 (direction)
I would support changing Rdt and Rdr in COM device parameters tables (Table 178-12, Table 179-15, Table 176D) from TBD to X Ohm (same as the reference single-ended impedance of X Ohm for all frequency-domain specifications).
Y: 12 N: 12 A: 8

Straw poll #E-2 (direction)
I would support changing Rdt and Rdr in COM device parameters tables (Table 178-12, Table 179-15, Table 176D) from TBD to 46.25 Ohm.
Y: 18 N: 5 A: 9

Cl 178  SC 178.10.1  P 285  L 41  # 255
Li, Mike  Intel
Comment Type  TR  Comment Status  A  COM R_d
RD(T) TBD

SuggestedRemedy

Replaced it w 46.25 ohm, see see lim_3dj_01_2405, slide 5

Response  Response Status  C

ACCEPT IN PRINCIPLE.
Resolve using the response to comment #396.

Cl 178  SC 178.10.1  P 285  L 41  # 397
Kocsis, Sam  Amphenol
Comment Type  T  Comment Status  A  COM R_d
RD(r) = "TBD"

SuggestedRemedy

Change "TBD" to "92-ohm" to match majority of contributions to the Task Force, and better align with Zc definition in package

Response  Response Status  C

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: TR  Comment Status: A  Comment: TBD  f_r

T(able 178û13) Presentations 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.

SuggestedRemedy
change TBD to 0.6.

Response  Response Status: C
ACCEPT IN PRINCIPLE.

There are several comments on this topic. The editorial team prepared a proposal in slide #12 of https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01c_2406.pdf.

Use the value 0.55 x f_b for f_r in Table 178-13, Table 179-16, Table 176D-6, and Table 176E-7.

Comment Type: TR  Comment Status: A  Comment: TBD  f_r

Receiver 3 dB bandwidth fr value in Table 178-13 is TBD

SuggestedRemedy
Replace TBD with 0.58*fb

Response  Response Status: C
ACCEPT IN PRINCIPLE. Resolve using the response to comment #36.

Comment Type: TR  Comment Status: A  Comment: TBD  f_r

The COM parameter values for the 200GBASE-KR1, 400GBASE-KR2, 800GBASE-KR4 and 1.6TBASE-KR8 PMDs are TBDs

SuggestedRemedy
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_g = 0
- N_f = 0
- N_max = 0
- b_max(1) = 0.85
- b_min(1) = 0

Additionally, set MLSE = 0 (not enabled)

Response  Response Status: Z
REJECT.

This comment was WITHDRAWN by the commenter.
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**: A  **COM TxFFE**

The max/min values and step size of transmitter equalizer in Table 178-13 need to match those in the Table 178u6 and those in sub-clauses 179.9.4.1.4 & 179.9.4.1.5

**SuggestedRemedy**

- 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

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

- **ACCEPT IN PRINCIPLE.**
- Resolve using the response to comment #37.

**Comment Status**: A  **Response Status**: C

**Melitz, Richard**  **Samtec**

**Comment Type**: TR  **Comment Status**: A  **COM TxFFE**

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 Tx FFFE.

**SuggestedRemedy**

Change TBDs for c(-3), c(-2), c(-1), and c(1) to zero. Set C(0) to 1.

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

- **ACCEPT IN PRINCIPLE.**
- There are several comments on this topic. The editorial team prepared a proposal in slide #11 of https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01c_2406.pdf.

The FFE coefficients in the transmitter characteristics may have larger ranges from those of the COM parameter table.

Use the following ranges and step sized for COM Tx FFE coefficients in 178, 179, 176D, and 176E:

- \(c(-3)\): 0 (not used in COM)
- \(c(-2)\): 0 to 0.14, in 0.02 steps
- \(c(-1)\): -0.34 to 0, in 0.02 steps
- \(c(0)\) minimum: 0.54
- \(c(+1)\): -0.2 to 0, in 0.02 steps.

Add editor's notes similar to that in slide 4 of https://www.ieee802.org/3/dj/public/24_05/lusted_3dj_07_2405.pdf to denote that the COM FFE ranges need further analysis.

**Comment Status**: A  **Response Status**: C

**Melitz, Richard**  **Samtec**

**Comment Type**: TR  **Comment Status**: A  **COM TxFFE**

- Replace it with 0.0.0.02 (min, max, step), see slide 5

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

- **ACCEPT IN PRINCIPLE.**
- Resolve using the response to comment #37.
<table>
<thead>
<tr>
<th>Cl 178</th>
<th>SC 178.10.1</th>
<th>P 286</th>
<th>L 26</th>
<th># 262</th>
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<tr>
<td>Li, Mike</td>
<td>Intel</td>
<td><strong>Comment Type</strong></td>
<td>TR</td>
<td>Comment Status</td>
</tr>
<tr>
<td><strong>Suggested Remedy</strong></td>
<td></td>
<td>Replace it with -0.2.0.0.02 (min, max, step), see lim_3dj_01_2405, slide 5</td>
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<td><strong>COM TxFFE</strong></td>
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<td>ACCEPT IN PRINCIPLE. Resolve using the response to comment #37.</td>
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<tr>
<th>Cl 178</th>
<th>SC 178.10.1</th>
<th>P 286</th>
<th>L 32</th>
<th># 263</th>
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<td>Replace it with 0.54, see lim_3dj_01_2405, slide 5.</td>
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<td>REJECT. The following presentation was reviewed by the task force at the May 2024 interim meeting: <a href="https://www.ieee802.org/3/dj/public/24_05/lim_3dj_01_2405.pdf">https://www.ieee802.org/3/dj/public/24_05/lim_3dj_01_2405.pdf</a>. The comment and the presentation do not provide sufficient justification to support the suggested remedy.</td>
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<td>There are several comments on this topic. The editorial team prepared a proposal in slide 15 of <a href="https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01b_2406.pdf">https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01b_2406.pdf</a>.</td>
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**Comment:**

- **Suggested Remedy:** Replace them with fb/4.223, fb/80 (fz1,fz2)
  - see lim_3dj_01_2405, slide 5

- **Response:**
  - REJECT.
  - Resolve using the response to comment #263.

- **Suggested Remedy:** Replace them with fb/1.8973, fb/2.6562, fb/80 (fp1,fp2, fp3)
  - see lim_3dj_01_2405, slide 5

- **Response:**
  - REJECT.
  - Resolve using the response to comment #266.

- **Suggested Remedy:**
  - Replace Av with 0.413 V
  - Replace Afe with 0.413 V
  - Replace Ane with 0.608 V

- **Response:**
  - REJECT.

There is no consensus to implement the suggested remedy. Further contributions on this topic are encouraged.
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 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 eta0 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 other comments.

Further analysis and consensus building are encouraged.
## 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>
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<td>Implement the suggested remedy and apply in addition in the COM tables in clause 179, annex 176D and Annex 176E.</td>
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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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Suggested Remedy

Replace it w 4,
see lim_3dj_01_2405, slide 5

Response Response Status C

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.

There is no consensus to implement the suggested remedy. Further contributions on this topic are encouraged.

<table>
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Suggested Remedy

Replace it w 5,
see lim_3dj_01_2405, slide 5

Response Response Status C

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

The comment appears to address the parameter Nmax.
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.

There is no consensus to implement the suggested remedy. Further contributions on this topic are encouraged.

<table>
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Suggested Remedy

Replace it w 60,
see lim_3dj_01_2405, slide 5

Response Response Status C

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.

There is no consensus to implement the suggested remedy. Further contributions on this topic are encouraged.

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 comments

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The comment addresses an open TBD and the suggested remedy is reasonable.

There are several comments on this topic. The editorial team prepared a proposal in slide #14 of https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01c_2406.pdf.

Use the following values to replace TBDs in COM tables in 178, 179, 176D, and COM table + reference receiver in 176E:

- \( w_{\text{max}}(i) = 0.7 \) for all \( i \) except 0
- \( w_{\text{min}}(i) = -0.7 \) for all \( i \) except 0
- \( b_{\text{max}} = 0.85 \)
- \( b_{\text{min}} = 0 \)

Implement with editorial license.

Add editor's notes similar to that in slide 4 of https://www.ieee802.org/3/dj/public/24_05/lusted_3dj_07_2405.pdf to denote that these values need further analysis.

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</table>

(The value for the floating tap indexes overrides the value 0.7 for fixed tap indexes adopted by comment #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

---

**Comment Type** TR | **Comment Status** A | **TR #** 284 | **L** 23 | **Cl SC** 178.10.1
---

**Li, Mike** | **Intel**

**Comment Type** TR | **Comment Status** A | **ERL COM ref Rx**
---

**Suggested Remedy**
- Added a new line for floating tap coefficient min limit
- See lim_3dj_01_2405, slide

**Response** C

**ACCEPT IN PRINCIPLE.**

Implement the suggested remedy for the COM tables in clauses 178, clause 179, annex 176D and annex 176E, with editorial license.

(The value for the floating tap indexes overrides the value -0.7 for fixed tap indexes adopted by comment #279).

---

**Comment Type** TR | **Comment Status** A | **TR #** 285 | **L** 23 | **Cl SC** 178.10.2
---

**Mellitz, Richard** | **Samtec**

**Comment Type** TR | **Comment Status** R | **Multiple COM parameters**
---

Selecting values the "Receiver discrete-time equalizer parameters" are critical for making progress. Many presentations a have shown quite a variation. Select values based on what seems consistent or use straw ballot to determine.

**Suggested Remedy**
- Use straw polls from the following
  - Dw 4, 6, or 8
  - Nfix 10, 15, 24
  - Ng 1, 2, 3
  - N 3, 4, 5
  - Nmax 40, 50, 120
  - Wmax(-1,0,1)=1
  - Wmin(-1,0,1)=0, otherwise -0.5
  - bmax(1) = 0.5, 0.75, 0.85
  - bmin(1) = -0.5, -0.75, -0.85

**Response** C

REJECT.

The suggested remedy does not propose an actionable (within the draft) remedy.

Proposed changes should preferably be backed by technical justification and not just straw polls.

---

**Comment Type** T | **Comment Status** A | **CL 178A SC 178A.1.5**
---

**Noujeim, Leesa** | **Google**

**Comment Type** T | **Comment Status** A | **CL 178A SC 178A.1.5**
---

**Mellitz, Richard** | **Samtec**

**Comment Type** TR | **Comment Status** A | **ERL**
---

**Suggested Remedy**
- In table 178-14 change TBD's as follows
  - Tr 0.005 ns
  - 0 GHz
  - 0.618
  - 7000 UI

**Response** C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #29.

---

**Comment Type** T | **Comment Status** A | **CL 178A SC 178A.1.5**
---

**Mellitz, Richard** | **Samtec**

**Comment Type** T | **Comment Status** A | **CL 178A SC 178A.1.5**
---

**Response** C

ACCEPT IN PRINCIPLE.

The port labels on Figure 178A-6 are inconsistent with the cascade order implied in 178A-12 and with the text on line 1.

**Suggested Remedy**
- In Fig 178A-6 replace "Port 2" with "Port 1" and replace "Port 1" with "Port 2"
- Alternatively, replace Figure 178A-6 with a copy of Figure 178A-2 and reverse the arrow directions and swap Port 1 with Port 2.

**Response** C

ACCEPT IN PRINCIPLE.

The port order of the resulting model is then reversed so that port 1 becomes the input to the optional host channel (or the device package when the host channel is not included) and port 2 becomes the output of the device termination.

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

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<td>178A.1.8</td>
<td>P654</td>
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<td>209</td>
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<tr>
<td>Shabiba, Hossein</td>
<td>Huawei Technologies Canada</td>
<td>Comment Type: T</td>
<td>Comment Status: A</td>
<td>Reference to the wrong section 178A.1.6.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Suggested Remedy:**
- Change reference to section 178A.1.8.1

**Response:**
- Response Status: C
- ACCEPT.

---

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<tr>
<td>Shabiba, Hossein</td>
<td>Huawei Technologies Canada</td>
<td>Comment Type: T</td>
<td>Comment Status: A</td>
<td>h_ISI in equation (178A-29) should not include the main cursor (h_ISI(main) = 0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Suggested Remedy:**
- Add a case to define h_ISI(n) = 0 for n = d+1

**Response:**
- Response Status: C
- ACCEPT IN PRINCIPLE.

---

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<tr>
<td>Healey, Adam</td>
<td>Broadcom Inc.</td>
<td>Comment Type: T</td>
<td>Comment Status: A</td>
<td>DER0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comment:**
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> 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.

**Response:**
- Response Status: C
- ACCEPT IN PRINCIPLE.

---

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<thead>
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<td>P659</td>
<td>L12</td>
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<tr>
<td>Li, Mike</td>
<td>Intel</td>
<td>Comment Type: TR</td>
<td>Comment Status: A</td>
<td>DER0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Suggested Remedy:**
- Change P(y0)= DER0 to 1-P(y0) =DER0, see slide 3 of lim_3dj_02_2405.pdf, see also a marked version in the support data sheet.

**Response:**
- Response Status: C
- ACCEPT IN PRINCIPLE.

---

The following contributions were reviewed at the May 2024 interim meeting:
- [https://www.ieee802.org/3/dj/public/24_05/lim_3dj_02_2405.pdf](https://www.ieee802.org/3/dj/public/24_05/lim_3dj_02_2405.pdf)

Resolve using the response to comment #362.
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: A  JM methodology MLSD_PAM

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.

Response: C  Response Status: C
ACCEPT IN PRINCIPLE.

The following contribution was reviewed at the May 2024 interim meeting:

The modifications to Equations (178A-36) and (178A-37) are also influenced by the responses to comments #285 and #362.

Resolve using the response to comment #362.

[Editor's note: changed subclause to 178A.1.11.]

Comment Type: TR  Comment Status: A  JM methodology MLSD_PAM

EQ (178A-36)

Suggested Remedy:
Update the equation per slide 4 of lim_3dj_02_2405, see also a marked version in the support data sheet.

Response: C  Response Status: C
ACCEPT IN PRINCIPLE.

The following contribution was reviewed at the May 2024 interim meeting:

The modifications to Equations (178A-36) and (178A-37) are also influenced by the responses to comments #285 and #362.

Resolve using the response to comment #362.

[Editor's note: changed subclause to 178A.1.11.]

Comment Type: T  Comment Status: A  JM methodology MLSD_PAM

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.

Suggested Remedy:
Change 3/4 to (L-1)/L to make it general. Note that L=4 still yields 3/4. Please refer to contribution tbd.

Response: C  Response Status: C
ACCEPT IN PRINCIPLE.

The following contributions were reviewed at the May 2024 interim meeting:

The modifications to Equations (178A-36) and (178A-37) are also influenced by the responses to comments #285 and #362.

Resolve using the response to comment #362.

[Editor's note: changed subclause to 178A.1.11.]

Comment Type: TR  Comment Status: A  JM methodology MLSD_PAM

EQ (178A-37)

Suggested Remedy:
Update the equation per slide 4 of lim_3dj_02_2405, see also a marked version in the support data sheet.

Response: C  Response Status: C
ACCEPT IN PRINCIPLE.

Resolve using the response to comment #362.

[Editor's note: changed subclause to 178A.1.11.]

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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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 178A SC 178A.1.11.1 P660 L52 # 213
Shakiba, Hossein Huawei Technologies Canada

Comment Type T Comment Status A MLSD_PDF (bucket)
Although clear, the result of the PDF convolution conv[p(y),p(y/b1)] is a PDF and assumed to have been normalized to satisfy the PDF sum requirement.

SuggestedRemedy
Either mention that after convolution, the result should be normalized, or add a normalization coefficient of 1/b1 in font of conv.

Response Response Status C
ACCEPT IN PRINCIPLE.
On page 660, line 52, change "conv[p(y), p(y/b1)]" to "conv[p(y), p(y/b1)/|b1|]" where |a| is the absolute value of a.
In Equation (178A-39), change "p(y/(1-b1))" to "p(y/(1-b1))/|1-b1|".
Add a note that states that the operation p(y/a)/|a| scales random variable Y by a factor of a, and that the scaled probability distribution function integrates to 1.
Implement with editorial license.

Cl 178A SC 178A.1.11.1 P661 L1 # 214
Shakiba, Hossein Huawei Technologies Canada

Comment Type T Comment Status A MLSD_PDF (bucket)
Although clear, the result of the PDF convolution of equation (178A-39) is a PDF and assumed to have been normalized to satisfy the PDF sum requirement.

SuggestedRemedy
Either mention that after convolution, the result should be normalized, or add a normalization coefficient of 1/(1-b1) in font of conv.

Response Response Status C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #213.

Cl 179 SC 179.9.4 P309 L23 # 124
Sakai, Toshiaki Socionext

Comment Type T Comment Status A B-T filter BW
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..

SuggestedRemedy
Change 40GHz to TBD GHz.

Response Response Status C
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 # 388
Kocsis, Sam Amphenol

Comment Type T Comment Status A B-T filter BW
BT LP 3dB BW of "40GHz"

SuggestedRemedy
"TBD" as cited in other places of the document

Response Response Status C
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 179.9.3 P309 L14 # 387
Kocsis, Sam Amphenol

Comment Type T Comment Status R R_0
The reference impedance should match the system impedance, Rd as defined in COM spreadsheets.

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

Response Response Status C
REJECT.
Resolve using the response to comment #395.

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

CI 179 SC 179.9.4 Page 88 of 129 6/12/2024 1:37:22 PM
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6/12/2024 1:37:22 PM
### Comment 179 SC 179.9.4 P309 L23 #225

**Noujeim, Leesa**
**Google**

**Comment Type** T  **Comment Status** A  **B-T filter BW**

Adopted baseline https://www.ieee802.org/3/dj/public/24_01/ran_3dj_01a_2401.pdf has BT filter bandwidth as TBD but D1.0 has 40GHz. 3dB bandwidth of 40GHz is insufficient for 200Gbps/lane PAM4

**Suggested Remedy**

**Response**

**Response Status** C  **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.

---

### Comment 179 SC 179.9.4.7 P310 L25 #204

**Ran, Adee**
**Cisco**

**Comment Type** TR  **Comment Status** A  **Tx jitter**

"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"

**Response**

**Response Status** C  **ACCEPT IN PRINCIPLE.**

The CRG reviewed the editorial team's notes on slides 19-21 of https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01d_2406.pdf.

For the Transmitter output in Clause 178, Clause 179, and Annex 176D:
- Use the jitter parameter $J_{rms03}$ (measured only on the R03 and F30 transitions). With a maximum value of 0.023 UI.
- Use the jitter parameter $EOJ03$ (measured only on the R03 and F30 transitions). With a maximum value of 0.025 UI.
- Use the jitter parameter $J_{3u03}$ with maximum values of $0.106$ UI for class A, $0.108$ UI for class B for clause 178.
- Use the jitter parameter $J_{3u03}$ with maximum value of $0.115$ UI for host-low, $0.122$ for host-nom, $0.128$ for host-high for clause 179.
- Use the jitter parameter $J_{4u03}$ with maximum value of $0.118$ UI for class A, $0.120$ UI for class B for annex 176D.

Add editor's notes near each table, stating that the different values of $J_{3u03}/J_{4u03}$ are based on the assumption that the measured jitter is affected by the loss to the measurement point, and that further work related to this assumption is encouraged.

For Annex 176E:
- Use the jitter parameter $J_{rms03}$ (measured only on the R03 and F30 transitions).
- With a maximum value of 0.023 UI for both host output and module output.
- Use the jitter parameter $EOJ03$ (measured only on the R03 and F30 transitions).
- With a maximum value of 0.025 UI for both host output and module output.
- Use the jitter parameter $J_{4u03}$ with maximum values of 0.118 UI for Module output, 0.135 UI for Host output.

Add editor's notes near each table, stating that the different values of $J_{4u03}$ between host...
output and module output are based on the assumption that the measured jitter is affected by the loss to the measurement point, and not strongly affected by crosstalk in the connector, and that further work related to this assumption is encouraged.

Do not specify J6u03 at this time.

The following straw polls were taken:

Straw poll #E-3 (direction)
I would support using the same J3u03 limits for all CR transmitters regardless of the host class, and similarly the same limits for KR transmitter classes.
Y: 9 N: 10 A: 15

Straw poll #E-4 (decision)
I support using the JRMS03, EOJ03, and J4u03 for C2M host output and module output specifications.
Y: 13 N: 9 A: 12

Comment Type T  Comment Status R  ERL Tfx
Practical test fixtures may have discontinuities close to 0.2 ns 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 0.2 ns
SuggestedRemedy
Change text to “…Tfx equal to twice the delay between the test fixture connector and the test fixture host-facing connection minus 0.2 ns or as needed to remove test-fixture discontinuities from the ERL result”
Response  Response Status C
REJECT.

There are several comments on this topic. The editorial team prepared a proposal in slide 6 of https://www.ieee802.org/3/dj/public/24_06/ran_3dj_01a_2406.pdf.

Comments #227, #219 and #220 are about host ERL. In this case the existing specification of Tfx is suitable, although subtracting less than 0.2 ns may be appropriate in some cases. There was no consensus on how this should be specified.

Comments #218 and #221 are about module and cable assembly ERL. In this case the proposal may result in ambiguity in the definition of ERL. There was no consensus on making a change.

Additional study of this parameter and consensus building is encouraged.

SuggestedRemedy
in table 163-7 change TBD's as follows
Tr 0.005 ns
\( \text{kHz} \) 0 GHz
7x 0.618
N 1600 UI
Response  Response Status C
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 #29.

---

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

TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
SORT ORDER: Clause, Subclause, page, line
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<th>Comment</th>
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<td>179.9.5.3.3</td>
<td>320</td>
<td>18</td>
<td>TR</td>
<td>A</td>
<td>4th order Bessel-Thomson filter BW is TBD</td>
<td>Replace TBD with 62 GHz</td>
<td>C</td>
<td>Accept in principle. Resolve using the response to comment #60.</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>TR</td>
<td>A</td>
<td>B-T filter BW</td>
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<tr>
<td>179</td>
<td>179.11</td>
<td>326</td>
<td>21</td>
<td>TR</td>
<td>A</td>
<td>Minimum COM is TBD</td>
<td>Replace TBD with 3 dB in table 179.13 and in line 41 of page 330</td>
<td>C</td>
<td>Accept in principle. Resolve using the response to comment #250.</td>
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<td>T</td>
<td>R</td>
<td>ERL Tfx</td>
<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>C</td>
<td>Reject. Resolve using the response to comment #227.</td>
</tr>
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<td>179.11.1</td>
<td>326</td>
<td>27</td>
<td>T</td>
<td>A</td>
<td>Nominal characteristic impedance of the cable assembly is 100 ohms</td>
<td>Remove &quot;The nominal differential characteristic impedance of the cable assembly is 100 ohms&quot;</td>
<td>C</td>
<td>Accept in principle. 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.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>&quot;Nominal impedance&quot; is something for a datasheet not a spec. If someone wants to build a cable assembly with 95 ohm bulk cable and it passes the spec - that's OK.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>179</td>
<td>179.11.1</td>
<td>326</td>
<td>27</td>
<td>TR</td>
<td>A</td>
<td>Nominal impedance (bucket)</td>
<td>Delete &quot;The nominal differential characteristic impedance of the cable assembly is 100 ohms&quot;. Move the one remaining sentence into 179.11.1</td>
<td>C</td>
<td>Accept in principle. Resolve using the response to comment #216.</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 Type: T
Comment Status: A
Nominal impedance (bucket)
Nominal characteristic impedance of the cable assembly is "100-ohm"

Suggested Remedy:
Contributions to the task force have demonstrated the nominal characteristic impedance of the cable assembly is ~92-ohm

Response: C
ACCEPT IN PRINCIPLE.
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.

Comment Type: T
Comment Status: A
B-T filter BW
The maximum frequency of 40GHz is is insufficient for 200Gbps/lane PAM4

Suggested Remedy:

Response: C
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.

Comment Type: T
Comment Status: A
ERL Tfx
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

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"

Response: C
REJECT.
Resolve using the response to comment #227.

Comment Type: TR
Comment Status: A
COM pkg tau (bucket)
COM reference package parameter value. (transmission line parameter tau) in "Table 179-15" 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, (llim_3dj_01a_2311.pdf (page8-9)), the value is 6.141e-3. The value should be 6.141e-3 ns/mm.

Suggested Remedy:
Change t(tau) value in Table 179-15 (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.

Response: C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #118.
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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<th>L 28</th>
<th># 121</th>
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<tr>
<td>Sakai, Toshiaki</td>
<td>Socionext</td>
<td>Comment Type: T</td>
<td>Comment Status: A</td>
<td>COM pkg tau (bucket)</td>
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<td>Comment: COM reference package parameter value. (transmission line parameter tau)</td>
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</tr>
<tr>
<td>In &quot;Table 179-15&quot; class B package model Transmission line parameter t(tau) value is 6.14e-4 ns/mm, but based on the adopted motion#10, Nov/2024, (llim_3dj_01a_2311.pdf (page8-9), the value is 6.14e-3. The value should be 6.14e-3 ns/mm.</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Suggested Remedy: Change t(tau) value in Table 179-15 (class B package) from 6.14e-4 ns/mm to 6.14e-3 ns/mm. Or simply delete this row, as the t(tau) value in table 93A-3 is 6.14e-3 ns/mm.</td>
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<tr>
<td>Response: ACCEPT IN PRINCIPLE. Resolve using the response to comment #118.</td>
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<thead>
<tr>
<th>Cl 179</th>
<th>SC 179.11.7</th>
<th>P 331</th>
<th>L 42</th>
<th># 114</th>
</tr>
</thead>
<tbody>
<tr>
<td>Li, Tobey</td>
<td>MediaTek</td>
<td>Comment Type: T</td>
<td>Comment Status: A</td>
<td>R_0</td>
</tr>
<tr>
<td>Comment: Single-ended reference resistance R0 value in Table 179-16 is TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggested Remedy: Replace TBD with 50 Ohm</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Response: ACCEPT IN PRINCIPLE. Resolve using the response to comment #403.</td>
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<tr>
<th>Cl 179</th>
<th>SC 179.11.7</th>
<th>P 331</th>
<th>L 43</th>
<th># 62</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mellitz, Richard</td>
<td>Samtec</td>
<td>Comment Type: TR</td>
<td>Comment Status: A</td>
<td>R_0</td>
</tr>
<tr>
<td>(Table 179-16): 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.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggested Remedy: 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.</td>
<td></td>
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<tr>
<td>Response: ACCEPT IN PRINCIPLE. Resolve using the response to comment #35.</td>
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</tbody>
</table>
### Comment 179.11.7 - Page 332, Line 12

#### Comment Type: TR

**Receiver 3 dB bandwidth fr value in Table 179-16 is TBD**

**Suggested Remedy:**
Replace TBD with $0.58 \times f_r$

**Response:**
Accept in principle. Resolve using the response to comment #36.

---

### Comment 179.11.7 - Page 332, Line 12

#### Comment Type: TR

**The COM parameter values for the 200GBASE-CR1, 400GBASE-CR2, 800GBASE-CR4 and 1.6TBASE-CR8 PMDs are TBDs**

**Suggested Remedy:**
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:

- $f_r = 0.58$
- $c(-3) = 0$
- $c(-2) = 0$
- $c(-1) = 0$
- $c(0) = 1$
- $c(1) = 0$
- $A_v = 0.413$
- $A_fe = 0.413$
- $A_ne = 0.45$
- $\eta_0 = 6 \times 10^{-9}$
- $SNR_{TX} = 33$
- $\sigma_{RJ} = 0.01$
- $A_{DD} = 0.02$
- $R_{LM} = 0.95$
- $d_w = 5$
- $Nfix = 10$
- $N_g = 0$
- $N_f = 0$
- $N_{max} = 0$
- $b_{max}(1) = 0.85$
- $b_{min}(1) = 0$

- Additionally, set MLSE = 0 (not enabled)

**Response:**
Reject.

This comment was WITHDRAWN by the commenter.
The max/min values and step size of transmitter equalizer in Table 179-16 need to match those in the Table 17907 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

**Response**
- ACCEPT IN PRINCIPLE.
- Resolve using the response to comment #37.

**Comment Type** TR
**Comment Status** A
**COM TxFFE**

Transmitter differential peak output voltage in Table 179-16 is TBD

**Suggested Remedy**
- Replace Av with 0.413 V
- Replace Afe with 0.413 V
- Replace Ane with 0.608 V

**Response**
- REJECT.
- Resolve using the response to comment #38.

**Comment Type** TR
**Comment Status** R
**COM voltage parameters**

Transmitter transition time T_r value in Table 179016 is TBD

**Suggested Remedy**
- Replace TBD with Tr = 4 ps

**Response**
- REJECT.
- Resolve using the response to comment #42.

**Comment Type** TR
**Comment Status** R
**COM T_r**

One sided noise spectral density in Table 179016 is TBD

**Suggested Remedy**
- Replace TBD with 6e-9 V^2/GHz

**Response**
- REJECT.
- Resolve using the response to comment #269.

**Comment Type** TR
**Comment Status** R
**Multiple COM parameters**

Selecting values the “Receiver discrete-time equalizer parameters” are critical for making progress. Many presentations a have shown quite a variation. Select values based on what seems consistent or use straw ballot to determine.

**Suggested Remedy**
- use straw polls from the following
  - Dw 4, 6, or 8
  - Nfix 10, 15, 24
  - Ng 1, 2, 3
  - Ni 3, 4, 5
  - Nmax 40 60 120
  - Wmax(1)=1
  - Wmin(-1,0,1)=0, otherwise -0.5
  - bmax(1) = 0.5 0.75 0.85
  - bmin(1)= 0 -0.5 -0.75 -0.85

**Response**
- REJECT.
- Resolve using the response to comment #42.

**Comment Type** E
**Comment Status** A
**Figure 179A-1 and figure 179A-2 are not showing completely in my PDF file**

**Suggested Remedy**
- 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

<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Commenter</th>
<th>Suggested Remedy</th>
<th>Response</th>
<th>Response Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>179A</td>
<td>179A.2</td>
<td>662</td>
<td>6710</td>
<td>TR</td>
<td>A</td>
<td>Mellitz, Richard</td>
<td>Reference to a diagram with TP0d and TP5d is required. Add TP0d and TP5d to Figure 93B-1 and Table 93B-1.</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td>C</td>
</tr>
<tr>
<td>179A</td>
<td>179A.2</td>
<td>662</td>
<td>6710</td>
<td>T</td>
<td>A</td>
<td>Noujeim, Leesa</td>
<td>Doubling ILdd_(host+TFmax) implies both ends of the link have the same host designations. Replace &quot;2*ILdd_(host+TFmax)&quot; with &quot;ILdd_(host+TFmax)<em>end1 + ILdd</em>(host+TFmax)_end2&quot; or similar notation to accommodate asymmetric Link Configurations in Table 179A-3.</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td>C</td>
</tr>
<tr>
<td>179A</td>
<td>179A.7</td>
<td>668</td>
<td>9</td>
<td>E</td>
<td>A</td>
<td>Kocsis, Sam</td>
<td>&quot;TP0 and TP5&quot;</td>
<td>Change to &quot;TP0d and TP5d&quot;</td>
<td>ACCEPT IN PRINCIPLE.</td>
</tr>
</tbody>
</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
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:** A  **(bucket)**

_Incorrect Annex reference 120G_

**SuggestedRemedy**

Replace 120G with 176E

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

ACCEPT.

---

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

_Missing reference to Module compliance at TP1 and TP4_

**SuggestedRemedy**

Add "Module measurements for Modules specified in Annex 176E are made at TP1 and TP4 with test fixtures as specified in 179B.3."

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

ACCEPT IN PRINCIPLE.

---

**Comment Type:** TR  **Comment Status:** A  **ERL**

_scale ERL parameter form 0.3ck_

**SuggestedRemedy**

in table 178-14 change TBD's as follows

| 0.005 ns | 0 GHz | 0.618 | 1600 UI | 0 | 1 | 2e-5 |

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

ACCEPT IN PRINCIPLE.

It is assumed that, based on the subclause/page/line, the suggested remedy is asking to change Table 179B-1. Resolve using the response to comment #29.

---

**Comment Type:** T  **Comment Status:** A  **HCB and MCB (bucket)**

_SFPxxx is unclear_

**SuggestedRemedy**

Replace "The SFPxxx mated test fixture" with "The single-lane mated test fixture"

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

ACCEPT IN PRINCIPLE.

---

**Comment Type:** TR  **Comment Status:** A  **HCB and MCB (bucket)**

At least the symbol rate is known

**SuggestedRemedy**

set fb to 106.25 Gbd

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

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: A  MDI references (bucket)

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".

Response  Response Status: C  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.

Suggested Remedy

Comment Type: TR  Comment Status: A  MDI references (bucket)

Refer to the specification for each connector type where each is first mentioned. See another comment against 1.3 for the reference docs.

Response  Response Status: C  ACCEPT IN PRINCIPLE.

Resolve using the response to comment #506.

Suggested Remedy

Comment Type: E  Comment Status: A  "QSFP-DD800"

"QSFP-DD800"

Suggested Remedy
Change to "QSFP-DD1600"

Response  Response Status: C  ACCEPT IN PRINCIPLE.

Resolve using the response to comment #506.

Suggested Remedy

Comment Type: T  Comment Status: A  "QSFP-DD800"

This says "the mechanical interface". The mechanical spec is SFF-TA-1027, QSFP2. It is a standard, not an MSA.

Suggested Remedy
Change "the TBD MSA" to "SFF-TA-1027".

Response  Response Status: C  ACCEPT IN PRINCIPLE.

Resolve using the response to comment #506.

Suggested Remedy

Comment Type: T  Comment Status: A  "QSFP-DD/QSFP-DD800/QSFP-DD1600 Hardware Specification"

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".

Response  Response Status: C  ACCEPT IN PRINCIPLE.

Resolve using the response to comment #506.

Suggested Remedy

Comment Type: T  Comment Status: A  "the OSFP Octal Small Form Factor Pluggable Module specification" or "section 4 of the OSFP Octal Small Form Factor Pluggable Module specification".

Response  Response Status: C  ACCEPT IN PRINCIPLE.

Resolve using the response to comment #506.

Suggested Remedy

Comment Type: T  Comment Status: A  "OSFP1600"

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".

Response  Response Status: C  ACCEPT IN PRINCIPLE.

Resolve using the response to comment #506.
### Comment #146

**Type:** Precoding  
**Cl:** 180  
**SC:** 180.4  
**P:** 349  
**L:** 10  
**#:** 146  
**Author:** Ghiasi, Ali  
**Affiliation:** Ghiasi Quantum/Alcatel-Lucent

**Comment Type:** T  
**Comment Status:** A  
**Response Status:** C

Prior to 180.4.1 add section on 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.

**Response:**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #21.

---

### Comment #160

**Type:** ER  
**Cl:** 180  
**SC:** 180.4.1  
**P:** 350  
**L:** 13  
**#:** 160  
**Author:** Ghiasi, Ali  
**Affiliation:** Ghiasi Quantum/Alcatel-Lucent

**Comment Type:** ER  
**Comment Status:** A  
**Response Status:** C

**Suggested Remedy:**

A typo of ‘L3’ in figure 180-2, right side, 3rd channel output label.

**Response:**

ACCEPT IN PRINCIPLE.

Implement with editorial license and discretion.

---

### Comment #326

**Type:** TR  
**Cl:** 180  
**SC:** 180.6.1  
**P:** 353  
**L:** 33  
**#:** 326  
**Author:** Welch, Brian  
**Affiliation:** Cisco

**Comment Type:** TR  
**Comment Status:** A  
**Response Status:** C

**Suggested Remedy:**

In later 100GSP specifications (i.e., 100GBase-FR1), the difference between OMA(min) and Pave(min) was 3 dB, 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).

**Response:**

ACCEPT IN PRINCIPLE.

Change "Average launch power, each lane (min)" in Table 180-7 from -2.8 dBm to -3.3 dBm.

---

### Comment #517

**Type:** TR  
**Cl:** 180  
**SC:** 180.6.2  
**P:** 354  
**L:** 35  
**#:** 517  
**Author:** Dawe, Piers  
**Affiliation:** Nvidia

**Comment Type:** T  
**Comment Status:** A  
**Response Status:** C

**Suggested Remedy:**

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.

**Response:**

ACCEPT IN PRINCIPLE.

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."

---

**Type:** ER  
**Cl:** 180  
**SC:** 180.6.2  
**P:** 354  
**L:** 35  
**#:** 517  
**Author:** Dawe, Piers  
**Affiliation:** Nvidia

**Comment Type:** ER  
**Comment Status:** A  
**Response Status:** C

**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."

**Response:**

ACCEPT IN PRINCIPLE.

Change footnote e, to "No aggressors needed for 200GBase-DR1 in a single lane device."

---
Comment Type: T
Comment Status: A
power budget

Footnote b did not clarify what's the compisiton 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.

Response
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #127.

The power budget does not explicitly say what the penalty allocation is for MPI and DG.

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."

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

Comment Type: TR
Comment Status: R
optical channel specs

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.

Response
REJECT.
There is no xWDM in this PMD clause.

Comment Type: T
Comment Status: A
Connector labeling
To support breakout, loopback, and OAN/OLT connector should be labeled

Suggested Remedy
DR2-2 connector should be labeled as Tx1Tx2 ----- Rx2Rx1

Response
ACCEPT IN PRINCIPLE.
While the labeling modification as proposed was not part of the adopted Baseline Proposal for Optical Link Training "OLT", it is necessary to support the adopted baseline.

Implement suggested remedy with editorial license.

Comment Type: T
Comment Status: A
Connector labeling
To support breakout, loopback, and OAN/OLT connector should be labeled

Suggested Remedy
DR2-4 connector should be labeled as Tx1Tx2Tx3Tx4 ----- Rx4Rx3Rx2Rx1

Response
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #590.

Comment Type: T
Comment Status: A
Connector labeling
To support breakout, loopback, and OAN/OLT connector should be labeled

Suggested Remedy
DR2-8 connector should be labeled as Tx1Tx2Tx3Tx4Tx5Tx6Tx7Tx8 Rx8Rx7Rx6Rx5Rx4Rx3Rx2Rx1

Response
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #590.

Comment Type: TR
Comment Status: R
Connector labeling
To support breakout, loopback, and OAN/OLT connector should be labeled

Suggested Remedy
DR2-8 connector should be labeled as Tx1Tx2Tx3Tx4Tx5Tx6Tx7Tx8 Rx8Rx7Rx6Rx5Rx4Rx3Rx2Rx1

Response
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #590.

Comment Type: TR
Comment Status: R
Connector labeling
To support breakout, loopback, and OAN/OLT connector should be labeled

Suggested Remedy
DR2-8 connector should be labeled as Tx1Tx2Tx3Tx4Tx5Tx6Tx7Tx8 Rx8Rx7Rx6Rx5Rx4Rx3Rx2Rx1

Response
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #590.
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 180 SC 180.7.3.2 P361 L9 #338
Lambert, Angie Corning
Comment Type T Comment Status A IEC revision
IEC 61753-1-1 has been superseded by IEC 61753-1.

SuggestedRemedy
- Change "IEC 61753-1-1" to "IEC 61753-1-1".

Response Response Status C
ACCEPT IN PRINCIPLE.

- Change "IEC 61753-1-1" to "IEC 61753-1-1" in the PMD clause.

Add "IEC 61753-1, Fibre optic interconnecting devices and passive components - Performance standard - Part 1: General and guidance" to 1.3 Normative references.

With editorial license.

---

Cl 180 SC 180.7.3.4 P361 L50 #341
Lambert, Angie Corning
Comment Type T Comment Status A IEC revision
IEC 61753-021-2 has been superseded by IEC 61753-021-02.

SuggestedRemedy
- Change "IEC 61753-021-2" to "IEC 61753-021-2".

Response Response Status C
ACCEPT IN PRINCIPLE.

Resolve using the response to comment #339.

---

Cl 180 SC 180.8.5 P364 L23 #1
Johnson, John Broadcom
Comment Type T Comment Status A TDECQ
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.

SuggestedRemedy
- Add a new exception to the list in 180.8.5:
  "The optical return loss is as given in Table 180-6."

Response Response Status C
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.
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:

*nThe 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.*

**Comment Type:** TR/technical required  **Response Status:** C

**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.

**Response**  

**Response Status:** C  

**ACCEPT IN PRINCIPLE.**

Implement the suggested remedy with editorial license.

---

**Comment:** 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.

Gilab 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.

**Response**  

**Response Status:** C  

**ACCEPT IN PRINCIPLE.**

Implement slides 8 and 9 of the presentation with editorial license.
<table>
<thead>
<tr>
<th>Cl 180</th>
<th>SC 180.8.11</th>
<th>P365</th>
<th>L 52</th>
<th>#</th>
<th>13</th>
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</thead>
<tbody>
<tr>
<td>LeCheminant, Greg</td>
<td>Keysight Technologies</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Comment Status</th>
<th>RIN-OMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>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)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suggested Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>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</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response</th>
<th>Response Status</th>
<th>C</th>
</tr>
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<tbody>
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<td>ACCEPT IN PRINCIPLE. Resolve using the response to comment #518</td>
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<tr>
<th>Cl 180</th>
<th>SC 180.8.13</th>
<th>P366</th>
<th>L 26</th>
<th>#</th>
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<tbody>
<tr>
<td>Dawe, Piers</td>
<td>Nvidia</td>
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<th>Comment Type</th>
<th>Comment Status</th>
<th>Jitter (common)</th>
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<tbody>
<tr>
<td>More exceptions - I found these in 167.8.14</td>
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<table>
<thead>
<tr>
<th>Suggested Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>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).</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Response</th>
<th>Response Status</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>REJECT. The comment does not provide sufficient justification to support the suggested remedy.</td>
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<table>
<thead>
<tr>
<th>Cl 180</th>
<th>SC 180.9.1</th>
<th>P366</th>
<th>L 31</th>
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<tbody>
<tr>
<td>Lambert, Angie</td>
<td>Corning</td>
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<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>IEC revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 60950-1 has been superseded by IEC 62368-1.</td>
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<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
<td>Change &quot;IEC 60950-1&quot; to &quot;IEC 63268-1&quot;.</td>
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<thead>
<tr>
<th>Response</th>
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<th>C</th>
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<tbody>
<tr>
<td>ACCEPT IN PRINCIPLE. Change &quot;IEC 60950-1&quot; to &quot;IEC 63268-1&quot; in the PMD clause.</td>
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<tr>
<th>Cl 180</th>
<th>SC 180.10</th>
<th>P368</th>
<th>L 11</th>
<th>#</th>
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<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>bit number (bucket)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit number should match number of lanes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suggested Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change 1.9.4 to 1.9.n. Below, change 1.10.4 to 1.10.n. Similarly in other clauses.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Response</th>
<th>Response Status</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCEPT IN PRINCIPLE. Implement the suggested remedy with editorial license.</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
Comment Type: T, Comment Status: A, Editorial (bucket)

The PHY bracket in Figure 181-1 is shown encompassing the MDI layer, which isn't consistent with previous PMDs.

Suggested Remedy
Shorten the PHY bracket to exclude the MDI layer.

Response
Response Status: C
Accept in principle.
Implement the suggested remedy with editorial license.

Comment Type: T, Comment Status: A

Prior to 181.4 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 OTL, without OTL the optical transmitter should enable 1/(1+D) mod 4 precoding to mitigate burst error.

Response
Response Status: C
Accept in principle.
Resolve using the response to comment #21

Comment Type: TR, Comment Status: A

Total average launch power (max) in Table 181-5 is TBD for 800GBASE-FR4-500.

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).

Response
Response Status: C
Accept in principle.
Implement the suggested remedy with editorial license.
Cl 181 SC 181.6.1 P 378 L 23 # 8

Johnston, John

Broadcom

Difference in launch power between any two lanes (OMAouter) (max) in Table 181-5 is TBD for 800GBASE-FR4-500.

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).

Response

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

Cl 181 SC 181.6.2 P 380 L 18 # 163

Yu, Rang-chen

InnoLight

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

Response

ACCEPT IN PRINCIPLE.

In Table 181-6, change the value for "Average receive power, each lane (min)" to -5.7.

Cl 181 SC 181.6.2 P 380 L 21 # 10

Johnston, John

Broadcom

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)

Response

ACCEPT IN PRINCIPLE.

Implement the 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 comment

Yu, Rang-chen
InnoLight

Comment Type T
Comment Status A

DGDmax (in Table 181-8) probably used DGDmean=0.8ps, it should be 2.24ps refer to 802.3df DR series.

Suggested Remedy
Recommend change to 2.24ps

Response Response Status C
ACCEPT IN PRINCIPLE.

Implement proposed remedy with editorial license.

LeCheeminant, Greg
Keysight Technologies

Comment Type T
Comment Status A

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. 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

Response Response Status C
ACCEPT IN PRINCIPLE.
Resolves using the response to comment #17

Ferretti, Vince
Corning

Comment Type TR
Comment Status A

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.

Response Response Status C
ACCEPT IN PRINCIPLE.
Implement suggested remedy.
Implement the same change in clause 183.7.1.

With editorial license

Lambert, Angie
Corning

Comment Type T
Comment Status A

IEC 61753-021-2 has been superseded by IEC 61753-021-02.

Suggested Remedy
Change "IEC 61753-021-2" to "IEC 61753-021-02".

Response Response Status C
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #339.

Johnson, John
Broadcom

Comment Type T
Comment Status A
Reference (bucket)

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.

Response Response Status C
ACCEPT IN PRINCIPLE.
Implement the 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

<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR</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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### Response Status: C

<table>
<thead>
<tr>
<th>Comment Status</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>ACCEPT IN PRINCIPLE.</td>
</tr>
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</table>

### Comment #325

Comment Type: TR

Comment Status: A

Suggested Remedy

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.

Response Status: C

Response

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #324.

---

### Comment #207

Comment Type: T

Comment Status: A

Suggested Remedy

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 "CM1".

Suggested Remedy

In the minimum column replace "-2.94" with "0.0115 x ? x [1-(1324/?)^4]". In the maximum column replace "1.66" with "0.0115 x ? x [1-(1300/?)^4]". These are the same values as in Table 151-12 with the coefficient divided by 4.

Response Status: C

Response

ACCEPT IN PRINCIPLE.

Implement suggested remedy with editorial license.

Note that "?" in the suggested remedy is the lambda symbol.

---

### Comment #301

Comment Type: TR

Comment Status: A

Suggested Remedy

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

Response Status: C

Response

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #518

---

### Comment #302

Comment Type: TR

Comment Status: A

Suggested Remedy

Delete the acronym IMDD.

Response Status: C

Response

ACCEPT.

---

### Comment #303

Comment Type: TR

Comment Status: A

Suggested Remedy

Delete the acronym IMDD.

Response Status: C

Response

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: TR  Comment Status: A  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.

Response
Response Status: C
ACCEPT.

Comment Type: TR  Comment Status: A  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.

Response
Response Status: C
ACCEPT.

Comment Type: T  Comment Status: A  Precoding
The PHY bracket in Figure 182-1 does not encompass the PMD layer, which isn't consistent with previous PMDs.

Suggested Remedy
Lengthen the PHY bracket to include the PMD layer.

Response
Response Status: C
ACCEPT IN PRINCIPLE.
Implement the 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** T  **Comment Status** A  **Marker**  power 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 TBD dB, DGD and MPI 0.4dB" to footnote b.

**Response**

Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #128 with the exception that the value is 0.4dB and not 0.5dB.

Implement with editorial license.

**Comment Type** TR  **Comment Status** A  **Marker**  optical channel specs

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.

**Response**

Response Status C

REJECT.

There is no xWDM in this PMD clause.

**Comment Type** T  **Comment Status** A  **Marker**  IEC revision

IEC 61753-1-1 has been superseded by IEC 61753-1.

**Suggested Remedy**

Change "IEC 61753-1-1" to "IEC 61753-1-1".

**Response**

Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #339.
Comment Type  T  Comment Status  A  Connector labeling  
To support breakout, loopback, and OAN/OLT connectro should be labled

SuggestedRemedy  
DR2-8 connector should be labled as Tx1Tx2Tx3Tx4Tx5Tx6Tx7Tx8
Rx8Rx7Rx6Rx5Rx4Rx3Rx2Rx1

Response  Response Status  C  
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #590.

Comment Type  T  Comment Status  A  
IEC 61753-021-2 has been superseded by IEC 61753-021-02.

SuggestedRemedy  
Change "IEC 61753-021-2" to "IEC 61753-021-02".

Response  Response Status  C  
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #399.

Comment Type  T  Comment Status  A  
IEC 61753-1-1 has been superseded by IEC 61753-1.

SuggestedRemedy  
Change "IEC 61753-1-1" to "IEC 61753-1".

Response  Response Status  C  
ACCEPT IN PRINCIPLE.
Resolve using the response to comment #338.
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 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.”

**Response**
Accept in principle.

---

Currently 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 121.8.5.1 with contents along the lines of 124.8.5.1 from 802.3df with the same compliance channel. Develop with editorial license.

**Response**
Accept in principle.

---

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.

**Response**
Accept in principle.

---

IEC 60950-1 has been superseded by IEC 62368-1.

**Suggested Remedy**
Change “IEC 60950-1” to “IEC 63268-1.”

**Response**
Accept in principle.

---

**Response Status**: C
Accept in principle.

---

**Response Status**: C
Accept in principle.

---

**Response Status**: C
Accept in principle.

---

**Response Status**: C
Resolve using the response to comment #17.

---

**Response Status**: C
Accept in principle.

---

**Response Status**: C
Accept in principle.

---

**Response Status**: C
Accept in principle.

---

**Response Status**: C
Accept in principle.

---

**Response Status**: C
Resolve using the response to comment #17.

---

**Response Status**: C
Accept in principle.

---

**Response Status**: C
Accept in principle.

---

**Response Status**: C
Accept in principle.

---

**Response Status**: C
Accept in principle.

---

**Response Status**: C
Accept in principle.

---

**Response Status**: C
Resolve using the response to comment #17.

---

**Response Status**: C
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

Maki, Jeffery  
Juniper Networks

Comment Type: TR  Comment Status: A  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.

Response  
Response Status: C
ACCEPT.

Ghiasi, Ali  
Ghiasi Quantum/Marvell

Comment Type: T  Comment Status: A  Precoding
Prior to 183.4 add section for PMA function to support precoder to mitigate burst errors

Suggested Remedy  
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.

Response  
Response Status: C
ACCEPT IN PRINCIPLE.
Resolve using response to comment #547.

Johnson, John  
Broadcom

Comment Type: T  Comment Status: A  TX specs
Total average launch power (max) in Table 183-6 is TBD for 800GBASE-FR4.

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.

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

Yu, Rang-chen  
InnoLight

Comment Type: TR  Comment Status: A  TX specs
Recommended relationship between 'Tx_OMAout (min)' and 'Tx_Pavg (min)' for 800G LR4 (in Table 183-6) should follow 400G LR4-6, with delta equal to 3dB, assuming max. OER infinite.

Suggested Remedy  
With 'OMAout (min)'=1.9dBm, then 'Average launch power, each lane' for 800G LR4 in Table 183-6 should be changed to -1.1dBm.

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

In Table 183-6 for LR4 change "Average launch power, each lane (min)" from -0.9 to -1.1

In Table 183-6, add a footnote to the value "-1.1" on the row for "Average launch power, each lane (min)" with the following text:  
"Average launch power of -1.1 dBm corresponds to an OMA of 1.9 dBm with an infinite extinction ratio."

With editorial license.
In later 100G PGL specs (ie, 400GBASE-FR4) 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 2.6 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 183-6 from -1.8 dBm 
to -2.2 dBm.

**Response**

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #164.

---

The TX must be compliant over the full range of fiber length (dispersion), so the use of 
TDECQ alone is insufficient to determine Outer Optical Modulation Amplitude (OMAouter), 
each lane 
(min) in Table 183-6 for 800GBASE-FR4/LR4.

**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. 
For consistency, replace "Equation 183-1" with "0.5 + max(TECQ, TDECQ)" in Table 183- 
6, and delete Equation 183-1 on page 435, line 20. Also update Figures 183-3, 183-5, 183- 
6 and surrounding text with max(TECQ, TDECQ).

**Response**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

---

The 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/Ln clauses (122, 151).

**Response**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with editorial license.

---

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 183û7 should be -1.1dBm-6.3dB=-7.4dBm

**Response**

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.

---

The delta between 'Tx_Pavg(min)' and 'Rx_Pavg(min)' for 800G FR4 should equal to 
'Channel insertion loss' (4.0dB for FR4)

**Suggested Remedy**

Rx_Pavg (min)' in Table 183û7 should be -2.2dBm-4.0dB=-6.2dBm

**Response**

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/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**
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)

**Response**
Implement the suggested remedy with editorial license.

Adding explanation on allocation for penalties calculation.

**Suggested Remedy**
Use same approach than for the inserion 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".

**Response**
Implement suggested remedy with editorial license.

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 800G-LR4 including penalties due to dispersion 3.9dB, DGD 0.7dB and MPI 0.4dB" to footnote e.

**Response**
Resolve using the response to comment #502.

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.

**Response**
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](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.

**Response**
ACCEPT IN PRINCIPLE.
Implement the suggested remedy with editorial license.
Comment Type: T  Comment Status: A

Clause 183.7.2 is TBD.

SuggestedRemedy

Use the same text as given in 182.7.2: "An optical fiber connection, as shown in Figure 183/7, consists of a mated pair of optical connectors." Since this is a basic definition of terms, it should not be controversial.

Response

ACCEPT IN PRINCIPLE.

Implemet the suggested remedy with editorial license.

Comment Type: T  Comment Status: A

IEC 61753-021-02 has been superseded by IEC 61753-021-02.

SuggestedRemedy

Change "IEC 61753-021-2" to "IEC 61753-021-02".

Response

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #339.

Comment Type: T  Comment Status: A

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)

SuggestedRemedy

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

Response

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #518
Cl 184 SC 184.1.1 P 441 L 8 # 308
Bruckman, Leon Huawei
Comment Type TR Comment Status A General (Bucket)
The Inner FEC as defined, includes the PMA. Shall make this clear to the reader
SuggestedRemedy
Either add sentence: "This Inner FEC sublayer includes functionality often associated with the PMA sublayer", or split the PMA function
Response Response Status C
ACCEPT IN PRINCIPLE.
Improve the following with editorial license,
Add sentence: "This Inner FEC sublayer includes functionality often associated with the PMA sublayer at the PMD service interface".
Add similar text to the appropriate sub clause in clause 177
[Editor's note: CC 184, 177]

Cl 184 SC 184.2 P 443 L 7 # 57
Huber, Thomas Nokia
Comment Type T Comment Status R General (Bucket)
Other diagrams of this type do not have dashed boxes around the transmit and received processes.
SuggestedRemedy
For consistency with the rest of the document, remove the dashed boxes
Response Response Status C
REJECT.
The dashed boxes clearly denote the transmit and receive functions. Removing the dashed boxes does not improve clarity of the draft.

Cl 184 SC 184.4 P 445 L 22 # 184
Brown, Matt Alphawave Semi
Comment Type T Comment Status A Reorder (Bucket)
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.
SuggestedRemedy
When describing the process applied to each PCS lane in each direction, use the word "flow" rather than "lane".
Response Response Status C
ACCEPT IN PRINCIPLE.
Implement the 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

**Cl 184 SC 184.4.1**

Loewenthal, Arnon
alphawave semi

Comment Type: T  Comment Status: A  Functional (bucket)

Need to further define the deskew requirement. For now it is defined as optional. In practice full deskew is optional, but doing 10b alignment of RS symbols is mandatory.

**SuggestedRemedy**

Replace lines 8-18 with the requirement of partial deskew, which means 10b RS symbols resolution deskew.

Response  Response Status: C

ACCEPT IN PRINCIPLE.

Implement the following with editorial license.

In the first paragraph of clause 184.4.1 delete ", when implemented," and delete the second paragraph

**Cl 184 SC 184.4.2**

Huber, Thomas
Nokia

Comment Type: T  Comment Status: A  Functional (bucket1p)

There are always many implementation options, but we don't have to describe them in the document, we just have to describe the behavior that is required.

**SuggestedRemedy**

Delete "when implemented" from the first sentence, and delete the second paragraph.

Response  Response Status: C

ACCEPT IN PRINCIPLE.

In the first paragraph of clause 184.4.1 delete ", when implemented," and delete the second paragraph with editorial license.

**Cl 184 SC 184.4.1**

Huber, Thomas
Nokia

Comment Type: T  Comment Status: A  Functional (Bucket)

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.

**SuggestedRemedy**

Either explain why this mapping process is needed, or delete it.

Response  Response Status: C

ACCEPT IN PRINCIPLE.

Add text to explain the purpose of this mapping.

Implement with editorial license.

---

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
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 reorder function shall reorder the PCS lanes according to the PCS lane number."

**Response**  
ACCEPT.

---

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."

**Response**  
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.

**Response**  
ACCEPT IN PRINCIPLE.

---

This 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.

**Response**  
ACCEPT IN PRINCIPLE.

---

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.

**Response**  
ACCEPT IN PRINCIPLE.

---

Delete the last paragraph.

**Response**  
ACCEPT IN PRINCIPLE.

---

Move the pseudo-code before Figure 184-3.

**Response**  
ACCEPT IN PRINCIPLE.

---

Update Figure 184-3 to make it more clear per the suggested remedy and remain consistent with the pseudocode.

**Response**  
ACCEPT IN PRINCIPLE.
The algorithm is unnecessarily complex. There is no need for bit-level detail since the operation is performed on 160-bit entities. Per figure 184-3, it's essentially receiving as input alternating sets of 160 bits from flow0 and flow1, and changing the order from 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1 to 0, 1, 0, 1, 1, 0, 1, 0.

**Suggested Remedy**
A minimal change would be to state that the algorithm operates on 10-bit symbols, delete the for j à loop and its terminator, and replace “10i+j” with “I” in the statement that describes the permutation.

Another option would be to rewrite the description around the 160-bit entities as described, and perhaps also change the figure to show those instead of 40-bit entities (which as noted in a previous comment seem to have no relevance to this process, or to the convolutional interleaver process that follows it).

**Response**
REJECT.

The algorithm is correct and unambiguous as written, and reflects the adopted baseline. There is sympathy for the direction of the suggested remedy; however, a more complete consensus proposal would be needed to change the current description.

---

The description of the convolutional interleaver process could be improved. The variable i is used in the first part of the subclause as an index for the delay lines and as an indication of time within a sequence. Then at the bottom of page 447 it's used a symbol index.

**Suggested Remedy**
Revise the list above the figure to read as follows, eliminating the overloading of the index i and improving the clarity a bit (and change the figure to label the lines as b=0, b=1, b=2):-

- a) The input and output switches are always aligned to the same row b, where b = 0 to 2
- b) a block of 40 bits is read from row b
- c) The contents of row b are shifted to the right by 40 bits
- d) A block of 40 bits is written to row b
- e) The switch position is updated to (b+1) mod 3

**Response**
ACCEPT IN PRINCIPLE.

Resolve using the response to comment #613

---

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.

**Response**
ACCEPT IN PRINCIPLE.

Resolve using the response to comment #613
For perm[p, 40x(i-18x i mod 3)+j], the column index 40x(i-18x i mod 3)+j may be a negative value.

Suggested Remedy

Suggest to add one sentence after Line 9: When 40x(i-18x i mod 3)+j is negative, perm[p, 40x(i-18x i mod 3)+j] will be undetermined value from initial buffer of the convolutional interleaver.

Response

Accept in principle.

Implement the following with editorial license.

Add the following sentence after Line 9: "When 40x(i-18x i mod 3)+j is negative, perm[p] is undefined."

---

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 is 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.

Suggested Remedy

Change the line above the dashed list to say "The BCH encoding is done separately on each lane. The encoding of each BCH codeword u is defined as follows:

At the top of page 449, remove the 'for pà' loop from the pseudocode.

Response

Accept in principle.

The algorithm is correct as written, and reflects the adopted baseline. However, "p" is used for another purpose in the previous subclause.

Change the flow index from p to q and implement with editorial license.

---

Clarify that the circular shift is applied per lane.

Suggested Remedy

Make similar changes to what was suggested in previous sections - remove the unnecessary variable p and associated for loop in the pseudocode, and add a sentence stating that the circular shift process is performed on each lane individually.

Response

Reject.

The algorithm is correct and unambiguous as written, and reflects the adopted baseline.
The DSP frame should probably be a level 3 clause of its own, rather than a sub-clause under BCH interleaver.

**Suggested Remedy:**
Change to a level 3 heading

**Response:**  
ACCEPT IN PRINCIPLE.

The "BCH interleaver" function includes the pilot insertion. Change clause 184.4.7 title to: BCH interleaver and pilot insertion

Implement with editorial license.

---

**Comment:**
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>, are between pilot symbols has 64 4-bit blocks.

**Suggested Remedy:**
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.

**Response:**  
ACCEPT IN PRINCIPLE.

Implement suggested remedy with editorial license.

---

**Comment:**
The first sentence of the second paragraph could be written more clearly.

**Suggested Remedy:**
Replace with "Two streams of DSP frames, one for each polarization, are generated by the inner FEC."

**Response:**  
ACCEPT.

---

**Comment:**
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.

**Response:**  
ACCEPT.

---

**Comment:**
The editor's note suggesting that the mapping to analog signals probably belongs in the PMD clause seems to make sense, in which case this clause is really not "DP-16QAM mapping", it's really just mapping to 4-level signals, which the PMD will then turn into DP-16QAM.

**Suggested Remedy:**
Change the title to "4-level signal mapper", and make the corresponding change in 184.5.3.

**Response:**  
ACCEPT IN PRINCIPLE.

After the first sentence of subclause 184.4.9 add: "This four-level signals are used by the 800GBASE-LR1 PMD to generate a single optical DP-16QAM signal with orthogonal polarizations (see 185.4.2)."

Implement with editorial license.
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)

**Response**

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.

---

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**

Revise to say: The signals Rx_Xi, Rx_XQ, Rx_Yi, and Rx_YQ each represent one of the corresponding Tx_Xi, Tx_XQ, Tx_Yi, Tx_YQ signals from the transmitting PMD. The association between Tx and Rx components is arbitrary (e.g., Rx_Xi can be any of the 4 Tx components).

**Response**

REJECT.

This comment was WITHDRAWN by the commenter.
Cl 184 SC 184.6.5 P 462 L 3 # 307
Bruckman, Leon Huawei

Comment Type TR Comment Status A

Set TBD values of N and M

SuggestedRemedy
Set N=12, M=8. See contribution bruckman_3dj_01_241205

Response Response Status C
ACCEPT IN PRINCIPLE.
The following presentation (referenced in the suggested remedy) was reviewed by the 802.3dj task force at the May Interim meeting: https://www.ieee802.org/3/dj/public/24_05/bruckman_3dj_01a_2405.pdf
Implement the suggested remedy with editorial license.

Cl 184 SC 184.6.5 P 462 L 9 # 559
Law, David HPE

Comment Type T Comment Status A

The LOCK_INIT state in Figure 184.9 '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 184.9.
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.

SuggestedRemedy
Change 'test_sym <= false' to read 'test_ps <= false'.

Response Response Status C
ACCEPT.

Cl 184 SC 184.6.5 P 462 L 22 # 560
Law, David HPE

Comment Type T Comment Status A

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.

SuggestedRemedy
[1] Insert a new subclause 184.6.5 'Constants' as follows, renumbering the following subclause.

184.6.5 Constants
- M The number of consecutive PS symbols that fail to 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).

[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.

Response Response Status C
ACCEPT IN PRINCIPLE.
In the first paragraph of clause 184.5.4 remove: "The values of N and M are TBD."
Insert new subclause 184.6.5 "Constants" after subclause 184.6.4 as follows, renumbering the subsequent subclause:

184.6.5 Constants
- M The number of consecutive PS symbols that fail to match the expected value for a given polarization stream required to exit frame lock (see 184.5.4). M = 8.
- 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). N=12.

In subclause 184.6.2 "Variables", change the text for "restart_lock" from:
### 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

"It is set to true when TBD PS symbols ..." to: "It is set to true when M PS symbols ..."

**Implement with editorial license.**

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<td>E</td>
<td>A (editorial)</td>
<td>The variable 'alignment_status' used in the LOSS_OF_ALIGNMENT and ALIGNMENT_ACQUIRED states is misspelt.</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td>C</td>
</tr>
<tr>
<td>E</td>
<td>A</td>
<td>Suggest that 'alignnment_status' should read 'alignment_status'.</td>
<td>Implement with editorial license and discretion.</td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>A</td>
<td>Only &quot;alignment_valid&quot; is reported, not individual &quot;dsp_lock&lt;x&gt;&quot; variables.</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td>C</td>
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<tr>
<td>TR</td>
<td>A</td>
<td>It is recommended to report both &quot;dsp_lock&lt;x&gt;&quot; in table 184-7, as we did for PCS lane lock where we reported &quot;Lane x aligned&quot; for all PCS lanes.</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td>C</td>
</tr>
<tr>
<td>TR</td>
<td>A</td>
<td>Clause 185 needs to be updated to reflect these layers.</td>
<td>Baseline Proposal in <a href="https://www.ieee802.org/3/dj/public/23_07/kota_3dj_01a_2307.pdf">https://www.ieee802.org/3/dj/public/23_07/kota_3dj_01a_2307.pdf</a> shows support for 800GAUI's.</td>
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---

**Comment from D’Ambrosia, John**

**Futurewei, U.S. Subsidiary of Huawei**

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

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 C2M, 800GAU-B SM-PMA, 800GAU-I4 C2C, and 800GAU-I4 C2M.


**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 C2M - optional
- 800GBASE SM-PMA - conditional
- 800GAU-I4 C2C - optional
- 800GAU-I4 C2M - optional

Add note: "C = Conditional, 800GBASE-R BM-PMA is conditional, pending implementation of 800GBASE-R SM-PMA is conditional, pending implementation of 800GAU-I4 C2C/C2M".

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 800BASE-R PMA Sublayer and service interface between the PCS and Inner FEC.

**Response** 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 C2M - optional
- 800GBASE SM-PMA - conditional
- 800GAU-I4 C2C - optional
- 800GAU-I4 C2M - optional

Resolve the concern about conditional SM-PMA and BM-PMA related to Table 185-1 using the response to comment #317.

**Implement with editorial license.**
The TBDs need to be replaced by values. Follow the same methodology as in 154 and latest draft D3.0 of P802.3cw

SuggestedRemedy
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.

Response
ACCEPT IN PRINCIPLE.
Implement the suggested remedy and update Table 169-4 with editorial license.

The specification should have a Tx clock noise defined.

SuggestedRemedy
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

Response
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.

SuggestedRemedy
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]

Response
ACCEPT IN PRINCIPLE.
The following presentation was reviewed by the 802.3dj task force at the May Interim meeting:

No agreement yet on an appropriate quality metric therefore no consensus to make a change.
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<td>Minimum transmit power specification has a big impact on coherent module designs. This has been defined in the initial proposals as a specification on the average power following other coherent physical layer specifications defined for DWDM systems. However, there is opportunity for a 800GBASE-LR1 PMD to change this in a way which can relax module transmit specifications</td>
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<td>SuggestedRemedy</td>
<td></td>
<td>Define the minimum transmit power specification to be defined per lane instead of average. See <a href="https://grouper.ieee.org/groups/802/3/dj/public/23_11/kota_3dj_01a_2311.pdf">https://grouper.ieee.org/groups/802/3/dj/public/23_11/kota_3dj_01a_2311.pdf</a> for an initial proposal based on this concept. Defining the power per lane provides an opportunity to relax lane mismatch specs.</td>
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<td>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</td>
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<tr>
<td>SuggestedRemedy</td>
<td></td>
<td>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 <a href="https://grouper.ieee.org/groups/802/3/dj/public/23_11/kota_3dj_01a_2311.pdf">https://grouper.ieee.org/groups/802/3/dj/public/23_11/kota_3dj_01a_2311.pdf</a> for an initial specification methodology proposal.</td>
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<td>A value of -27dB is appropriate for Maximum discrete reflectance</td>
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<td>SuggestedRemedy</td>
<td></td>
<td>Replace TBD in Table 185-7 with -27</td>
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<td>A value of 24dB is appropriate for Optical Return Loss</td>
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<td>Replace TBD in Table 185-7 with 24</td>
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<td>Response</td>
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<td>ACCEPT.</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
### Comment Type: TR
#### Comment Status: A

IEC 61753-021-2 has been superseded by IEC 61753-021-02.

**Suggested Remedy:**

Change "IEC 61753-021-2" to "IEC 61753-021-02".

**Response:**

ACCEPt IN PRINCIple. Resolve using the response to comment #339.

---

### Comment Type: TR
#### Comment Status: A

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".

**Suggested Remedy:**

Change "pattern description" column in Table 185-9 to "Scrambled idle procedd by 800GBASE-R PCS and then encoded by the 800GBASE-LR1 Inner FEC".

**Response:**

ACCEPt IN PRINCIple.

---

### Comment Type: TR
#### Comment Status: A

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.

**Response:**

ACCEPt IN PRINCIple. Implement suggested remedy with editorial license.

---

### Comment Type: T
#### Comment Status: A

IEC 61753-021-2 has been superseded by IEC 61753-021-02.

**Suggested Remedy:**

Change "IEC 61753-021-2" to "IEC 61753-021-02".

**Response:**

ACCEPt IN PRINCIple. Resolve using the response to comment #339.

---

### Comment Type: TR
#### Comment Status: A

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:**

REJECT.

The suggested remedy does not provide sufficient detail to implement.
### 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>
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<tr>
<td>186</td>
<td>186</td>
<td>491</td>
<td>1</td>
<td>108</td>
<td>T</td>
<td>A</td>
<td>(bucket)</td>
<td>The baseline for the 800GBASE-ER1[-20] PCS has issues with PTP accuracy when an extender sublayer is used.</td>
<td>Accept in Principle.</td>
<td>C</td>
<td>A</td>
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<td>Update baseline per presentations in the May meeting proposing a mechanism to reduce the PTP inaccuracy.</td>
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<td>Update baseline per presentations in the May meeting proposing a mechanism to reduce the PTP inaccuracy.</td>
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<td>187</td>
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<td>17</td>
<td>109</td>
<td>T</td>
<td>A</td>
<td>RX specs</td>
<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>
<td>Accept.</td>
<td>C</td>
<td>A</td>
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<td></td>
<td>For Receiver reflectance (max) replace TBD by 20 dB for both ER1-20 and ER1</td>
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<tr>
<td>187</td>
<td>187.3</td>
<td>497</td>
<td>31</td>
<td>115</td>
<td>T</td>
<td>A</td>
<td>Delay</td>
<td>The TBDs need to be replaced by values. Follow the same methodology as in 154 and latest draft D3.0 of P802.3cw</td>
<td>Accept in Principle.</td>
<td>C</td>
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<td>Replace contents by The sum of the transmit and receive delays at one end of the link contributed by the 800BASE-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.</td>
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<td>187.5.1</td>
<td>501</td>
<td>8</td>
<td>109</td>
<td>T</td>
<td>A</td>
<td>TX specs</td>
<td>The ppm value for this PMD should be 20 ppm</td>
<td>Accept.</td>
<td>C</td>
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<td>Replace TBD by 20 ppm</td>
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<td>TX specs</td>
<td>The ppm value for this PMD should be 20 ppm</td>
<td>Accept in Principle.</td>
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<td>Replace TBD by 20 ppm</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
Comment Type  T  Comment Status  A  optical channel specs
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

Suggested Remedy
Replace "Positive dispersion (max)" by "Chromatic dispersion (max)" with value 400 ps/nm for ER1-20 and 800 ps/nm for ER1. Replace "Negative dispersion (min)" by "Chromatic dispersion (min)" with value 0 ps/nm for both ER1-20 and for ER1.

Response  Response Status  C
ACCEPT IN PRINCIPLE. Implement suggest remedy with editorial license.

Comment Type  T  Comment Status  A  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".

Response  Response Status  C
ACCEPT IN PRINCIPLE. Resolve using the response to comment #339.

Comment Type  T  Comment Status  A  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".

Response  Response Status  C
ACCEPT IN PRINCIPLE. Resolve using the response to comment #339.