

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI **FM** SC **FM** P**8** L**41** # **I-45**
 McClellan, Brett Marvell Semiconductor, Inc.
 Comment Type **E** Comment Status **X**
 typo
 SuggestedRemedy
 change 'Mcclellan' to 'McClellan'
 Proposed Response Response Status **O**

CI **0** SC **0** P**14** L**1** # **I-68**
 Maguire, Valerie Copperopolis
 Comment Type **E** Comment Status **X**
 IEEE Std 802.3da has published
 SuggestedRemedy
 Replace "20xx" with "2026"
 Proposed Response Response Status **O**

CI **1** SC **1.2** P**56** L**33** # **I-54**
 Brown, Matthew Qualcomm
 Comment Type **ER** Comment Status **X**
 The definition of the 1.6TMII reads as follows:
 1.6 Tb/s Media Independent Interface (1.6TMII). The 1.6TMII is designed to connect a 1.6 Tb/s capable MAC to a 1.6 Tb/s PHY. The 1.6TMII is a logical interface intended for use as an intra-chip interface. No mechanical connector is specified for use with the 1.6TMII. The 1.6TMII is optional."
 It is defined as a "logical interface intended for use as an intra-chip interface". It is rather obvious that no "mechanical connect" would be defined. I believe this is a carry-over from earlier xMII interfaces where a physical interface was defined (e.g., XGMII, see 46.5 XGMII electrical characteristics).
 SuggestedRemedy
 Delete "No mechanical connector is specified for use with the 1.6TMII."
 Proposed Response Response Status **O**

CI **1** SC **1.3** P**57** L**9** # **I-31**
 Brown, Matthew Qualcomm
 Comment Type **E** Comment Status **X**
 The following normative reference is never referenced in the draft:
 "SFF-8665, Rev 1.9.11, July 11, 2025, QSFP+ 4X Pluggable Transceiver Solutions."
 SuggestedRemedy
 Delete this reference or alternately move to bibliography if there is a desire to keep it in the draft as informative information.
 Alternately, if the lack of reference was an oversight then add the reference where needed.
 Proposed Response Response Status **O**

CI **1** SC **1.3** P**57** L**17** # **I-323**
 Kocsis, Sam Amphenol Corporation
 Comment Type **TR** Comment Status **X**
 A reference specifications for SFP224 has not been made available to the Task Force.
 Remove references to SFP224, SFF-TA-1031 and remove editors note.
 SuggestedRemedy
 Remove references to SFP224 to SFF-TA-1031 and remove editors note.
 Proposed Response Response Status **O**

CI **45** SC **45.2** P**76** L**45** # **I-364**
 Slavick, Jeff Broadcom Inc
 Comment Type **TR** Comment Status **X**
 The register address for Reserved section after 1.1478 appears to be a typo for the first address.
 SuggestedRemedy
 Change "1.4479 through 1.1499" to "1.1479 through 1.1499"
 Proposed Response Response Status **O**

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Cl 45 SC 45.2.1 P77 L 32 # I-1

Marris, Arthur

self

Comment Type T Comment Status X

All of the registers from 1.2412 through 1.2436 are for lane 0 only and there are equivalent registers for lanes 1 through 7 in the range 1.2437 through 1.2611. However, only the last two counters have "lane 0" in their names. However all the registers should have "lane 0" in their names to make it clear that there are equivalent registers following on for the other lanes for all of them.

SuggestedRemedy

Add "lane 0" in the register name for registers 1.2412 through 1.2423

Proposed Response Response Status O

Cl 45 SC 45.2.1 P77 L 52 # I-2

Marris, Arthur

self

Comment Type TR Comment Status X

The range of the "IFEC symbol error counter, lane 16 to 31" registers should be "1.2770 through 1.2801" rather than "1.2770 through 1.2799".

SuggestedRemedy

Change range to "1.2770 through 1.2801" in 45.2.1

In 45.2.1.222 on page 110 line 21 make it "IFEC symbol error counter, lane 1 through 31 (Register 1.2212 through 1.2241, and 1.2770 through 1.2801)"

In the body of 45.2.1.222 update the text to clarify that lanes 1 through 15 are in the block 1.2212 through 1.2241 and lanes 16 through 32 are in the block 1.2270 through 1.2801.

Proposed Response Response Status O

Cl 45 SC 45.2.1.8 P82 L 1 # I-142

Bruckman, Leon

NVIDIA

Comment Type TR Comment Status X

The title of this section is: "PMD transmit disable register", but in Table 45-3 of the base standard the name is: "PMA/PMD transmit disable". This makes the reference in 176C.3: "The C2C component shall meet the functional specifications in 178.8 and the management variable specifications in 178.13, unless stated otherwise." inconsistent since the name of the variables has the PMD prefix only (see comment #104 against D2.3)

SuggestedRemedy

Change the title of section 45.2.1.8 to: "PMA/PMD transmit disable register"

Proposed Response Response Status O

Cl 45 SC 45.2.1.60b P85 L 32 # I-15

Marris, Arthur

self

Comment Type E Comment Status X

Typo in description of bit 1.73.6 in Table 45-58b—800G PMA/PMD ability register bit definitions

SuggestedRemedy

Change:

0 = PMA/PMD is not able to perform 800GBASE-DR8-2

To

0 = PMA/PMD is not able to perform 800GBASE-KR4

Proposed Response Response Status O

Cl 45 SC 45.2.1.60c P87 L 4 # I-3

Marris, Arthur

self

Comment Type ER Comment Status X

This is the "800G PMA/PMD extended ability register" not the "800G PMA/PMD extended ability 2 register".

SuggestedRemedy

Delete "2" on lines 4, 6, and 9

Proposed Response Response Status O

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Cl 45 SC 45.2.1.96 P90 L0 # I-385

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

The descriptions for 45.2.1.96 point to the ILT clauses and we haven't added 178B to those lists.

SuggestedRemedy

Update the following clauses to be:

45.2.1.96.1 Receiver status 0 (1.151.0)

This bit maps to the state variable rx_trained as defined in 72.6.10.3.1, local_trained in 136.8.11.7.1 and local_rx_ready in 178B.8.3.1.

45.2.1.96.2 Frame lock 0 (1.151.1)

This bit maps to the state variable frame_lock as defined in 72.6.10.3.1 and local_tf_lock in 136.8.11.7.1 and 178B.8.3.1.

45.2.1.96.3 Startup protocol status 0 (1.151.2)

This bit maps to the state variable training as defined in 72.6.10.3.1, 136.8.11.7.1 and 178B.8.3.1.

45.2.1.96.4 Training failure 0 (1.151.3)

This bit maps to the state variable training_failure as defined in 72.6.10.3.1, 136.8.11.7.1 and 178B.8.3.1.

Proposed Response Response Status O

Cl 45 SC 45.2.1.139 P90 L26 # I-16

Marris, Arthur self

Comment Type ER Comment Status X

Missing space in "0 = Lane 9Tx output precoder disabled"

SuggestedRemedy

Change "9Tx" to "9 Tx"

Proposed Response Response Status O

Cl 45 SC 45.2.1.217.6a P109 L5 # I-6

Marris, Arthur self

Comment Type T Comment Status X

Correct subclause title and and make it clear this is for the 800G-ER1 FEC.

SuggestedRemedy

Change "45.2.1.217.6a IER1 FEC remote loopback ability (1.2201.7)" to: "45.2.1.217.6a 800G-ER1 FEC remote loopback ability (1.2201.7)"

on line 7 change "the ER1 FEC" to "the 800G-ER1 FEC"

Proposed Response Response Status O

Cl 45 SC 45.2.1.217.6c P109 L15 # I-9

Marris, Arthur self

Comment Type TR Comment Status X

The bit definitions for 1.2201.4 and 1.2201.5 are incorrect. These bits are nothing to do with the 800GBASE-ER1 FEC but are for indicating IFEC status signalled by the partner AUI attached PCS.

SuggestedRemedy

Change "45.2.1.217.6c IFEC received local degraded (1.2201.5)" description to:

"When read as a one, bit 1.2201.5 indicates that the local degraded SER signal has been received. This bit reflects the state of rx_local_degraded for the IFEC."

Change "45.2.1.217.6d IFEC received remote degraded (1.2201.4)" description to:

"When read as a one, bit 1.2201.4 indicates that the remote degraded SER signal has been received. This bit reflects the state of rx_rm_degraded for the IFEC."

Proposed Response Response Status O

Cl 45 SC 45.2.1.257 P115 L8 # I-7

Marris, Arthur self

Comment Type E Comment Status X

Change PS to "pilot sequence" for clarity

SuggestedRemedy

Change "PS" to "pilot sequence"

Proposed Response Response Status O

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Cl 45 SC 45.2.1.269 P121 L15 # I-14

Marris, Arthur self
 Comment Type E Comment Status X

For 1.2733.13 "0 = Lane 20 alignment marker is not locked" should read "0 = Lane 29 alignment marker is not locked"

SuggestedRemedy

Change 20 to 29 on line 15 to fix this typo.

Proposed Response Response Status O

Cl 45 SC 45.2.1.271 P122 L46 # I-4

Marris, Arthur self
 Comment Type T Comment Status X

Table 45-212t shows the assignment of bits for the lane 0 PMA test block error bin 0 to bin 3 registers in the transmit direction, and the text in the third paragraph mentions test_block_error_bin_tx_0_16p and test_block_error_bin_tx_1_0 registers, however there is no "tx" in the names and descriptions in Table 45-212t.

SuggestedRemedy

On line 46 change "Table 45-212t—Lane 0 PMA test block error bin register definitions (for 4 of the 17 bins)" to "Table 45-212t—Lane 0 PMA transmit test block error bin register definitions (for 4 of the 17 bins)"

In the table add "transmit" to the names. For example make the first name "PMA transmit test block error bin 0 lower"

In the table add "tx" to the descriptions. For example make the first description "test_block_error_bin_tx_0_0[15:0] "

Proposed Response Response Status O

Cl 45 SC 45.2.1.272 P123 L25 # I-365

Slavick, Jeff Broadcom Inc
 Comment Type TR Comment Status X

The title of this section is not entirely true as it a replica of all the registers which is more than jus the ILT training registers.

SuggestedRemedy

Change the title of 45.2.1.272 to be "Registers for the upper AUI component"

Proposed Response Response Status O

Cl 73A SC 73A.1a P723 L24 # I-130

Huber, Thomas Nokia
 Comment Type ER Comment Status X

The description of host class priority is overly complex and leaves the reader guessing. The intended meaning is that if a PMD supports more than one host class, it should advertise one of them, with the preference being to prioritize them in the order HL, HN, HH.

SuggestedRemedy

Replace "If the PMD is compliant to more than one host class, the recommended priority of which class to indicate would be HL followed by HN. So for example, HL would be advertised if the PMD supports all three host classes"

with

"If the PMD is compliant to more than one host class, it is recommended to advertise HL class if that is supported; if HL is not supported (and thus the PMD supports only HN and HH), it is recommended to advertise HN."

Proposed Response Response Status O

Cl 116 SC 116.1.4 P163 L20 # I-280

D'Ambrosia, John Futurewei Technoogies, U.S. Subsidiary of Huawei
 Comment Type ER Comment Status X

Annex 178B is described in the clause as ILT/RTS. Annex 178B is about APSU, which RTS / ILT are functions of, but could cause reader confusion, as support of APSU means support of both functions. Furthermore, when looking at PMD functional specifications, it is denoted as APSU, not ILT/RTS

SuggestedRemedy

Change "RTS / ILT" to "APSU" in Table 116-3 and all PHY type clause correlation tables.

Proposed Response Response Status O

Cl 116 SC 116.1.4 P164 L163 # I-279

D'Ambrosia, John Futurewei Technoogies, U.S. Subsidiary of Huawei
 Comment Type TR Comment Status X

For ILT / RTS entry - APSU can not be described as mandator for any 200Gb/e, 400 Gb/s, or 800 Gb/s PHY as the PHY might be implemented using a 100 Gb/s based AUI.

SuggestedRemedy

Change all PHY type / clause correlation tables where any PHY based on 200 Gb/s signaling needs the ILT/RTS column to be changed from "M" to "C", as it might be implemented with a 100Gb/s based AUI.

Proposed Response Response Status O

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Cl 116 SC 116.2.9 P170 L 53 # I-366
 Slavick, Jeff Broadcom Inc
 Comment Type E Comment Status X
 The list of PHYs and AUIs are ordered in PMD first then AUI last rather than 200G then 400G. I would think makes more sense to list all 200G then all 400G.
 SuggestedRemedy
 Move 200GAUI-C2C and 200G-C2M before 400G-KR2 and perhaps insert an empty line before doing the 400G list.
 Proposed Response Response Status O

Cl 116 SC 116.3.3.3.1 P176 L 24 # I-145
 Bruckman, Leon NVIDIA
 Comment Type TR Comment Status X
 An interface may reach the OK state and still the receive signal may be ILT frames (not valid data). For example if the propagation_timer (see 178B.8.3.3) in this side of the ISL is shorter than the one configured in the peer side.
 SuggestedRemedy
 Change: "A value of OK indicates that valid data is being presented by the sublayer to the next higher sublayer in the rx_symbol parameters."
 To: "A value of OK indicates that data received by the next lower layer is being presented by the sublayer to the next higher sublayer in the rx_symbol parameters."
 Proposed Response Response Status O

Cl 118 SC 118 P184 L 1 # I-288
 D'Ambrosia, John Futurewei Technoogies, U.S. Subsidiary of Huawei
 Comment Type TR Comment Status X
 A 400GMII Extender shall support APSU if based on 400GAUI-2
 SuggestedRemedy
 Add a normative statement that a A 400GMII Extender shall support APSU if based on 400GAUI-2
 Proposed Response Response Status O

Cl 118 SC 118 P184 L 1 # I-287
 D'Ambrosia, John Futurewei Technoogies, U.S. Subsidiary of Huawei
 Comment Type TR Comment Status X
 A 200GMII Extender shall support APSU if based on 200GAUI-1
 SuggestedRemedy
 Add a normative statement that a A 200GMII Extender shall support APSU if based on 200GAUI-1
 Proposed Response Response Status O

Cl 118 SC 118.1 P184 L 40 # I-281
 D'Ambrosia, John Futurewei Technoogies, U.S. Subsidiary of Huawei
 Comment Type TR Comment Status X
 An extender is considered to be an ISL and should be denoted in Table 118-a, as a physical layer clause associated with 200GMII Extender
 SuggestedRemedy
 Add table entry in Tabe 118-a
 178B - APSU Conditional Note F
 Note F - Required when implementing a 200GMII Extender based on 200GAUI-1 C2C or 200GAUI-1 C2M only.
 Proposed Response Response Status O

Cl 118 SC 118.1 P185 L 28 # I-282
 D'Ambrosia, John Futurewei Technoogies, U.S. Subsidiary of Huawei
 Comment Type TR Comment Status X
 An extender is considered to be an ISL and should be denoted in Table 118-b, as a physical layer clause associated with 400GMII Extender
 SuggestedRemedy
 Add table entry in Tabe 118-b
 178B - APSU Conditional Note F
 Note F - Required when implementing a 400GMII Extender based on 400GAUI-2 C2C or 400GAUI-2 C2M only.
 Proposed Response Response Status O

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Cl 120 SC 120.1.1 P199 L19 # I-411

Opsasnick, Eugene Broadcom Inc.

Comment Type TR Comment Status X

The first sentence states that this clause defines bit-multiplexing for 200GE and 400GE implementations. But there is no indication of when this type of lane multiplexing is needed. Add some color for the reader so this single statement makes sense, Especially since the Clause title implies it is used for all 200/400 type PMAs.

SuggestedRemedy

In 120.1.1 change the the first paragraph from:

"This clause specifies the Physical Medium Attachment (PMA) sublayer types that use bit-multiplexing for 200GBASE-R and 400GBASE-R Physical Layer implementations."

To:

"This clause specifies the Physical Medium Attachment (PMA) sublayer types that use bit-multiplexing for 200GBASE-R and 400GBASE-R Physical Layer implementations. Bit-multiplexing is used for 200GBASE-R PMA interfaces of 8, 4, and 2 lanes, and for 400GBASE-R PMA interfaces of 16, 8 and 4 lanes. Symbol-muxing, as defined in Clause 176, is used for 200GBASE-R PMA interfaces of 1 lane, and for 400GBASE-R PMA interfaces of 2 lanes."

Proposed Response Response Status O

Cl 120 SC 120.1.1 P199 L22 # I-410

Opsasnick, Eugene Broadcom Inc.

Comment Type E Comment Status X

The last paragraph on 120.1.1 that defines how the terms SM-PMA and BM-PMA are used in this clause is unnecessary since those terms are not used at all in Clause 120. But it should still be noted that this clause defines the bit-muxing PMAs since there is now a new clause which define the SM-PMAs. This is clearly stated in the previous paragraph.

SuggestedRemedy

In 120.1.1, remove the last paragraph:

"When necessary 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."

Proposed Response Response Status O

Cl 120 SC 120.1.4 P200 L7 # I-412

Opsasnick, Eugene Broadcom Inc.

Comment Type TR Comment Status X

The numbered items 2, 3, and 4 in the list of item b) define the AUIs that run at 25G/lane, 50G/lane, and 100G/lane, respectively. These terms are used in the later list items 5 to 10. Those later list items also refer the AUI types that run at 200G/lane. There should be new item (5) added after item (4) to define these new AUI types.

SuggestedRemedy

In 120.1.4, add a new item between list items 4 and 5 (a new #5), and update the numbering on the rest of the list accordingly.

New list item 5:

"5) 200GAUI-1 is a 106.25 GBd single lane PAM4 physical instantiation of the 200 Gb/s connection. 400GAUI-2 is a 106.25 GBd by 2 lane PAM4 physical instantiation of the 400 Gb/s connection."

Proposed Response Response Status O

Cl 169 SC 169.1.4 P205 L19 # I-357

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

In the copper tables ILT/RTS is listed as conditional for PHYs that don't use 178B but with a footnote stating it's mandatory for 800GAUI-4 C2M/C2C. Currently these PHYs don't use ILT/RTS, so the conditional value is based on the existence of a 800GAUI-4 being present.

SuggestedRemedy

In Table 169-3a Add a new footnote that says "Mandatory for 800GAUI-4 C2C and 800GAUI-4 C2M." and replace the footnote b in the 178B column with a reference to this new footnote.

Proposed Response Response Status O

Cl 169 SC 169.2.10 P207 L7 # I-367

Slavick, Jeff Broadcom Inc

Comment Type E Comment Status X

The order of the PHY list intermixes DR and FR.

SuggestedRemedy

Move 800G-FR4-500 to be after 800G-FR4

Proposed Response Response Status O

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Cl 170 SC 170.4.3 P 223 L 7 # I-422
 Dawe, Piers J G NVIDIA
 Comment Type **TR** Comment Status **X**
 800GMII and 1.6TMII are different; a prospective customer reading a PICS is entitled to know which is being offered.
 SuggestedRemedy
 Create major options (not exclusive) for 800GMII and 1.6TMII
 Proposed Response Response Status **O**

Cl 171 SC 171.1 P 225 L 22 # I-283
 D'Ambrosia, John Futurewei Technoogies, U.S. Subsidiary of Huawei
 Comment Type **TR** Comment Status **X**
 An extender is considered to be an ISL and should be denoted in Table 171-1, as a physical layer clause associated with 800GMII Extender
 SuggestedRemedy
 Add table entry in Tabe 171-1
 178B - APSU Conditional Notee
 Note E - Required when implementing a 800GMII Extender based on 800GAUI-4 C2C or 800GAUI-4 C2M only.
 Proposed Response Response Status **O**

Cl 171 SC 171.1 P 226 L 20 # I-284
 D'Ambrosia, John Futurewei Technoogies, U.S. Subsidiary of Huawei
 Comment Type **TR** Comment Status **X**
 An extender is considered to be an ISL and should be denoted in Table 171-1a, as a physical layer clause associated with 1.6TMII Extender
 SuggestedRemedy
 Add table entry in Tabe 171-1a
 178B - APSU Conditional Notee
 Note C - Required when implementing a 1.6TMII Extender based on 1.6TAUI-8 C2C or 1.6TAUI-8 C2M only.
 Proposed Response Response Status **O**

Cl 171 SC 171.3.3 P 233 L 8 # I-289
 D'Ambrosia, John Futurewei Technoogies, U.S. Subsidiary of Huawei
 Comment Type **TR** Comment Status **X**
 A 800GMII Extender shall support APSU if based on 800GAUI-4.

However, it states here
 The TXLS and RXLS signals and tx_link_status variable are only required if the PHY 800GXS is part of a Physical Layer that supports autonomous path startup (APSU) (Annex 178B).
 This would apply to 800GAUI-8, which is not what Annex 178B states.
 SuggestedRemedy
 Modify this statement -
 The TXLS and RXLS signals and tx_link_status variable are only required if the PHY 800GXS is part of a Physical Layer that supports autonomous path startup (APSU) (Annex 178B).
 To
 The TXLS and RXLS signals and tx_link_status variable shall be implemented if the PHY 800GXS is supporting a 800GAUI-4.
 Proposed Response Response Status **O**

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CI 171 SC 171.3.3a P 234 L 10 # I-290

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

Comment Type TR Comment Status X

A 1.6TGMII Extender shall support APSU if based on 1.6TAUI-8. However, it states here The TXLS and RXLS signals and tx_link_status variable are only required if the PHY 1.6TXS is part of a Physical Layer that supports autonomous path startup (Annex 178B).

SuggestedRemedy

Modify this statement - The TXLS and RXLS signals and tx_link_status variable are only required if the PHY 1.6TXS is part of a Physical Layer that supports autonomous path startup (Annex 178B).

To

The TXLS and RXLS signals and tx_link_status variable shall be implemented if the PHY 1.6TXS is supporting a 1.6TAUI-8.

Proposed Response Response Status O

CI 171 SC 171.6.1 P 235 L 48 # I-399

Opsasnick, Eugene Broadcom Inc.

Comment Type E Comment Status X

Lines 48-51 on page 236 contain one very long run-on sentence that should be broken up into separate sentences. It might also be better to separate the equation from the definition of the variables.

SuggestedRemedy

Replace the text in 171.6.1 with:
"The variable tx_am_sf is set as follows:
tx_am_sf<2:0> = {FEC_degraded_SER + rx_local_degraded,0,0}

FEC_degraded_SER and rx_local_degraded are defined in 172.2.6.2.2 for DTE 800GXS and in 175.2.5.3 and 175.2.5.5 for DTE 1.6TXS. The "+" symbol denotes a logical OR."

Proposed Response Response Status O

CI 171 SC 171.6.2 P 236 L 4 # I-400

Opsasnick, Eugene Broadcom Inc.

Comment Type ER Comment Status X

Lines 4-7 on page 236 contain one very long run-on sentence that should be broken up into separate sentences. It might also be better to separate the equation from the definition of the variables.

It is also very confusing to assign this "TX" variable from the RX inputs. It should be explained that the "tx_am_sf" variable is actually propagating in the RX direction.

SuggestedRemedy

Replace the text in 171.6.2 with:
"The variable tx_am_sf is set as follows:
tx_am_sf<2:0> = {RXRD,RXLD, 0}

RXRD and RXLD are signals from the PCS on the PCS service interface. They are defined in 172.1.5.1 for the PHY 800GXS and in 175.1.4.1 for the PHY 1.6TXS. Note that for the PHY XS, the tx_am_sf variable is used in the alignment markers of the data propagating in the RX direction towards the MAC.

Proposed Response Response Status O

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Cl 172 SC 172.2.5 P262 L42 # I-360

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

We have edited the 64b66b encoder/decoder sections of 800G to guide folks to use the new stateless decoder defined in 119. In Clause 119 FEC decoder we state when using the 119 stateless decoding function you SHALL also error mark extra blocks that could have errors due to scrambler extension.

In 172.2.5.3 FEC decoder we have the following:

The Reed-Solomon decoder is identical to that specified in 119.2.5.3, with the following exceptions:

— FEC_degraded_SER in flow 0 and flow 1 are mapped to FEC_degraded_SER_0 and FEC_degraded_SER_1, respectively.

— hi_ser in flow 0 and flow 1 are mapped to hi_ser_0 and hi_ser_1, respectively.

Which if someone is doing a 800G that uses the 119 stateless 64b66b decoder then the FEC decoder shall error mark some of the extra blocks beyond the uncorrectable CW. But if they're using the 172 stateless 64b66b decoder (perhaps due to re-use) then they would not be guided to fix their design to address the scrambler error extension possibility. So adding guidance to do the same error mark when using 172 stateless 64b66b decoder, but not mandating it, would be a service to humanity to address a hole in the standard.

SuggestedRemedy

Bring in 172.2.5.3 add another exception that states:

"The additional error marking when using the stateless decoder specified in 119.2.5.8 should also be done if using the stateless decoder specified in 172.2.5.9.2."

Proposed Response Response Status O

Cl 174 SC 174.1.4 P272 L18 # I-370

Slavick, Jeff Broadcom Inc

Comment Type T Comment Status X

Is footnote b necessary for 1.6T given all PMDs require it to be present. Yes RTS may not be possible if you have 1.6TAUI-16, but you need to read the spec to know that so what clarification is being made that would otherwise be missed?

SuggestedRemedy

Remove footnote b from Table 174-2 and 174-3.

Proposed Response Response Status O

Cl 174A SC 174A.4 P743 L45 # I-65

WANG, Xuebo Huawei Technologies Co., Ltd

Comment Type ER Comment Status X

"MAC-TO-MAC" in the sub-clause title should be "MAC-to-MAC".

SuggestedRemedy

Change "MAC-TO-MAC" to "MAC-to-MAC".

Proposed Response Response Status O

Cl 174A SC 174A.6 P744 L25 # I-27

Brown, Matthew Qualcomm

Comment Type E Comment Status X

list of figures and tables should include Figure 174A-11

SuggestedRemedy

Change "(see Figure 174A-6, Table 174A-1, and Table 174A-2)"

To "(see Figure 174A-6, Figure 174A-11, Table 174A-1, and Table 174A-2)"

Proposed Response Response Status O

Cl 174A SC 174A.9 P745 L22 # I-421

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The FEC bin histogram, BER_added and masks methodology is very complicated. It needs more accessible explanation.

SuggestedRemedy

Add a more accessible explanation, with graphs and examples to illustrate what is going on. Show how the method can be simplified when assessing error rates around PMDs, where BER_added is relatively small.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 174A SC 174A.9 P745 L 27 # I-241
 Ghiasi, Ali Ghiasi Quantum LLC, Marvell Semiconductor, Inc.
 Comment Type TR Comment Status X
 In case of Clause 180 or 181 there is no Inner FEC
 SuggestedRemedy
 Need to clarify an Inner FEC only for PMDs defined with Inner FEC
 Proposed Response Response Status O

CI 174A SC 174A.13 P755 L 43 # I-64
 WANG, Xuebo Huawei Technologies Co., Ltd
 Comment Type TR Comment Status X
 In Figure 174A-11, CRC error ratio for FEC-to-FEC path should be less than 5.7×10^{-11} instead of 1.45×10^{-11} according to 174A.7.
 SuggestedRemedy
 Change "CRC error ratio < 1.45×10^{-11} " to "CRC error ratio < 5.7×10^{-11} ".
 Proposed Response Response Status O

CI 174A SC 174A.9.6 P749 L 12 # I-66
 WANG, Xuebo Huawei Technologies Co., Ltd
 Comment Type TR Comment Status X
 For step b), Ha(k) should reflect the error distribution over all lanes that are not tested by the PMA. When using Equation (174A-5) to calculate Ha(k), the value of n should be specified to be 544 as Ha(k) is calculated without convolution of per-lane error histogram. The same issue also exists in 174A.9.7. A contribution related to this comment was presented in March plenary meeting and the option 1 therein was supported. See https://www.ieee802.org/3/dj/public/26_03/wang_3dj_01a_2603.pdf
 SuggestedRemedy
 Implement option 1 of the proposed change on slide 5 in https://www.ieee802.org/3/dj/public/26_03/wang_3dj_01a_2603.pdf
 Proposed Response Response Status O

CI 175 SC 175.2.4.6.1 P291 L 10 # I-423
 Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X
 802.3 is a specification, not an example, lecture or tutorial. It is definitive and should be written in proper formal English. am_x<119:0> is not an example; it is *the* name for this thing. Other sections use better language, for example "The variable tx_am_sf is set as follows".
 SuggestedRemedy
 Change:
 Let am_x<119:0> be the alignment marker for PCS lane x, x=0 to 15, where bit 0 is the first bit transmitted.
 am_x<119:0> is constructed as shown in Figure 175-3 using the values in Table 175-4 for each PCS lane number x.
 to:
 The alignment marker for PCS lane x is am_x<119:0>, where x=0 to 15 and bit 0 is the first bit transmitted. It is constructed as shown in Figure 175-3 using the values in Table 175-4 for each PCS lane number x.
 Scrub the draft for similar misuse of "let".
 Proposed Response Response Status O

CI 174A SC 174A.13 P755 L 43 # I-28
 Brown, Matthew Qualcomm
 Comment Type T Comment Status X
 This figure should include allocation of FLR for the PCS to PCS path.
 SuggestedRemedy
 Add arrows and label for PCS-to-PCS path, similar to Figure 174A-10, except for error expectations listing only "FLR < $6E-11$ ".
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 175 SC 175.6 P305 L17 # I-57

de Koos, Andras Microchip Technology Inc

Comment Type T Comment Status X

The path data delay instructions could be further clarified for the RxPCS to incorporate the deskew function.

Specifically, the current text just says to calculate the path data delay using the first bit of a set of 4 interleaved FEC codewords, which is necessarily on PCS lane 0. But the directives in Clause 90 specify that the path data delay to be calculated on the last-arriving lane - essentially ignoring any incoming skew.

If the last-arriving lane is not PCS lane 0, then the instructions here and the directive in clause 90 would appear to be at odds. But not really, as the directive is to ignore any incoming skew by treating all the lanes as if they arrived at the same time as the last-arriving lane. But a wording tweak could avoid any potential confusion.

SuggestedRemedy

I'd rather avoid making the instructions even more complicated.

Consider changing the instructions to include the deskew step for the Rx PCS

from :

When the PCS_timesync_multilane_ability variable is asserted, the transmit and receive path data delays are reported as if the DDMP (data delay measurement point) is at the start of the set of four interleaved RS-FEC codewords (see 90.7).

to :

When the PCS_timesync_multilane_ability variable is asserted, the transmit and receive path data delays are reported as if the DDMP (data delay measurement point) is at the start of the set of four interleaved RS-FEC codewords, ignoring any incoming lane skew (see 90.7).

Proposed Response Response Status O

Cl 176 SC 176.4.2.2 P322 L28 # I-53

Brown, Matthew Qualcomm

Comment Type ER Comment Status X

In a previous draft, most of the new logic clauses were updated to reference state diagram figures with the form "<state diagram name> (Figure xxx-xx)".

As an example, from Clause 177: "Inner FEC self-synchronization state diagram (Figure 177-13) or the Inner FEC pad detection state diagram (Figure 177-14)"

Some instances were missed in Clause 176 and Clause 184.

SuggestedRemedy

On page 322 line 29 change "in the state diagram shown in Figure 176-10" to "in the PMA multiplex synchronization state diagram (Figure 176-10)".

Other locations to update are (page/line):

Clause 176: 322/33, 330/39, 331/34, 331/47

Clause 184: 607/36

Proposed Response Response Status O

Cl 176 SC 176.4.2.2 P322 L28 # I-74

Ran, Adee Cisco Systems, Inc.

Comment Type E Comment Status X

(Comment resubmitted from WG ballot)

"with the following exception: <dashed list>"

A single exception does not require a list (there are many such exceptions in the draft without a list).

SuggestedRemedy

Change the first paragraph to the following text:

"The alignment marker lock process for each input PCSL operates in the same manner as the xBASE-R PCS alignment marker lock process (see 119.2.5.1, 172.2.5.1, and 175.2.5.1), except that the restart_lock variable (see Figure 119-12) takes the value of restart_lock_mux, which is defined in 176.4.4.2.1 and set by the PMA multiplex synchronization state diagram (Figure 176-10).

Delete the dashed list.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 176 SC 176.4.2.2 P322 L33 # I-75

Ran, Adee Cisco Systems, Inc.

Comment Type E Comment Status X

"PMA multiplex lane synchronization process" is not defined anywhere.
The state diagram in Figure 176-10 has a different title.
Similarly in 176.4.2.3.
In 176.4.4.3 the text refers to this diagram as "the PMA multiplex synchronization process"

SuggestedRemedy

Change from
"performed by the PMA multiplex lane synchronization process as specified in the state diagram in Figure 176-10"
to
"performed by the PMA multiplex synchronization state diagram (Figure 176-10)"
Apply a similar change to the second paragraph of 176.4.2.3.

Alternatively, change the figure title and align the text.

Proposed Response Response Status O

Cl 176 SC 176.4.2.3.1 P322 L52 # I-76

Ran, Adee Cisco Systems, Inc.

Comment Type TR Comment Status X

"The 4-codeword deskew aligns PCSs to a four codeword boundary relative to the start of the alignment marker block across all PCSs"

The expression "alignment marker block" is used once in 176A where it refers to what we usually call "alignment marker group" (subject of another comment). In clause 176 it is used 3 times (176.4.2.3.1, 176.4.2.3.2, and 176.4.2.3.3) and seems to refer to the (single) alignment marker on each PCSL.

This expression is used in the base standard only once, in clause 82, with the meaning of single alignment markers (which are 66-bit blocks in that case). But from clause 119 and on, alignment markers are not 66-bit blocks anymore.

SuggestedRemedy

Change from
"relative to the start of the alignment marker block across all PCSs"
to
"relative to the start of the alignment marker on each PCSL".

Apply the same change in 176.4.2.3.2, and 176.4.2.3.3.

Proposed Response Response Status O

Cl 176 SC 176.4.3.2.1 P330 L28 # I-56

de Koos, Andras Microchip Technology Inc

Comment Type T Comment Status X

In the receive SM-PMA, the symbol pair de-interleave will be successful whether or not the odd PCS lane delay was performed by the opposite-end transmitter. PCS lanes are symbol-pair deinterleaved with a random symbol alignment from the PMA lane. As long as the PMA lane was formed by the round-robin symbol-pair-interleave from PCS lanes, delay between the PCS lanes will have no bearing on whether the lanes can lock to their AM. When all 8 PCS lanes lock, the de-interleave is successful. It is strange that something so fundamental to the proper functioning of the 200Gbps/lane signaling (odd lane delay) is in no way enforced or even visible at the receiver. There may be a temptation, especially for the 8:1 and 16:2 SM-PMAs, to forego the 2CW odd lane delay in order to reduce the latency. Furthermore, there is no obvious way for the receiver to deduce whether the transmitter has such a non-compliance. The only visible effect would be that the FEC symbol error histogram (errors/codeword) would look worse than expected in the presence of burst errors.

SuggestedRemedy

There is likely no appetite to change the symbol pair de-interleave process at this stage. But consider mandatory PCS lane skew reporting after the symbol pair de-interleave. With such a status, the user could deduce whether the Tx odd lane delay was properly done. (many implementations would already have a skew status, so this may not be too intrusive to existing development efforts).

Proposed Response Response Status O

Cl 176 SC 176.4.3.2.2 P331 L34 # I-77

Ran, Adee Cisco Systems, Inc.

Comment Type E Comment Status X

"as specified by the state diagram in Figure 176-11"
The state diagram title should be stated.

SuggestedRemedy

Change to
"as specified by the PMA demultiplex symbol lock state diagram (Figure 176-11)"

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 176 SC 176.4.3.2.3 P331 L46 # I-78

Ran, Adeo Cisco Systems, Inc.

Comment Type E Comment Status X

"takes the value of restart_lock_demux<y> which is set in the state diagram shown in Figure 176-11"
 The variable is defined separately from the figure.
 The state diagram title should be stated.

SuggestedRemedy

Change to
 "takes the value of restart_lock_demux<y>, which is defined in 176.4.4.2.1 and set by the PMA demultiplex symbol lock state diagram (Figure 176-11)"

Proposed Response Response Status O

Cl 176 SC 176.4.4.2 P332 L35 # I-79

Ran, Adeo Cisco Systems, Inc.

Comment Type E Comment Status X

(Comment resubmitted from WG ballot)
 This subclause includes a dashed list with one item (external reference to Figure 119-12), and then a paragraph with multiple statements regarding different PMAs, which would be more readable as a table or a list.
 It should be the other way around: single statement in a text paragraph, and multiple statements in a list.

The suggested remedy is one way of improving this text, using a table. Other ways may be considered.

SuggestedRemedy

Use the following content, with editorial license:
 The 200GBASE-R 8:1, 400GBASE-R 16:2, 800GBASE-R 32:4, and 1.6TBASE-R 16:8 PMAs use the alignment marker lock state diagram from Clause 119 (Figure 119-12), with the definitions of variables in 176.4.4.2.1, functions in 176.4.4.2.2, and counters in 176.4.4.2.3. Table 176-*new* lists the locations of additional variable definitions and values, and the values of the index x, which denotes the PMA service interface lane number.

Add a new table 176-*new* with columns for PMA type, reference clause for variables, and the range of x.

Proposed Response Response Status O

Cl 176 SC 176.4.4.2 P332 L38 # I-402

Opsasnick, Eugene Broadcom Inc.

Comment Type ER Comment Status X

The paragraph starting at line 38 on page 332 contains cross-references for variable definitions and defines the value of x for four separate PMA types. It is very wordy and hard to follow. The text can be cleaned up with the addition of a simple table.

SuggestedRemedy

Replace the text of the second paragraph of 176.4.4.2 with the following text and a new table (Table 176-n) as described below.

Change:

"Any constants, variables, functions, or counters used in the above Clause 119 state diagram which are not defined in the following subclauses shall use the values and definitions from 119.2.6.2 for the 200GBASE-R 8:1 PMA and 400GBASE-R 16:2 PMA, the values and definitions from 172.2.6.2 for the 800GBASE-R 32:4 PMA, and the values and definitions from 175.2.6.2 for the 1.6TBASE-R 16:8 PMA. The variable x in the definitions of 119.2.6.2 is used as an index for the PMA service interface lane number and shall use the values of x = 0 to 7 for the 200GBASE-R 8:1 PMA, x = 0 to 15 for the 400GBASE-R 16:2 PMA, x = 0 to 31 for the 800GBASE-R 32:4 PMA, and x = 0 to 15 for the 1.6TBASE-R 16:8 PMA."

To:

"Any constants, variables, functions, or counters used in the above Clause 119 state diagram which are not defined in the following subclauses shall use the values and definitions of the variables defined in the subclauses referenced in Table 176-N. The index variable x in these definitions is used to indicate the PMA service interface lane number and shall take the values as specified in Table 176-N."

Table 176-N:

column headers:
 PMA type | variable references | x

4 rows with these entries:

200GBASE-R 8:1	119.2.6.2	0 to 7
400GBASE-R 16:2	119.2.6.2	0 to 15
800GBASE-R 32:4	172.2.6.2	0 to 31
1.6TBASE-R 16:8	175.2.6.2	0 to 15

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 176 SC 176.4.4.3 P 334 L 39 # I-80
 Ran, Adeo Cisco Systems, Inc.
 Comment Type E Comment Status X
 "shall each implement m alignment marker processes as depicted in Figure 119–12"
 Figure 119-12 is titled "Alignment marker lock state diagram".
 SuggestedRemedy
 Change "alignment marker processes" to "alignment marker lock processes".
 Proposed Response Response Status O

Cl 176 SC 176.7.1.2 P 341 L 18 # I-81
 Ran, Adeo Cisco Systems, Inc.
 Comment Type TR Comment Status X
 "in the LINK_READY state on lane i (see Figure 178B–10)"
 There is no such state.
 SuggestedRemedy
 Change "LINK_READY" to "ISL_READY".
 Proposed Response Response Status O

Cl 176 SC 176.6.1 P 340 L 10 # I-147
 Bruckman, Leon NVIDIA
 Comment Type TR Comment Status X
 In Figure 176-13 there is an input from each PAM4 decode block to the SIL, but there is no
 requirement to monitor anything in the PAM4 decoder that can be used as a signal failure
 detection
 SuggestedRemedy
 Either define what shall be monitored by the PAM4 decoder or in Figure 176-13:
 - remove the arrow from the PAM4 decode blocks to the SIL block
 - remove the SIL block and pass the IS_SIGNAL.request directly to the Service Interface
 below the PMA and IS_SIGNAL.indication directly to the Service Interface above the PMA
 Proposed Response Response Status O

Cl 176 SC 176.7.1.2 P 341 L 22 # I-372
 Slavick, Jeff Broadcom Inc
 Comment Type TR Comment Status X
 ILT is run for both settings of mr_training_enable so stating ILT is disabled is not
 accurate. In 178B.7 we refer to it as training enabled and training disabled.
 SuggestedRemedy
 Change "ILT is disabled" to "training is disabled"
 Proposed Response Response Status O

Cl 176 SC 176.7.1.2 P 341 L 18 # I-371
 Slavick, Jeff Broadcom Inc
 Comment Type TR Comment Status X
 Figure 178B-10 does not have a state named LINK_READY. It is now named
 PATH_READY.
 SuggestedRemedy
 Change LINK_READY to PATH_READY
 Proposed Response Response Status O

Cl 176 SC 176.7.3 P 341 L 42 # I-82
 Ran, Adeo Cisco Systems, Inc.
 Comment Type E Comment Status X
 Typo: IS_UNIT_DATA (twice)
 SuggestedRemedy
 Change to IS_UNITDATA
 Proposed Response Response Status O

Cl 176 SC 176.10 P334 L24 # I-55

de Koos, Andras

Microchip Technology Inc

Comment Type **TR** Comment Status **X**

Instructions for calculating the path data delay in the SM-PMA are incomplete, as they do not take into account the symbol pair (or symbol quartet) interleave function.

Ideally, the text should specify which bit through the SM-PMA layer should be used to calculate its path data delay.

To align with the directives in Clause 90, the chosen bit should have the largest delay on transmit, and the smallest delay on receive.

See short presentation from the March plenary :

https://www.ieee802.org/3/dj/public/26_03/dekoos_3dj_01_2603.pdf

SuggestedRemedy

Change the following paragraph in 176.10 from:

The transmit and receive path data delays are reported as if the DDMP (data delay measurement point) occurs on an odd PCS lane (see 90.7).

To:

For 8:1, 16:2, 32:4, 1:8, 2:16, and 4:32 SM-PMAs, the transmit and receive path data delays are reported as if the

DDMP (data delay measurement point) occurs on the first bit of the last odd-PCS-lane symbol-pair within an 8:1

symbol-pair round-robin interleave sequence, across all PMA lanes.

For 16:8 and 8:16 SM-PMAs, the transmit and receive path data delays are reported as if the DDMP (data delay measurement point) occurs on the first bit of the last PCS-lane symbol-quartet within a 2:1 symbol-quartet interleave sequence.

For 1:1, 2:2, 4:4, 8:8 and 16:16 SM-PMAs, the transmit and receive path data delays are reported as if the DDMP

(data delay measurement point) occurs on an arbitrary bit.

See 90.7 for more information.

Proposed Response Response Status **O**

Cl 176 SC 176.12.3 P349 L52 # I-149

Bruckman, Leon

NVIDIA

Comment Type **TR** Comment Status **X**

MDIO has its own table (Table 176.12.3.6)

SuggestedRemedy

Delete MDIO row from Table 176.12.3

Proposed Response Response Status **O**

Cl 176A SC 176A P768 L45 # I-102

Ran, Adeo

Cisco Systems, Inc.

Comment Type **ER** Comment Status **X**

"The first of the four codewords contains the alignment marker block"

"Alignment marker block" is not defined in 802.3dj or the base standard. Its usage here seems to refer to the "alignment marker group" which is defined in 175.2.4.6 and used extensively in clause 175 and annex 175A, consistent with previous PCS clauses and annexes.

SuggestedRemedy

Change "alignment marker block" to "alignment marker group".

Proposed Response Response Status **O**

Cl 176B SC 176B.3 P773 L5 # I-103

Ran, Adeo

Cisco Systems, Inc.

Comment Type **T** Comment Status **X**

176B.3 is titled "Special Case for 200GBASE-R, 400GBASE-R, and 800GBASE-R PMAs", and includes Figure 176B-4, which provides examples of 800GBASE-R PHYs with back-to-back PMAs. However, there are no examples of the equally relevant 200GBASE-R and 400GBASE-R PHYs.

Realizing that adding detailed 200G and 400G labeling to the same figure would make it unreadable, and new figures would be almost identical, this could be noted in the text and/or in a NOTE inside the figure.

The suggested remedy is a NOTE.

SuggestedRemedy

Add a NOTE inside the figure:

NOTE---400GBASE-R and 200GBASE-R PHYs are formed in a similar way except that the number of lanes is divided by two and four, respectively.

Implement with editorial license.

Proposed Response Response Status **O**

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 176C SC 176C.3 P795 L48 # I-318

Nicholl, Gary Cisco Systems, Inc.

Comment Type T Comment Status X

As Mike Dudek pointed out in Draft 2.3 comment #104 (https://www.ieee802.org/3/dj/comments/D2p3/8023dj_D2p3_comments_final_clause.pdf), the C2C spec normatively requires meeting the functional specifications in management variable specifications in 178.13 which point to those in 179.14 where PMD_reset is required.

" The C2C component shall meet the functional specifications in 178.8 and the management variable specifications in 178.13, unless stated otherwise."

However the C2C component functions were separated from optional functions that resided in the PMA clause in earlier revisions of the specification. Mike was therefore proposig to reference the PMA status/control variables in Clause 176 rather than the PMD status/control control variables in Clause 178.

One issue with this approach is that the PMA and AUI component sublayers are co-located and likely using the same MMD (MDIO Manageable Device) address and therefore we can't use "PMA_reset" to independently reset the PMA sublayer and the AUI component subalyer as Mike proposed (see Figure 83C-7 as an example of how this was done in the past).

A better solution would to define a separate set of control and status variables for the AUI component (both C2C and C2M) sublayers and add the appropriate MDIO registers in Clause 45.

Same issue applies in 176D.3 for the C2M AUI Component.

SuggestedRemedy

Add a new sub-clause in 176C called "Management Variables" (similar to 178.13) and define the specific control and status variables that are required for the AUI C2C component. Add associated new MDIO registers in Clause 45.

An alternative proposal would be to continue to reference the management variable specifications in 178.13 and the same MDIO registers in Clause 45, but with the local control and status variables names of "AUI_xxx" replacing "PMD_xxx". With this approach we could use the same MMD address for both the PMA and the AUI Component, but still have unique control and status variables (and associated MDIO registers) for both sub-layers.

Make the same change in 176D for the AUI C2M Component.

Proposed Response Response Status O

CI 176C SC 176C.3 P796 L48 # I-299

Dudek, Michael Marvell

Comment Type TR Comment Status X

As discussed in dudek_3dj_01_2603 the C2C spec normatively requires meeting the functional specifications in management variable specifications in 178.13 which point to those in 179.14 where a number of registers are called PMD_xxxx (including PMD_reset). This is confusing particularly as PMA_reset is defined in table 178B-6

SuggestedRemedy

Adopt Option 1 on slide 6 of dudek_3dj_01_2603

Proposed Response Response Status O

CI 176C SC 176C.4 P797 L3 # I-104

Ran, Adee Cisco Systems, Inc.

Comment Type TR Comment Status X

"When SIGNAL_OK is either IN_PROGRESS or FAIL, the corresponding tx_symbol parameters on all lanes are unspecified"

This sentence should apply to AUI components in both directions, so it is either tx_symbol or rx_symbol.

The two directions are listed in the preceding sentence - PMA:IS_SIGNAL.indication or PMA:IS_SIGNAL.request. In the first case, the parameters are rx_symbol; in the second case, they are tx_symbol.

(A similar comment is submitted against 176D.4, the same changes should be applied in both clauses).

SuggestedRemedy

Implement the same changes as in the comment against 176D.4.

Proposed Response Response Status O

CI 176C SC 176C.4 P797 L3 # I-382

Slavick, Jeff Broadcom Inc

Comment Type E Comment Status X

The acronym RTS has already be referred to.

SuggestedRemedy

In 176C.4 and 176D.4: Change "ready-to-send (RTS)" to "RTS"

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 176C SC 176C.6.4.4 P 803 L 32 # -105

Ran, Adeo Cisco Systems, Inc.

Comment Type TR Comment Status X

The values in Table 176C-6 seem incorrect. The probabilities match the calculation of H_max in 174A.9.5 with RSSER=8e-6, not with BER_max=8e-6, which would yield RSSER=8e-5.

A spreadsheet for the calculation will be contributed.

SuggestedRemedy

Use the following values, which result from calculation with BER_max=8e-6 and RSSER=8e-5:

Probability Hmax(k)

k=1 p=2 p=4 p=8

- 13.3E-01 3.5E-01 2.6E-01 1.6E-01
- 22.5E-01 1.3E-01 4.8E-02 1.4E-02
- 31.3E-01 3.3E-02 6.0E-03 8.8E-04
- 44.7E-02 6.1E-03 5.5E-04 3.9E-05
- 51.4E-02 9.1E-04 4.0E-05 1.4E-06
- 63.5E-03 1.1E-04 2.4E-06 4.1E-08
- 77.4E-04 1.2E-05 1.2E-07 9.9E-10
- 81.4E-04 1.1E-06 5.5E-09 2.1E-11
- 92.3E-05 8.7E-08 2.2E-10 3.9E-13
- 103.3E-06 6.4E-09 7.6E-12 6.3E-15
- 114.5E-07 4.2E-10 2.4E-13 9.2E-17
- 125.5E-08 2.5E-11 6.9E-15 1.2E-18
- 136.2E-09 1.4E-12 1.8E-16 1.4E-20
- 146.5E-10 7.1E-14 4.4E-18 1.6E-22
- 156.4E-11 3.4E-15 1.0E-19 1.5E-24
- 165.8E-12 1.5E-16 2.1E-21 1.4E-26

Proposed Response Response Status O

CI 176C SC 176C.6.4.4 P 803 L 32 # -106

Ran, Adeo Cisco Systems, Inc.

Comment Type TR Comment Status X

For p=1, measurement of block error ratio for validation of the requirements for AUI-C2C (Table 176C-6, probability lower than Hmax for all values of k), even with corrected values of Hmax per another comment, would take more than 1e20 years (for k=16), which is not quite feasible. For p>1 the required times are even longer.

This means the test cannot be declared to pass without some kind of extrapolation of the measurement.

Similar concerns exist for AUI-C2M (Table 176D-10), KR (Table 178-11) and CR (Table 179-13). Although for KR and CR the test times for p=1 may be feasible, p=2 would still require more than a year to verify.

A spreadsheet for the calculation will be contributed.

SuggestedRemedy

Add the following NOTE after Table 176C-6, based on 180.9.16:

NOTE—If the statistical projection is modeled accurately by a linear fit extrapolation, a means to provide statistical projection of the measured histograms (see 174A.9.3) in order to reduce test time follows. Extrapolate the measured histogram to Hm(i)(16) using a line determined by a linear fit of log10(Hm(i)(k)), for k = 1 to n, where n is the largest value of k for which all bins from 0 to k have a count greater than 2.

Add similar notes after Table 176D-10, Table 178-11, and Table 179-13.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 176C SC 176C.6.7 P 807 L 33 # I-159

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Reflect the proposal on slide 3 in https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_03a_2603.pdf, incorporating the consensus from Straw Poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf.

SuggestedRemedy

In Table 176C-8:
 Add note (a) to row "Differential-mode to common-mode return loss, RLcd"
 Insert 3 table rows for with the respective Reference, Value, and Units
 Common-mode to common-mode effective return loss, ERLcc (min) (b); 178A.3; 2dB
 Common-mode to differential-mode effective return loss, ERLdc (min) (b); 178A.3; 17 dB
 Differential -mode to common-mode effective return loss, ERLcd (min) (b); 178A.3; 17 dB
 Add the following notes to the bottom of the table:
 (a & b) The minimum modal return loss is met by exceeding the requirements of either (a) or (b)
 (b) Modal ERL parameter values are taken from 178C.7.3

Proposed Response Response Status O

CI 176C SC 176C.7 P 807 L 32 # I-167

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

As suggested in 179.1, table 179-16, channels with high values of COM should not be required to meet minimum ER

SuggestedRemedy

Add note (c) to the ERL row in table 176C.8 and the add the following note at bottom of the table:
 (c) Channels with a COM greater than 4 dB are not required to meet minimum ERL.

Proposed Response Response Status O

CI 176D SC 176D P 817 L 35 # I-107

Ran, Adee Cisco Systems, Inc.

Comment Type T Comment Status X

Updated figures for Annex 176D have been proposed in https://www.ieee802.org/3/dj/public/26_03/ran_3dj_03a_2603.pdf, to reduce usage of the contentious term "connector" and improve the representation of entities.

SuggestedRemedy

Implement the proposed figures on slides 7, 8, 9, and 10 of ran_3dj_03a_2603, with editorial license.

Proposed Response Response Status O

CI 176D SC 176D.3 P 819 L 38 # I-173

Healey, Adam Broadcom Inc.

Comment Type E Comment Status X

In Figure 176D-2, the delineation between host and module is shown to be the outer edge of the box labeled "connector". However, in Figures 176D-4 and 176D-5, the host and module are shown to extend to the line in the middle of a similar looking "connector" box. Figure 176D-2 should be changed to be consistent with the other figures.

SuggestedRemedy

In Figure 176D-2, move the point where the arrows delineating "host" and "module" meet to align with the line in the middle of the box labelled "connector". If there is ambiguity about what this line represents, add a note to the figure indicating that the line corresponds to the "mating point of the MDI connector" similar to what is described in 179B.2.1 and 179B.3.1.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 176D SC 176D.4 P818 L14 # I-108

Ran, Adeo Cisco Systems, Inc.

Comment Type TR Comment Status X

"When SIGNAL_OK is either IN_PROGRESS or FAIL, the corresponding tx_symbol parameters on all lanes are unspecified"

This sentence should apply to AUI components in both directions, so it is either tx_symbol or rx_symbol.

The two directions are listed in the preceding sentence - PMA:IS_SIGNAL.indication or PMA:IS_SIGNAL.request. In the first case, the parameters are rx_symbol; in the second case, they are tx_symbol.

The proposed text breaks the paragraph into the two cases to avoid using "corresponding", "respectively", etc.

SuggestedRemedy

Change the paragraph:

"The SIGNAL_OK parameter of the PMA:IS_SIGNAL.indication (for an AUI component above the AUI channel) or PMA:IS_SIGNAL.request (for an AUI component below the AUI channel) corresponds to the variable rts_status of the RTS function, as defined in 178B.8.2.1. When SIGNAL_OK is either IN_PROGRESS or FAIL, the corresponding tx_symbol parameters on all lanes are unspecified."

To the following two paragraphs:

"For an AUI component above the AUI channel, the SIGNAL_OK parameter of the PMA:IS_SIGNAL.indication primitive corresponds to the variable rts_status of the RTS function, as defined in 178B.8.2.1. When SIGNAL_OK is either IN_PROGRESS or FAIL, the rx_symbol parameters of the PMA:IS_DATAUNIT_i.indication primitive on all lanes are unspecified.

For an AUI component below the AUI channel, the SIGNAL_OK parameter of the PMA:IS_SIGNAL.request primitive corresponds to the variable rts_status of the RTS function, as defined in 178B.8.2.1. When SIGNAL_OK is either IN_PROGRESS or FAIL, the tx_symbol parameters of the PMA:IS_DATAUNIT_i.request primitive on all lanes are unspecified."

Apply the same change in 176C.4.

Proposed Response Response Status O

CI 176D SC 176D.6.4 P820 L36 # I-242

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

Comments submitted against D2.x requested demonstration that using transmitter out test parameters with SNDR are sufficient for interoperability. These explicit jitter value either will are too strengthen or too relaxed from the point of what receiver cares!

SuggestedRemedy

The established method in CK VEO and VEC has direct correlation to what receiver can tolerate, the EECQ is another test developed in the OIF Linear and RTLr is a composite test that determines goodness/badness from the perspective of the receiver.

TF either need to demonstrate that the current jitter limits is sufficient for interoperability otherwise consider adding VEO/VEC or EECQ.

Other standards that typically follow IEEE in this case plan to continue with VEC/VEO and some major customers also not convinced what we have for C2M is sufficient and likely will create their own specifications

Proposed Response Response Status O

CI 176D SC 176D.6.4 P821 L18 # I-160

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Reflect the proposal on slide 3 in https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_03a_2603.pdf, incorporating the consensus from Straw Poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf.

SuggestedRemedy

In Table 179D-2:

Add note (a) to rows
 Common-mode to common-mode return loss, RLcc (min)
 Common-mode to differential-mode return loss, RLdc (min)
 Insert 3 table rows for with the respective Reference, Value, and Units
 Common-mode to common-mode effective return loss, ERLcc (min) (b); 178A.3; 2dB
 Common-mode to differential-mode effective return loss, ERLdc (min) (b); 178A.3; 17 dB
 Differential -mode to common-mode effective return loss, ERLcd (min) (b); 178A.3; 17 dB
 Add the following notes to the bottom of the table:
 (a & b) The minimum modal return loss is met by exceeding the requirements of either (a) or (b)
 (b) Modal ERL parameter values are taken from 176D.8.3

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 176D SC 176D.6.4 P 821 L 33 # I-312

Dudek, Michael Marvell

Comment Type TR Comment Status X

The SNDR for the host output is measured with the worst case next agressor after the major loss of the channel. (i.e. close to the end of the channel). It is unrealistic and unnecessary to meet the values at the CR test point

SuggestedRemedy

Change the requirement (just for the host output) from "Table 179-9" to 27.5dB. On line 17 Delete "The minimum SNDR requirements in Table 179-9 apply for both module output and host output."

Proposed Response Response Status O

Cl 176D SC 176D.6.4 P 821 L 34 # I-274

Calvin, John Keysight Technologies

Comment Type TR Comment Status X

SNRISI has a limit of 26dB. The pass/fail statistics gathered on early system/switch designs are having trouble passing this number. Particularly any host with a HH channel ranges from 24-25dB and fails current specifications.

SuggestedRemedy

A presentation will be offered to support this comment. Propose changing the 26dB target value for SNRISI to 24dB would offer margin on systems that are known to interoperate, but are failing this spec.

Proposed Response Response Status O

Cl 176D SC 176D.6.4 P 821 L 36 # I-183

Rysin, Alexander NVIDIA

Comment Type ER Comment Status X

The method for the random jitter measurement changed to phase-only (horizontal) jitter, yet the naming remained J_rms, similar to the previous, 12-edge method.

SuggestedRemedy

Replace J_rms with JH_rms here and in subclause 176D.6.8.10.

Proposed Response Response Status O

Cl 176D SC 176D.6.4 P 821 L 37 # I-354

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

TP1a has no composite eye penalty

SuggestedRemedy

Add EECQ per definition in the OIF 112G-RTLr with max limit of 9 dB and following exceptions BT4 filter 60 GHz, reference equalizer per definition in table 176D-7

Proposed Response Response Status O

Cl 176D SC 176D.6.4 P 821 L 38 # I-311

Dudek, Michael Marvell

Comment Type T Comment Status X

With the change from J4U to JH4u this jitter parameter is no longer expected to be dependent on channel loss and therefore there shouldn't be different values for the host and module and the value should match the value allocated to the die

SuggestedRemedy

In table 176D-2 change JH4U value to 0.118

Proposed Response Response Status O

Cl 176D SC 176D.6.5 P 821 L 25 # I-298

Dudek, Michael Marvell

Comment Type TR Comment Status X

As discussed in healey_3dj_01_2601 the module loss allocated in the budget does not align with Rpeak and Vf specifications and the module input interference and jitter tolerance calibration

SuggestedRemedy

Implement the changes proposed in healey_3dj_01_2601

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 176D SC 176D.6.5 P 822 L 20 # I-161

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Reflect the proposal on slide 3 in https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_03a_2603.pdf, incorporating the consensus from Straw Poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf.

SuggestedRemedy

In Table 179D-3:

Add note (a) to rows

Common-mode to common-mode return loss, RLcc (min)

Common-mode to differential-mode return loss, RLdc (min)

Insert 3 table rows for with the respective Reference, Value, and Units

Common-mode to common-mode effective return loss, ERLcc (min) (b); 178A.3; 2dB

Common-mode to differential-mode effective return loss, ERLdc (min) (b); 178A.3; 17dB

Differential -mode to common-mode effective return loss, ERLcd (min) (b); 178A.3; 17 dB

Add the following notes to the bottom of the table:

(a & b) The minimum modal return loss is met by exceeding the requirements of either (a) or (b)

(b) Modal ERL parameter values are taken from 176D.8.3

Proposed Response Response Status O

Cl 176D SC 176D.6.5 P 822 L 38 # I-184

Rysin, Alexander NVIDIA

Comment Type ER Comment Status X

The method for the random jitter measurement changed to phase-only (horizontal) jitter, yet the naming remained J_rms, similar to the previous, 12-edge method.

SuggestedRemedy

Replace J_rms with JH_rms.

Proposed Response Response Status O

Cl 176D SC 176D.6.5 P 824 L 25 # I-175

Healey, Adam Broadcom Inc.

Comment Type TR Comment Status X

Slide 7 of <https://www.ieee802.org/3/dj/public/25_11/healey_3dj_01a_2511.pdf> highlighted that there is some ambiguity in the loss that has been allocated to the module. The value computed on slide 12 for module output Rpeak was based on the more generous interpretation i.e., 5.9 dB from the TP4d to the mating point of the connector. If the loss from TP4d to the mating point of the connector is limited to 3.8 dB as shown in Figure 176D-6, then the Rpeak limit in Table 176D-3 needs to be adjusted.

SuggestedRemedy

If the module loss allocation is limited to 3.8 dB, then in Table 176D-3 change Rpeak (min) to 0.51 and change the lower value of the vf range to 0.392.

Proposed Response Response Status O

Cl 176D SC 176D.6.6 P 823 L 16 # I-162

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Reflect the proposal on slide 3 in https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_03a_2603.pdf, incorporating the consensus from Straw Poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf.

SuggestedRemedy

In Table 176D-4:

Add note (a) to row "Differential-mode to common-mode return loss, RLcd"

Insert 3 table rows for with the respective Reference, Value, and Units

Common-mode to common-mode effective return loss, ERLCC (min) (b); 178A.3; 2dB

Common-mode to differential-mode effective return loss, ERLCD (min) (b); 178A.3; 17dB

Differential -mode to common-mode effective return loss, ERLDC (min) (b); 178A.3; 17 dB

Add the following notes to the bottom of the table:

(a & b) The minimum modal return loss is met by exceeding the requirements of either (a) or (b)

(b) Modal ERL parameter values are taken from 178D.8.3

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 176D SC 176D.6.7 P 823 L 45 # I-163

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Reflect the proposal on slide 3 in https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_03a_2603.pdf, incorporating the consensus from Straw Poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf.

SuggestedRemedy

In Table 176D-5:
 Add note (a) to row "Differential-mode to common-mode return loss, RLcd"
 Insert 3 table rows for with the respective Reference, Value, and Units
 Common-mode to common-mode effective return loss, ERLcc (min) (b); 178A.3; 2dB
 Common-mode to differential-mode effective return loss, ERLdc (min) (b); 178A.3; 17 dB
 Differential -mode to common-mode effective return loss, ERLcd (min) (b); 178A.3; 17 dB
 Add the following notes to the bottom of the table:
 (a & b) The minimum modal return loss is met by exceeding the requirements of either (a) or (b)
 (b) Modal ERL parameter values are taken from 178D.8.3

Proposed Response Response Status O

CI 176D SC 176D.7.1 P 824 L 25 # I-243

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

Should make it clear that host and module channel include any packages

SuggestedRemedy

Replace Host channel with "Host channel and package"
 Replace Module channel with "Module channel which may include a package"

Proposed Response Response Status O

CI 176D SC 176D.7.1 P 824 L 37 # I-292

Dudek, Michael Marvell

Comment Type E Comment Status X

In figure 176D-6 the note includes "to the center of the edge connector of the module " whereas in Figure 179A-1 it says "The point of demarcation between the MCB and HCB is the mating point of the MDI connector." and in 179B.2.1 and 179B.3.1 it says "the mating point of the MDI connector". These points should be the same.

SuggestedRemedy

Change "to the center of the edge connector of the module" to "to the mating point of the host connector"

Proposed Response Response Status O

CI 176D SC 176D.7.2 P 824 L 41 # I-269

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

COM reference model provided is module-chip and only used for interference tolerance, but current transmitter relies on jitter output which is incomplete not having a reference COM model

SuggestedRemedy

Create an ASIC-Module COM model and also a Module-ASIC COM model. If there is interest in TF, I can provide it COM models.

Proposed Response Response Status O

CI 176D SC 176D.7.2 P 825 L 26 # I-246

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

Host package model in the is package B and not calling the package host class B disconnects one from the knowledge in CL 178/179

SuggestedRemedy

Add to the name , host class B

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 176D SC 176D.7.2 P 825 L 41 # I-244

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

Given HCB has a loss of ~3.8 dB adding a module will increase the loss to 34.1 dB

SuggestedRemedy

Not a clean option here some options that can be considered:

- Adjust host partial channel loss by up to 2.1 dB (not a good option)
- Not to use module package maybe the simplest option
- Another viable option is to use 4 mm package with partial module PCB adsuted for total of 3.8 dB loss

see ghiasi_3dj_01_2605

Proposed Response Response Status O

Cl 176D SC 176D.7.2 P 825 L 49 # I-245

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

Module packages if exist are core-less

SuggestedRemedy

In case of core-less package you just have stack via through the ABF layers, suggest replacing 1.8 mm with 0.25 mm.

Proposed Response Response Status O

Cl 176D SC 176D.8.2 P 828 L 24 # I-291

Dudek, Michael Marvell

Comment Type T Comment Status X

Two synchronous samples per UI is potentially insufficient to find the peak to peak voltage if there is significant overshoot in the signal.

SuggestedRemedy

Change to four samples per UI at least when the sampling is synchronous.

Proposed Response Response Status O

Cl 176D SC 176D.8.2 P 828 L 31 # I-427

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This says "For compliance testing, it is sufficient to measure it from a square wave output with a period of at least 128 UI". There is no such square wave in this spec, and no alternative is offered. "At least" makes the measurement arbitrary. The nonlinear processes in the transmitter are not in their normal state - 128 UI is much more extreme than the SONET CID. 802.3 is not a compliance test spec; we define parameters not write test definitions. As the measurement doesn't need the scope to lock to the signal, one can just look at the envelope of a scrambled idle or scrambled RF signal; this avoids over- or under-measurement.

I wonder whether this could be done with PRBS13Q.

SuggestedRemedy

Change "For compliance testing, it is sufficient to measure it from a square wave output with a period of at least 128 UI, while lanes not under test transmit PRBS31Q" to "with the lane under test transmitting pattern 7 (e.g. idle, RF, or a one-lane portion of one of these), while lanes not under test transmit pattern 7 (e.g. other lanes from a common PCS) or PRBS31Q.

Proposed Response Response Status O

Cl 176D SC 176D.8.3 P 829 L 2 # I-428

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This says "the test fixture delay is defined as the propagation delay between the coaxial connector on the test fixture and the host-facing connection, excluding the mating interface discontinuity". The test fixture has two mating interfaces per lane, one at the coaxial connector and the other at the host-facing connection, each of which can have a discontinuity. It is not stated which one is to be excluded.

SuggestedRemedy

Please clarify. Three places.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 176D SC 176D.8.7 P 830 L 1 # I-304
 Dudek, Michael Marvell
 Comment Type E Comment Status X
 missing "and"
 SuggestedRemedy
 Change "step size coefficient" to "step size and coefficient"
 Proposed Response Response Status O

CI 176D SC 176D.8.13.1 P 833 L 39 # I-313
 Dudek, Michael Marvell
 Comment Type TR Comment Status X
 The test channel for both Host test and Module itest L is just a mated test board. The loss value in Table 176D-11 is 9+/-2dB but the Mated test board loss given in 179B does not match this. (The value wasn't changed here when the MCB loss was changed).
 SuggestedRemedy
 Change "9+/-2" dB to "8+/-2" dB, or better delete the numbers and replace with "note a" rewording note a to "The test channel consists of mated MCB and HCB with no frequency-dependent attenuator."
 Proposed Response Response Status O

CI 176D SC 176D.8.13.1 P 833 L 44 # I-355
 Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.
 Comment Type TR Comment Status X
 Interference penalty has no composite measurable penalty and given COM may differ from actual stress generator may result in under/over stress test condition
 SuggestedRemedy
 Add EECQ per definition in the OIF 112G-RTLr with max limit of 9 dB and following exceptions BT4 filter 60 GHz, reference equalizer per definition in table 176D-7
 Proposed Response Response Status O

CI 176D SC 176D.8.13.2 P 832 L 6 # I-352
 Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.
 Comment Type TR Comment Status X
 The description for host test is not clear enough for average reader
 SuggestedRemedy
 Create a figure starting with Figure 176D-7b but add module package, host package, and partial host channel
 Proposed Response Response Status O

CI 176D SC 176D.8.13.2 P 832 L 8 # I-353
 Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.
 Comment Type TR Comment Status X
 The description for module test is not clear enough for average reader
 SuggestedRemedy
 Create a figure starting with Figure 176D-8b but add module package and host package
 Proposed Response Response Status O

CI 176D SC 176D.8.13.2 P 834 L 8 # I-12
 Lusted, Kent Synopsys, Inc.
 Comment Type TR Comment Status X
 Repeating comment #58 from D2.3: For the module receiver interference tolerance test, item b) states that "COM is calculated using the module device package and device termination models". However, the module test channel shown in Figure 176D-8b includes the host compliance board (HCB). The reference loss of the HCB equals the module loss allocation to TP1d illustrated in Figure 176D-6. Therefore, the addition of the module device package model results in the interference tolerance test being calibrated with approximately 2.1 dB more loss than a module has been allocated.
 SuggestedRemedy
 Replace 176D.8.13.2 item b) with the following. "For the module test, the test channel is measured between the Tx and Rx test references shown in Figure 176D-8b, and COM is calculated using device termination model in Table 176D-6 for the receiver S-parameter model."
 implement the changes per
https://www.ieee802.org/3/dj/public/26_01/healey_3dj_01_2601.pdf
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 176D SC 176D.8.13.2 P 836 L 9 # I-174

Healey, Adam Broadcom Inc.

Comment Type TR Comment Status X

For the module receiver interference tolerance test, item b) states that "COM is calculated using the module device package and device termination models". However, the module test channel shown in Figure 176D-8b includes the host compliance board (HCB). The reference loss of the HCB equals the module loss allocation to TP1d illustrated in Figure 176D-6. Therefore, the addition of the module device package model results in the interference tolerance test being calibrated with approximately 2.1 dB more loss than a module has been allocated.

SuggestedRemedy

Replace 176D.8.13.2 item b) with the following. "For the module test, the test channel is measured between the Tx and Rx test references shown in Figure 176D-8b, and COM is calculated using device termination model in Table 176D-6 for the receiver S-parameter model."

Proposed Response Response Status O

CI 176D SC 176D.8.15 P 836 L 12 # I-179

Healey, Adam Broadcom Inc.

Comment Type TR Comment Status X

The transmitter output amplitude tolerance test calibrates the receiver input for a target steady-state voltage value. However, a transmitter with overshoot in the preset 1 configuration would have a differential peak-to-peak output amplitude greater than 1 V. Since a compliant transmitter must also meet a differential peak-to-peak output voltage limit of 1 V (see Table 176D-2), the resulting test condition would not be encountered in practice and would over-stress the receiver. The stress test signal must also be verified to have a differential peak-to-peak voltage less than or equal to 1 V for the preset 1 configuration.

SuggestedRemedy

Add a requirement that the differential peak-to-peak output voltage measured at TP1 must meet the requirements of Table 176D-2 for module testing. Add similar requirements to transmitter output amplitude tolerance tests in Clauses 178, Clause 179, Annex 176C, and for host testing in Annex 176D.

Proposed Response Response Status O

CI 177 SC 177.1 P 354 L 4 # I-398

Opsasnick, Eugene Broadcom Inc.

Comment Type E Comment Status X

In Figure 177-2, the input and output UNITDATA signals at the top of figure use the index "i" to represent n input lanes and output lanes. "n" is defined on the previous page, but "i" is not defined until later in the subclause. On the bottom of the figure the UNITDATA input & output lanes are indexed as "*_0:n-1". This is more consistent with the representation of a variable number of I/O lanes as shown in other clauses (e.g. Figure 176-2 on page 321).

SuggestedRemedy

In Figure 177-2 on page 354:

change:
"FEC:IS_UNITDATA_i.request"
to:
"FEC:IS_UNITDATA_0:(n-1).request"

change:
"FEC:IS_UNITDATA_i.indication"
to:
"FEC:IS_UNITDATA_0:(n-1).indication"

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 177 SC 177.2 P355 L21 # I-83

Ran, Adeo Cisco Systems, Inc.

Comment Type **TR** Comment Status **X**

For SIGNAL_OK in the transmit direction (.request primitive) there is the following text:
 "When SIGNAL_OK is IN_PROGRESS or FAIL, the corresponding tx_symbol parameters on all lanes are unspecified"
 In the subsequent paragraph, for the receive direction (.indication primitive) there is a similar text but it also includes the READY state.

The READY state indicates that the sublayer that generates the primitive is not generating valid data - either because of incomplete training on an adjacent interface or because AM lock and deskew is still underway. Therefore, the data that the inner FEC sublayer provides to the next sublayer will also be invalid, both for indication and for request.

However, this paragraph actually describes the behavior of the client sublayer (PMA), so the wording "the corresponding tx_symbol parameters" refers to the PMA's transmitted symbol. The statement does not describe the inner FEC sublayer's output, and thus is not required in this subclause.

SuggestedRemedy

Since the paragraph about the PMA's signal status information describes the PMA's output, it should be deleted from this clause.

If the paragraph is retained, change the quoted sentence to
 "When the value of SIGNAL_OK is READY, IN_PROGRESS, or FAIL, the corresponding tx_symbol parameters of the PMA:IS_SIGNAL.request_i primitive on all lanes are unspecified".

Proposed Response Response Status **O**

CI 177 SC 177.4.2 P358 L15 # I-403

Opsasnick, Eugene Broadcom Inc.

Comment Type **ER** Comment Status **X**

At end of the second paragraph, there is an extra instance of the word "table".

SuggestedRemedy

Replace:
 "... are shown in table Table 177-3."
 with:
 "... are shown in Table 177-3."

Proposed Response Response Status **O**

CI 177 SC 177.4.7.1 P362 L41 # I-60

WANG, Xuebo Huawei Technologies Co., Ltd

Comment Type **ER** Comment Status **X**

The hyphen in "48-bits" is redundant, and should be removed.

SuggestedRemedy

Change "48-bits" to "48 bits".

Proposed Response Response Status **O**

CI 177 SC 177.4.8.2 P364 L10 # I-373

Slavick, Jeff Broadcom Inc

Comment Type **TR** Comment Status **X**

ILT is run for both settings of mr_training_enable so stating ILT is disabled is not accurate. In 178B.7 we refer to it as training enabled and training disabled.

SuggestedRemedy

Change "ILT is disabled" to "training is disabled"

Proposed Response Response Status **O**

CI 177 SC 177.5.1.1 P364 L34 # I-374

Slavick, Jeff Broadcom Inc

Comment Type **TR** Comment Status **X**

ILT is run for both settings of mr_training_enable so stating ILT is enabled is not accurate. In 178B.7 we refer to it as training enabled and training disabled.

SuggestedRemedy

Change "ILT is enabled" to "training is enabled"

Proposed Response Response Status **O**

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 177 SC 177.5.1.1 P364 L36 # I-375
 Slavick, Jeff Broadcom Inc
 Comment Type TR Comment Status X
 ILT is run for both settings of mr_training_enable so stating ILT is disabled is not accurate. In 178B.7 we refer to it as training enabled and training disabled.
 SuggestedRemedy
 Change "ILT is disabled" to "training is disabled"
 Proposed Response Response Status O

Cl 177 SC 177.5.1.1 P364 L37 # I-376
 Slavick, Jeff Broadcom Inc
 Comment Type TR Comment Status X
 All the other precoder conditions for non-training mode of operation state it is set as required by implementation rather than specifically stating management entity. And this is the receiver not the transmitter.
 SuggestedRemedy
 Change "data at the transmitter is controlled by a management entity" to "received data is set as required by the implementation"
 Proposed Response Response Status O

Cl 177 SC 177.5.2 P365 L37 # I-143
 Bruckman, Leon NVIDIA
 Comment Type E Comment Status X
 Figure 177-11 is related with section 177.5.2.
 SuggestedRemedy
 Move Figure 177-11 to be before section 177.5.3
 Proposed Response Response Status O

Cl 177 SC 177.5.5 P366 L42 # I-361
 Slavick, Jeff Broadcom Inc
 Comment Type TR Comment Status X
 The definition of the bin_counters in Clause 177 and 184 are not entirely accurate. It states that they count for exactly k corrected bits, but then the highest bin also increments if you changed k or more bits.
 Also, stating bin_0 is counting codewords received with no detectable errors would be useful to clarify its behavior.
 SuggestedRemedy
 Implement the changes shown in
https://www.ieee802.org/3/dj/public/26_01/opsasnick_3dj_01b_2601.pdf slides 13 and 14
 Proposed Response Response Status O

Cl 177 SC 177.5.8 P367 L14 # I-413
 Opsasnick, Eugene Broadcom Inc.
 Comment Type TR Comment Status X
 177.5.8 "Convolutional deinterleaver" does not give any information regarding the relationship of the 120-bit block inputs from the 120-bit block distribution (multiplexer) to the 40-bit symbol-quartets distributed to each of the three delay lines. 177.4.3 requires that the first RS-FEC quartet within a 120-bit block is always from delay line 0. A similar statement should be added to 177.5.8.
 SuggestedRemedy
 In 177.5.8, Add this text to the end of the second paragraph:
 "Symbol quartets of data from the 120-bit block multiplexer are distributed sequentially to delay line 0, delay line 1, and delay line 2. The first 40-bit symbol quartet of each 120-bit block is always aligned to delay line 0."
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 177 SC 177.5.8 P367 L38 # I-317

Nicholl, Gary Cisco Systems, Inc.

Comment Type TR Comment Status X

To ensure that the convolutional deinterleaver shall correctly perform the inverse function of the convolutional interleaver function, it is important that the convolutional deinterleaver is aligned to the 120-bit block structure in the same way as the convolution interleaver.

The alignment between the convolution interleaver and the 120-bit block structure in the transmit direction is defined by the following sentence in 177.4.3:

"The first RS-FEC symbol-quartet within a 120-bit block is always from delay line 0."

Need a similar sentence in the receive direction, to ensure that the first RS-FEC symbol-quartet within a 120-bit block is always sent to delay line 0.

SuggestedRemedy

Add the following sentence at the end of the second paragraph of 177.5.8:

"The first RS-FEC symbol-quartet (40 bits) within a 120-bit block received from the 120-bit block demultiplexer is sent to Delay Line 0."

Proposed Response Response Status O

Cl 177 SC 177.6.1.1 P368 L4 # I-172

He, Xiang Huawei Technologies Co., Ltd

Comment Type E Comment Status X

"FEC lane" should be "Inner FEC lane". Also line 51 on this page.

SuggestedRemedy

Change "FEC lane" to "Inner FEC lane". Apply this fix throughout the clause.

Proposed Response Response Status O

Cl 177 SC 177.7.2.1 P369 L50 # I-84

Ran, Adee Cisco Systems, Inc.

Comment Type T Comment Status X

There is only one signal_ok variable in the inner FEC sublayer, but it seems that there should be one for each of the two interfaces (similar to the PMA's signal_ok_mux and signal_ok_demux).

There are no state diagrams for the client sublayer interface function but the inner FEC should have a function for identifying the symbol boundaries similar to the PMA multiplex synchronization state diagram (Figure 176-10), which uses signal_ok_mux. The currently defined signal_ok is for the PMD service interface, and should thus be called signal_ok_demux. Alternatively, it can be called pmd_signal_ok.

SuggestedRemedy

Rename signal_ok to signal_ok_demux in the definition and the state diagrams that use it (Figure 177-13 and Figure 177-14).

Consider adding signal_ok_mux to represent the PMA's SIGNAL_OK and specifying how it affects the transmit process.

Proposed Response Response Status O

Cl 178 SC 178.1 P381 L14 # I-17

Brown, Matthew Qualcomm

Comment Type TR Comment Status X

Relating to the following text: "The package is either class A or class B. PMD transmitters and PMD receivers conform to electrical specifications of either class A or class B."

It is not possible to determine if a package is of class A or class B. It is only possible to determine if a device meets the class A or class B requirements. Also, these are not mutually exclusive; a device could possibly meet both the class A and class B requirements. Instead reword this to indicate that two classes, class A and class B, are defined for transmitters and receivers to allow for a range of package characteristics.

SuggestedRemedy

Change the paragraph to the following:

"This clause defines specifications for two classes of transmitters and two classes of receivers, class A and class B, to allow for a range of package characteristics. A transmitter or receiver is classified as class A or class B if it meets all the specifications for class A or class B, respectively. The required characteristics of the electrical interconnect between two PMDs depend on the intended transmitter class on one PMD and the receiver class on the other PMD."

Further changes elsewhere may be required to align with this restatement.

Proposed Response Response Status O

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Cl 178 SC 178.1 P381 L48 # I-285

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

Comment Type TR Comment Status X

Note e states the following -
ILT and RTS functions are mandatory for the 200GBASE-KR1 PMD and 200GAUI-1 C2C.

However, this is incomplete. It is also necessary for the 200GMII Extender if based on a 200GAUI-1.

SuggestedRemedy

Add note "e" to 200GAUI-1 C2C entry.
Add note "f" to 200GMII Extender entry -
f. If the 200GMII Extender is based on a 200GAUI-1, it shall support APSU, as defined in 178B.

Proposed Response Response Status O

Cl 178 SC 178.1 P382 L31 # I-286

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

Comment Type TR Comment Status X

Note e states the following -
ILT and RTS functions are mandatory for the 400GBASE-KR2 PMD and 400GAUI-2 C2C.

However, this is incomplete. It is also necessary for the 400GMII Extender if based on a 400GAUI-2.

SuggestedRemedy

Add note "e" to 400GAUI-2 C2C entry.
Add note "f" to 400GMII Extender entry -
f. If the 400GMII Extender is based on a 400GAUI-2, it shall support APSU, as defined in 178B.

Proposed Response Response Status O

Cl 178 SC 178.8.10 P388 L37 # I-146

Bruckman, Leon NVIDIA

Comment Type TR Comment Status X

The PMD reset, resets also the RTS function as shown in Figure 178B-9. See also the reset variable definition in 178B.8.2.1.

SuggestedRemedy

Change: "PMD reset shall reset the inter-sublayer link training (ILT) and ready-to-send (RTS) functions associated with the PMD"

Proposed Response Response Status O

Cl 178 SC 178.9.2 P389 L32 # I-306

Dudek, Michael Marvell

Comment Type T Comment Status X

The reference 179.9.2.4 is only appropriate for the coefficient step size. The values at minim and maximum state should not be referencing 179.9.2.4 they should reference the Coefficient ranges in 179.9.4.2.5

SuggestedRemedy

Add the appropriate references to 179.9.4.2.5. as is done in Table 179-7. Make the same change in table 176C-2

Proposed Response Response Status O

Cl 178 SC 178.9.2 P389 L43 # I-310

Dudek, Michael Marvell

Comment Type T Comment Status X

With the change from J4U to JH4u this jitter parameter is no longer expected to be dependent on channel loss and therefore there shouldn't be different values for different package classes and should match the value allocated to the die

SuggestedRemedy

Remove the different package classes and have a single value of 0.118 Make the same change in 176C

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 178 SC 178.9.2.3 P954 L11 # I-176

Healey, Adam Broadcom Inc.

Comment Type TR Comment Status X

The receiver 3 dB bandwidth and the target detector error ratio for the dERL measurement is not defined. It is presumably the values specified in Table 178-15 but this table is not included in the list of references for parameter values.

SuggestedRemedy

In the first sentence of 178.9.2.3, change "...with the values in Table 178-8 and Table 178-14, with differential reference impedance..." to "...with the values in Table 178-8, Table 178-14, and Table 178-15, with differential reference impedance...".

Proposed Response Response Status O

Cl 178 SC 178.9.3.3 P394 L45 # I-52

Brown, Matthew Qualcomm

Comment Type T Comment Status X

Draft 2.2 comment #220 changed BER_total in Table 178-10 from 2.92E-4 to 2.921E-4. However, the BER_max value in Table 178-10, and the mask values in Table 178-11 were not correspondingly updated. A similar problem exists in Table 179-12/13, Table 180-19/20, Table 181-17/18, and Table 185-15/16.

SuggestedRemedy

Update Table 178-10, Table 179-12, Table 180-19, Table 181-17, and Table 185-15, changing BER_max to the different of BER_total and BER_added. Accordingly update the mask values in Table 178-11, Table 179-13, Table 180-20, Table 181-18, and Table 185-16. A contribution will be provided with the updated BER_max and mask values.

Proposed Response Response Status O

Cl 178 SC 178.9.3.3 P395 L30 # I-85

Ran, Adee Cisco Systems, Inc.

Comment Type TR Comment Status X

The values in Table 178-11 mostly match the calculation of H_max in 174A.9.5 with BER_max=2.76e-4, but the values for k=16 with p=1 and p=2 have a slight mismatch, while for p=4 and p=8 they match.

Note that the text in 174A.9.5 does not include a special treatment for k=16.

The same values appear in Table 179-13.

A spreadsheet for the calculation will be contributed.

SuggestedRemedy

In Table 178-11, row k=16, change the values as follows:

p=1: Change from 6.4e-12 to 5.8e-12

p=2: Change from 1.6e-16 to 1.5e-16

Make the same changes in Table 179-13.

Proposed Response Response Status O

Cl 178 SC 178.10 P400 L28 # I-46

Lusted, Kent Synopsys, Inc.

Comment Type T Comment Status X

Apply modal ERL.

Keep all frequency domain modal masks

If modal masks for cable assemblies, hosts, modules, KR channels, chip to chip channels, or MTF fail the respective modal RL mask, there is an opportunity to pass if modal ERL passes.

SuggestedRemedy

Apply modal ERL per mellitz_3dj_03a_2603, slides 2 and 3.

see also straw poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf

Proposed Response Response Status O

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Cl 178 SC 178.10 P 400 L 41 # I-166

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

As suggested in 179.1, table 179-16, channels with high values of COM should not be required to meet minimum ER

SuggestedRemedy

Add note (c) to the ERL row in table 178.13 and the add the following note at bottom of the table:

(c) Channels with a COM greater than 4 dB are not required to meet minimum ERL.

Proposed Response Response Status O

Cl 178 SC 178.10 P 400 L 41 # I-155

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Reflect the proposal on slide 3 in https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_03a_2603.pdf, incorporating the consensus from Straw Poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf.

SuggestedRemedy

In Table 178-13:

Add note (a) to row "Differential-mode to common-mode return loss, RLcd"

Insert 3 table rows for with the respective Reference, Value, and Units

Common-mode to common-mode effective return loss, ERLcc (min) (b); 178A.3; 2dB

Common-mode to differential-mode effective return loss, ERLdc (min) (b); 178A.3; 17 dB

Differential -mode to common-mode effective return loss, ERLcd (min) (b); 178A.3; 17 dB

Add the following notes to the bottom of the table:

(a & b) The minimum modal return loss is met by exceeding the requirements of either (a) or (b)

(b) Modal ERL parameter values are taken from 179.10.3

Proposed Response Response Status O

Cl 178 SC 178.10 P 400 L 43 # I-171

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Prior posted computations for SCMR_CH where computed using DER_0 for P_Peak. The current draft specifies P_peak as 1e-7. This reduces SCMR_CH by 3 dB.

SuggestedRemedy

Lower SCMR_CH (min) as follows:

178.10

Page 400

Line 43

Change

Minimum channel signal to common-mode ratio, SCMR_CH from 20 dB to 17 dB

179.11

Page 443

Line 21

Channel signal to common-mode ratio, SCMR_CH (min) from 12 dB to 9 dB

Page 807

Line 35

Change

Minimum channel signal to common-mode ratio, SCMR_CH from 20 dB to 17 dB

Proposed Response Response Status O

Cl 178 SC 178.10.1 P 401 L 16 # I-424

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This table contains "C_d⁽¹⁾", "C_d⁽²⁾" and so on. A superscript denotes either exponentiation or some sort of footnote or reference, yet the former would not be consistent with the units and the latter are missing. Computer programs don't have variable names containing superscript, and such names are difficult for humans too.

SuggestedRemedy

Change to C_{d1}", "C_{d2}" and so on. Similarly R_d and so on

Scrub the draft for unnecessary superscript notation, so that it does not appear outside 178A.1, Channel Operating Margin.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 178 SC 178.10.1 P402 L 12 # I-32
 Brown, Matthew Qualcomm
 Comment Type E Comment Status X
 Per style manual, use of the word "can" in the sense of "is permitted" is deprecated. Instead, use the word "may".
 SuggestedRemedy
 Change "parameters can be measured" to "parameters may be measured".
 Proposed Response Response Status O

Cl 178 SC 178.10.1 P403 L 25 # I-425
 Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X
 This says "Random jitter, RMS", "sigma_RJ" yet it is clear by inspection that what is meant is Gaussian jitter, and the its cause (random, known cause, or unknown cause) is not the point. A new COM definition is our chance to follow OIF and break with this old name from 8B/10B times which in the age of scrambled coding is inaccurate and encourages sloppy thinking.
 SuggestedRemedy
 Change "Random jitter, RMS", "sigma_RJ" to "Gaussian jitter, RMS", "sigma_GJ" throughout. Add notes as necessary pointing out that similar quantities in older clauses (Annex 93A for example) use the old names.
 Proposed Response Response Status O

Cl 178 SC 178.13 P405 L 53 # I-300
 Dudek, Michael Marvell
 Comment Type T Comment Status X
 The notes to the tables 179-23 and 179-24 correctly apply to CR, but these tables are normatively referenced by clause 178 where these CR PMD references do not apply but should be replaced by other references.
 SuggestedRemedy
 In 178.13 Change "The PMD control and status variables are identical to those defined in 179.14." to "The PMD control and status variables are identical to those defined in 179.14, with the exception that references to CR PMD's are replaced by references to the equivalent KR PMD's".
 Proposed Response Response Status O

Cl 178 SC 178.14.3 P407 L 15 # I-58
 de Koos, Andras Microchip Technology Inc
 Comment Type ER Comment Status X
 It is unclear how the PICS items PMA100, FEC100, and PCS100 relate to the 200GBASE-KR1 PMD. Are they meant to be in this table?
 SuggestedRemedy
 Clean up the Clause 178 PICS table - The equivalent table in Clause179 (CR) looks a lot cleaner - includes references to 800GBASE-R and does NOT include references to 100GBASE-P/R.
 Proposed Response Response Status O

Cl 178 SC 178.14.3 P407 L 18 # I-59
 de Koos, Andras Microchip Technology Inc
 Comment Type ER Comment Status X
 Typo : "200GBASE-P PMA"
 SuggestedRemedy
 Replace with "200GBASE-R PMA"
 Proposed Response Response Status O

Cl 178 SC 178.14.4.2 P409 L 42 # I-401
 Opsasnick, Eugene Broadcom Inc.
 Comment Type E Comment Status X
 in the table row for PC10 "Training", the Value/Comment column capitalizes the value TRUE. The rest of 802.3dj seems to always keep Boolean values "true" and "false" in lower case, even though the base standard, IEEE802.3-2022, seems to have a mix of uppercase and lowercase.
 SuggestedRemedy
 Change "TRUE" to "true" on line 42 of page 409.
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 178A SC 178A P864 L13 # I-154
 Mellitz, Richard Samtec, Inc.
 Comment Type TR Comment Status X
 A comprehensive method is required to support modal ERL, reflecting the consensus from Straw Poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf.
 SuggestedRemedy
 Add a section to Annex 178A (178A.1.3) that describes the computation of modal ERL (see [mellitz_3dj_02_adhoc_260415.pdf](https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf)).
 Proposed Response Response Status O

CI 178A SC 178A.1.2 P842 L47 # I-153
 Mellitz, Richard Samtec, Inc.
 Comment Type TR Comment Status X
 Modal S-parameters are not explicitly specified for 200 Gb/s per lane, reflecting the consensus from Straw Poll #11 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf.
 SuggestedRemedy
 Modify 178A.1.2 to include modal S-parameter syntax (see [mellitz_3dj_02_adhoc_260415.pdf](https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf)).
 Proposed Response Response Status O

CI 178A SC 178A.1.8.1 P854 L36 # I-414
 Swenson, Norman Nokia Corporation, Norman Swenson Consulting, Point
 Comment Type ER Comment Status X
 The quantizer is actually a 1UI (T-spaced) sampler and quantizer. This should be explicitly stated.
 SuggestedRemedy
 Change "The input to the feed-forward filter is the output of the quantizer." to "The input to the feed-forward filter is the output of the quantizer, which samples and quantizes its input at 1 UI intervals."
 Proposed Response Response Status O

CI 178A SC 178A.1.9.1 P857 L47 # I-51
 Shakiba, Mohammad Huawei Technologies Canada Co., Ltd.
 Comment Type TR Comment Status X
 *** Comment submitted with the file 802d3_TFR_SAB_comments_D3p0_Shakiba260318.xls attached ***

Equation (178A-37) defines signal amplitude, (A_s) used in Equation (178A-36) for COM calculation. However, Equation (178A-37) defines the signal amplitude at the launch point. Since noise amplitude (A_{ni}) for COM calculation (described in section 178A.1.9.2 and its referenced sections and equations) is for noise at the input of the DFE slicer, A_s should also be defined as the signal amplitude at this point. This was the case in Annex 93A.

SuggestedRemedy
 Modify Equation (178A-37) to include the effect of the signal chain on the signal amplitude up to the DFE slicer input (from before TxFFE to after RxFFE). This can be achieved by adding a multiplying factor equal to the main cursor of the equalized pulse response ($h^*(0)(0)$) to Equation (178A-37).
 FYI, the COM Matlab code implementation seems to have used the correct equation as it is still following the procedure defined in section 93A.1.6 to calculate A_s .
 Proposed Response Response Status O

CI 178A SC 178A.2 P863 L28 # I-347
 Kocsis, Sam Amphenol Corporation
 Comment Type TR Comment Status X
 The lack of nomenclature around the terms of σ_{ts} and VCMch used in calculating SCMR_CH can be confusing for the reader.
 SuggestedRemedy
 Add the following "nomenclature" to clarify the terms. σ_{ts} is "the channel-induced differential timing noise" calculated using Equation (178A-56) and Equation (178A-57). VCMch is "the channel-generated common-mode voltage" calculated using Equation (178A-58) through Equation (178A-60).
 Proposed Response Response Status O

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Cl **178B** SC **178B** P **865** L **6** # **I-247**

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type **TR** Comment Status **X**

By calling the overall function "Autonomous path startup functions for electrical and optical interfaces" we are putting the cart in front of the horse! APSU and RTS are function of ILT not the other way around

SuggestedRemedy

Change the chapter name to Inter-sublayer link training with two key functions link training and RTS.
 APSU and RTS are somewhat redundant terminology. One way to solve the overlap between RTS and APSU are as following: RTS is signal indicator on an ISL after completion of link training. After receipt of RTS by the training function attached to the PCS indicating all ISLs are trained APSU conditions are met, where training stops and data transitions to PCS.

Proposed Response Response Status **O**

Cl **178B** SC **178B** P **865** L **7** # **I-494**

Dawe, Piers J G NVIDIA

Comment Type **ER** Comment Status **X**

Put the abbreviation in the title as we do for PMD, PMA, PCS...

SuggestedRemedy

Autonomous path startup (APSU) functions for electrical and optical interfaces

Proposed Response Response Status **O**

Cl **178B** SC **178B** P **870** L **9** # **I-137**

Huber, Thomas Nokia

Comment Type **TR** Comment Status **X**

The ILT function shouldn't have a DATA or a LOCAL PATTERN mode. This function is providing training on all the lanes of the PMD/AUI, not RTS signaling.

SuggestedRemedy

Remove DATA and LOCAL PATTERN modes from 178B.7. Further details will be provided in a presentation.

Proposed Response Response Status **O**

Cl **178B** SC **178B.1** P **865** L **35** # **I-278**

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

Comment Type **TR** Comment Status **X**

This note appears to be in conflict with the implementation in the standard itself - NOTE—AUI components and PMDs that are not specified to support the ILT function or the RTS function as defined in this annex may include equivalent capabilities, however this is beyond the scope of this standard.

However, looking at Table 116-3 as an example, all of these PHY types (not based on 200 Gb/s signaling) - 200GBASE-KR2 / KR4 / CR2 / CR4 have 2 notes -
 b: Mandatory for 200GAUI1-C2C
 c: Conditional

This is in conflict with the note in 178B.1, as it is noted that:"this is beyond the scope of this standard."
 If it is beyond the scope of the standard, then it should not be noted.

SuggestedRemedy

Any PHYs that are based on 100 Gb/s should delete any entires in the 178B column - it is beyond the scope of the standard.

Proposed Response Response Status **O**

Cl **178B** SC **178B.3** P **866** L **16** # **I-195**

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type **TR** Comment Status **X**

The Physical Layer extends from RS to MDI, and includes the RS and MDI.

SuggestedRemedy

Extend the arrows representing the boundaries of the Physical Layer to include the MDI.

Proposed Response Response Status **O**

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 178B SC 178B.4 P 867 L 5 # I-194

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type E Comment Status X

The word "activated" is used extensively in this subclause. Considering the first paragraph in 178B.2, it may be more consistent to use the word "initialized" instead. If my interpretation is incorrect and "activated" is not a synonym for "initialized", please define "activated" in 178B.3.

SuggestedRemedy

Replace all instances of the word "activated" with the word "initialized".

Proposed Response Response Status O

CI 178B SC 178B.4 P 867 L 18 # I-131

Huber, Thomas Nokia

Comment Type TR Comment Status X

The description of APSU in this bullet list needs to be rewritten. The variables local_rts and remote_rts do not propagate anywhere; they are state variables at an interface. RTS or !RTS is signaled between peer interfaces via a PMD-specific mechanism and signaled between adjacent sublayers via the service interface. An interface uses that signaling (plus other criteria) to determine the values of the local_rts and remote_rts state variables. Also, since we are extending APSU to coherent PMDs, the ILT function is not a requirement for APSU.

SuggestedRemedy

Replace "APSU is the result of each ISL in the path transitioning to DATA mode using the RTS and ILT functions as follows:" and the subsequent bullet list with this:

"APSU is the result of each ISL in the path transitioning to DATA mode as follows:
 - The local_rts variable at an interface indicates that the interface is ready to send data. An interface signals that it is ready to send to a peer interface via a PMD-specific or AUI-specific mechanism. An interface signals that it is ready to send data to an adjacent sublayer via the inter-sublayer service interface.
 - The remote_rts variable indicates that the peer interface is ready to send. An interface asserts remote_rts when the receive function detects RTS signaling; this indicates that local_rts is true in the peer interface
 - When both local_rts and remote_rts are true for an interface, it switches to DATA mode (tx_mode = data, see 178B.8.3.1)
 - End-to-end communication is established when all interfaces in the path are in DATA mode"

Proposed Response Response Status O

CI 178B SC 178B.4 P 867 L 27 # I-358

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

Sending and receiving RTS does not always mean "all ISLs" are ready, it just means that upstream of your Tx is ready to transmit and that upstream of your peer Tx are all ready to transmit.

For example on slide 19 of https://iee802.org/3/dj/public/adhoc/178b/25_1029/slavick_178b_03a_251029.pdf the Retimer and Host B are not "RTS = true" but Host A has shifted to data mode since it has RTS at both Tx and Rx.

SuggestedRemedy

Change: "it means all the ISLs in the same path (see 178B.3) are ready"
 To: "it means the ISL is ready"

Proposed Response Response Status O

CI 178B SC 178B.5 P 867 L 34 # I-196

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type E Comment Status X

The words "for the entire interface" makes the sentence confusing. The sentence also reads a bit awkward.

SuggestedRemedy

Replace:
 The ILT function is composed of one per-interface ILT function for the entire interface and one per-lane ILT function for each lane associated with the interface.

With:
 The ILT function within an interface is composed of:
 - one per-interface ILT function, and
 - n per-lane ILT functions, one for each of n lanes associated with the interface.

Proposed Response Response Status O

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CI 178B SC 178B.5 P 867 L 36 # I-197

Mascitto, Marco Infinera Canada Inc., Nokia

Comment Type TR Comment Status X

An input is missing. The RTS function uses inputs from:

- a) adjacent interface (via the service interface)
- b) peer interface (via the ILT function)
- c) its own per-interface ILT function to transition to DATA mode.

SuggestedRemedy

Replace:

The RTS function uses inputs from the adjacent interface (via the service interface) and the peer interface (via the ILT function) to permit the ILT function to transition to DATA mode.

With:

The RTS function uses inputs from the adjacent interface (via the service interface), its peer interface (via the ILT function), and its per-interface ILT function to permit the ILT function to transition to DATA mode.

Proposed Response Response Status O

CI 178B SC 178B.5 P 868 L 8 # I-132

Huber, Thomas Nokia

Comment Type TR Comment Status X

Figure 178B-3 shows bidirectional communication between the RTS and ILT functions. This is presumably the result of the choice to use the ILT training frames to signal RTS information on 200G IMDD PHYs - but that choice doesn't make the RTS signaling part of the ILT function. There is no need for the RTS function to communicate to the ILT function.

SuggestedRemedy

Change the arrow between ILT and RTS to be one-way from ILT to RTS. Further detail will be provided in a presentation

Proposed Response Response Status O

CI 178B SC 178B.5 P 869 L 5 # I-62

WANG, Xuebo Huawei Technologies Co., Ltd

Comment Type TR Comment Status X

In Figure 178B-4, RTS function provide the state of the rts_status variable from a reference interface to its adjacent interface via SIGNAL_OK. However, if we are talking about host devices, the reference interface has no adjacent interface. Under this case, in the receive direction, SIGNAL_OK will be sent to PCS or DTE xXS by IS_SIGNAL.indication primitive.

SuggestedRemedy

Add a note to Figure 178B-4: If there is no adjacent interface, in the receive direction, SIGNAL_OK will be sent to PCS or DTE xXS via the IS_SIGNAL.indication primitive of PMA service interface.

Proposed Response Response Status O

CI 178B SC 178B.5 P 869 L 14 # I-133

Huber, Thomas Nokia

Comment Type TR Comment Status X

Figure 178B-4 shows local_rts as a signal communicated from the RTS function to the ILT function and remote_rts as a signal communicated from the ILT function to the RTS function. Since local_rts cannot be true unless the ILT function is complete on every lane, the ILT function cannot possibly depend on local_rts. Remote_rts is unrelated to training the link, so it should not be coming through the ILT function, it should be a direct input to the RTS function. The confusion seems to be that the same frame structure used for ILT is used to signal RTS for 200G IMDD AUIs/PMDs - but that doesn't make the RTS signaling part of the ILT function.

SuggestedRemedy

Revise figure 178B-4 to not show local_rts and remote_rts as signals between the two functions, but rather to show a 'training complete' signal from ILT to RTS. Further details will be provided in a presentation.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 178B SC 178B.6 P 869 L 28 # I-198

Mascitto, Marco Infinera Canada Inc., Nokia

Comment Type E Comment Status X

While the first sentence is technically correct, it may help the reader to list the control actions in the order in which they will occur.

SuggestedRemedy

Replace:

The RTS function facilitates the indication of the local interface readiness to switch to DATA mode (local_rts) to other interfaces (peer and adjacent) and controls the switch over of the transmitter clock source to its DATA mode clock (when necessary).

With:

The RTS function controls the switch over of the transmitter clock source to its DATA mode clock (when necessary) and facilitates the indication of the local interface readiness to switch to DATA mode (local_rts) to other interfaces (peer and adjacent).

Proposed Response Response Status O

Cl 178B SC 178B.6 P 869 L 31 # I-134

Huber, Thomas Nokia

Comment Type TR Comment Status X

The operation of the RTS function should have no dependency on whether training is enabled (or even defined) for an ISL. Having such a dependency complicates extending APSU to PMDs that don't use ILT. The ISL needs to indicate to the RTS function that "training is complete" (whatever that means for the ISL in question).

SuggestedRemedy

Change "The operation of the RTS function is different based upon the state of mr_training_enable and whether the interface is implemented in a retimer (see 178B.9)." to

"The operation of the RTS function is different based upon whether the interface is implemented in a retimer (see 178B.9)."

Further details will be provided in a presentation.

Proposed Response Response Status O

Cl 178B SC 178B.6 P 869 L 46 # I-135

Huber, Thomas Nokia

Comment Type TR Comment Status X

RTS status signalling cannot provided by the ILT function, since some PMDs don't have that function. RTS status is signaled by a PMD- or AUI-specific mechanism (which in some cases is the same training frame that ILT uses, but that does not make this signaling part of the ILT function).

SuggestedRemedy

Change "The state of the local_rts variable is provided to the peer interface via the ILT function (Figure 178B-4)."

to

"The state of the local_rts variable is provided to the peer interface via a PMD- or AUI-specific mechanism."

Further details on the implications of this will be provided in a presentation.

Proposed Response Response Status O

Cl 178B SC 178B.7 P 870 L 4 # I-136

Huber, Thomas Nokia

Comment Type TR Comment Status X

RTS status signaling cannot be transferred by the ILT function, since some PMDs don't have that function. RTS status is signaled by a PMD- or AUI-specific mechanism (which in some cases is the same training frame that ILT uses, but that does not make this signaling part of the ILT function).

SuggestedRemedy

Change "The ILT function facilitates the establishment of communication between the peer interfaces of an ISL, including clock and data recovery and the transfer of the RTS status of the transmitter."

to

"The ILT function facilitates the establishment of communication between the peer interfaces of an ISL."

Further details on the implications of this will be provided in a presentation.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 178B SC 178B.7 P 870 L 9 # I-199

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type E Comment Status X

It may help the reader to place this sentence after the paragraph that follows, so that they are introduced to the three modes of operation before stating something specific about one of those modes.

SuggestedRemedy

Place the sentence which starts at line 9 after the paragraph that begins on line 13.

Proposed Response Response Status O

CI 178B SC 178B.7 P 870 L 14 # I-200

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type E Comment Status X

To add clarity to TRAINING mode, it is suggested to use similar phrasing to LOCAL_PATTERN mode.

SuggestedRemedy

Replace:
TRAINING mode (tx_mode = training): training frames are sent between peer interfaces

With:
TRAINING mode (tx_mode = training): training frames are transmitted to the peer interface

Proposed Response Response Status O

CI 178B SC 178B.7.2 P 870 L 51 # I-201

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type TR Comment Status X

The first sentence of this subclause appears to suggest that the per-lane ILT function generates local pattern data so that an adaptation process can take place when in LOCAL_PATTERN mode. We do not want imply or suggest this. The only mode where adaptation is taking place is in TRAINING mode.

SuggestedRemedy

Replace:
The per-lane ILT function is responsible for the locally generated data that is transmitted while not in DATA mode and for the adaptation processes of the received signal.

With:
The per-lane ILT function is responsible for the locally generated training frames that are transmitted while in TRAINING mode and for the adaptation processes of the received signal. It is also responsible for the locally generated pattern that is transmitted while in LOCAL_PATTERN mode.

Proposed Response Response Status O

CI 178B SC 178B.7.2 P 871 L 1 # I-202

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type E Comment Status X

Comma missing.

SuggestedRemedy

Add comma after the word "mode":
"When in TRAINING mode, the frame format [...]"

Proposed Response Response Status O

CI 178B SC 178B.7.2 P 871 L 7 # I-203

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type E Comment Status X

Comma missing.

SuggestedRemedy

Add comma after the word "mode":
"When in LOCAL_PATTERN mode, the pattern transmitted [...]"

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 178B SC 178B.7.3.3 P 873 L 8 # I-138

Huber, Thomas Nokia
 Comment Type **TR** Comment Status **X**

The "1:2" and "x3" functions in figure 178B-6 are not clear. There is some explanation in 178B.7.3.4, but if the reader doesn't know that, it's hard to understand the figure.

SuggestedRemedy

In fiure 178B-6, change "1:2" to "Distribution" and change "x3" to "PAM2 encoder". Add these sentences to the end of the first paragraph of 178B.7.3.3:
 The distribution function performs a round-robin distribution of the test pattern to two streams, A and B, with the first bit going to stream A and the second bit going to stream B, etc. The PAM2 encoder encodes the input stream of bits as PAM2 symbols to be transmitted over the PMD (see 178B.7.3.4).

Proposed Response Response Status **O**

CI 178B SC 178B.7.4 P 876 L 18 # I-139

Huber, Thomas Nokia
 Comment Type **ER** Comment Status **X**

The "continue training" field in he E1 and O1 frame is inaccurately named. Signaling not-RTS or RTS is not a continuation of the ILT function, it is part of the RTS function. The use of the ILT frame structure to indicate nor-RTS or RTS status should not be confused with that signaling being part of the ILT function.

SuggestedRemedy

In both tables 178B-2 and 178B-3, rename the "Continue training" field to "RTS status", and change the definition of the 1 value to "not ready to send". Change heading 178B.7.4.2 to "RTS status".

Proposed Response Response Status **O**

CI 178B SC 178B.7.7 P 880 L 42 # I-383

Slavick, Jeff Broadcom Inc
 Comment Type **TR** Comment Status **X**

Now that we specify a specific pattern to transmit when training is disabled (local_pattern), an implementation could potentially do auto polarity correction.

SuggestedRemedy

Change: "NOTE—Polarity detection and correction is not available when training is disabled."
 To: "NOTE—When training is disabled support of polarity detection and correction is implementation dependent."

Proposed Response Response Status **O**

CI 178B SC 178B.8 P 884 L 17 # I-140

Huber, Thomas Nokia
 Comment Type **TR** Comment Status **X**

The state diagrams in figures 178B-9 and 178B-10 need to be refactored to separate states related to per-lane link training from states related to per-interface ready-to-send functions. This will simplify extension of APSU to PMD types other than 200G/lane IMDD.

SuggestedRemedy

A presentation with a complete proposal to revise the diagrams and supporting text (variable definitions, etc.) will be provided.

Proposed Response Response Status **O**

CI 178B SC 178B.8.2.1 P 885 L 4 # I-204

Mascitto, Marco Infinera Canada Inc.,Nokia
 Comment Type **TR** Comment Status **X**

APSU is the behaviour that is observed on a path, not at an interface (see 178B.2 and 178B.4). mr_restart applies to an interface, not the entire path.

SuggestedRemedy

Replace the definition of mr_restart with:
 Boolean variable used by management to restart the RTS and ILT functions.

Proposed Response Response Status **O**

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 178B SC 178B.8.2.1 P 885 L 6 # I-205

Mascitto, Marco Infinera Canada Inc., Nokia

Comment Type TR Comment Status X

There are scenarios where a user may need to restart the RTS and ILT functions at an interface. The note is too restrictive and should be changed to a warning.

SuggestedRemedy

Replace:

NOTE — There is no specified time limit for the APSU. Restarting APSU might result in live-lock situation, thus APSU should only be restarted if there is an indication of an unrecoverable fault. The definition of unrecoverable fault is beyond the scope of this standard.

With:

NOTE -- There is no specified time limit for APSU to complete along a path. Caution should be exercised when invoking mr_restart, as it may result in live-lock situations.

Proposed Response Response Status O

CI 178B SC 178B.8.2.1 P 885 L 18 # I-356

Slavick, Jeff Broadcom Inc

Comment Type T Comment Status X

Rewording the 2nd sentence defining remote_rts behavior can help the reader understand its behavior better.

SuggestedRemedy

Change: "If mr_training_enable is true and the "continue training" bit of the control field of received training frames on all lanes of the interface is zero then remote_rts is set to true, otherwise it is set to false."

To: "If mr_training_enable is true then remote_rts is set to true when the received training frames on all lanes of the interface have the "continue training" bit set to zero (see 178B.7.4.2), otherwise it is set to false."

Proposed Response Response Status O

CI 178B SC 178B.8.2.1 P 885 L 26 # I-186

Osorio, Luz Nokia

Comment Type TR Comment Status X

rts_status is missing from the Management Variables

SuggestedRemedy

Add per interface rts_status to the Management Variables (2 bits)

Proposed Response Response Status O

CI 178B SC 178B.8.2.1 P 885 L 34 # I-185

Osorio, Luz Nokia

Comment Type TR Comment Status X

training_status is, based on this definition, the aggregated value of the lane_training_status. It is an enumerated variable with 4 possible values. However, in the Management Variables table, it is linked to a MDIO Boolean variable (1.151.2), which only indicates whether training is in progress. It further suggests this a per lane indication providing a link to 8 lanes.

Based on the variable definition, if any lane is FAIL, then the training_status value must also be set to FAIL.

The current Management Variables definition would dictate that all 8 values must be set to FAIL, which makes it impossible to know which lane actually failed.

There must be a way for management to know the status of each lane clearly so that fault isolation can proceed in case of a failure.

SuggestedRemedy

Add lane_training_status to the Management Variables (2 bits per lane) to indicate the status of each signal.

Change training_status to be an aggregate per interface indicator (2 bits).

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 178B SC 178B.8.2.4 P 886 L 15 # I-206

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type TR Comment Status X

Figure 178B-9 should be optimized for the reason described in:

https://www.ieee802.org/3/dj/public/26_03/slavick_3dj_03_2603.pdf.

However, the revised state diagram shown on slide 3 can be further optimized by removing the CLOCK_MODE state, and revising the START state exit conditions as follows:

(Isl_ready + !mr_training_enable) *
uses_recovered_clock condition to the SWITCH_CLOCK state

(Isl_ready + !mr_training_enable) *
!uses_recovered_clock to the FOWARD_RTS state

SuggestedRemedy

Implement the optimizations described in this comment. For clarity, a presentation with a revised diagram will be provided.

Proposed Response Response Status O

CI 178B SC 178B.8.2.4 P 886 L 18 # I-369

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

As shown in https://www.ieee802.org/3/dj/public/26_03/slavick_3dj_03_2603.pdf Figure 178B-9 could be simplified. During the March plenary some feedback indicated the desire to retain the isl_ready check from SWITCH_CLOCK to FORWARD_RTS. However, local_rts is really an indicator of Yes we're transmitting on mission mode clock. isl_ready is a condition of both local and peer Rx (in training mode) are happy and that has no bearing on the transmitters state. The edits proposed related to https://www.ieee802.org/3/dj/public/26_03/slavick_3dj_01_2603.pdf cover the concerns that were raised.

SuggestedRemedy

Update Figure 178B-9 per https://www.ieee802.org/3/dj/public/26_03/slavick_3dj_03_2603.pdf slide 3

Proposed Response Response Status O

CI 178B SC 178B.8.3 P 887 L 3 # I-207

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type E Comment Status X

Sentence is a bit awkward.

SuggestedRemedy

Replace:

An interface using the E1 format implements one instance of each of the training control, the training frame lock and the coefficient update state diagrams, and their associated variables, functions, counters and timers defined in this subclause, independently for each lane.

With:

An interface using the E1 format implements one instance per lane of each of the training control, the training frame lock and the coefficient update state diagrams, and their associated variables, functions, counters and timers defined in this subclause.

Proposed Response Response Status O

CI 178B SC 178B.8.3 P 887 L 7 # I-208

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type E Comment Status X

Sentence is a bit awkward.

SuggestedRemedy

Replace:

An interface using the O1 format implements one instance of each of the training control and the training frame lock state diagrams, and their associated variables, functions, counters and timers defined in this subclause, independently for each lane.

With:

An interface using the O1 format implements one instance per lane of each of the training control and the training frame lock state diagrams, and their associated variables, functions, counters and timers defined in this subclause.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 178B SC 178B.8.3.1 P887 L24 # I-409

Opsasnick, Eugene Broadcom Inc.

Comment Type E Comment Status X

It would be much easier for the reader if the text values of all enumerated variables used in the state diagrams were written in upper case. Note that several variables already use upper case for their enumerated values such as lane_training_status and local_mc_mode and all enumerated variables in 178B.8.2.1.

SuggestedRemedy

In 178B.8.3.1, put the enumerate values in upper case for these variables: coef_req, coef_sts, ic_req, ic_sel, ic_sts, tx_mode.

In both the variable definitions and when used in the state diagrams or text.

Proposed Response Response Status O

CI 178B SC 178B.8.3.1 P888 L16 # I-63

WANG, Xuebo Huawei Technologies Co., Ltd

Comment Type TR Comment Status X

The value of local_mc_mode is initially set to PAM2 by the training control state diagram instead of training frame lock state diagram. A similar issue happens in Line 33 on Page 888. The value of local_tp_mode is initially set to synchronous PRBS13 by the training control state diagram instead of training frame lock state diagram.

SuggestedRemedy

Change "training frame lock state diagram" to "training control state diagram" in Line 16 on Page 888.

Make the same change in Line 33 on Page 888.

Proposed Response Response Status O

CI 178B SC 178B.8.3.3 P890 L16 # I-29

Brown, Matthew Qualcomm

Comment Type T Comment Status X

The behavior of the quiet_timer is somewhat ambiguous. The state diagram in Figure xxx shows the quiet timer being started in "QUIET" state. If reset or mr_restart are true then this state is "entered" continuous until both are false. So does this mean the the quiet_timer is constantly reset until both reset and mr_restart are false? In this case, the quiet_timer would only start counter after exiting the quiet state. Or is the intent that the timer starts counting right away and if it has expired the transition out of QUIET state can immediately occur.

SuggestedRemedy

Add some clarity as to the intent. One option is to add an intermediate state that starts the quiet_timer when exiting the QUIET state and before entering the SEND_LOCAL or SEND_TRAINING states.

Proposed Response Response Status O

CI 178B SC 178B.8.3.3 P890 L18 # I-151

Ran, Adeo Cisco Systems, Inc.

Comment Type T Comment Status X

The quiet_timer has a maximum duration of 200 ms. But in practice the state diagram can be held in the QUIET state due to reset / mr_restart for an unspecified time, and prior to that it can be in FAIL state for an unspecified time. The effect would be identical to extending quiet_timer. This does not affect interoperability, so the maximum duration of quiet_timer has no importance.

Specifying something that has no importance can lead to confusion, unnecessary verification efforts and false failures.

SuggestedRemedy

Change from
 "The terminal count of this timer is between 100 ms and 200 ms"
 to
 "The terminal count of this timer is at least 100 ms".

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 178B SC 178B.8.3.5 P 891 L 1 # I-109

Ran, Adeo Cisco Systems, Inc.

Comment Type TR Comment Status X

The link training state diagram does not address the event of loss of signal (LOS). There is no specification of how the LOS event affects other sublayers and interfaces, and how the link is recovered, whether training is restarted or not.

Annex 178B should specify behavior that results in interoperability.

SuggestedRemedy

The required changes are currently discussed in a consensus building group. A detailed proposal is planned.

Proposed Response Response Status O

CI 178B SC 178B.8.3.5 P 891 L 38 # I-110

Ran, Adeo Cisco Systems, Inc.

Comment Type TR Comment Status X

As highlighted in <https://www.ieee802.org/3/dj/public/26_03/slavick_3dj_01_2603.pdf>, the transition from ISL_READY to PATH_READY is unsafe. It can cause the peer to time out and fail if it has lost its frame lock due to the clock transition.

The peer indicates this condition in its outgoing training frames (received as remote_tf_lock) but it is not part of the condition for the transition.

A simple solution is to add this variable to the transition condition. It would verify that the peer has "survived" the clock transition.

Note that if the peer signals that its receiver is not ready (remote_rx_ready=false) it will prevent the transition through the variable isl_ready, so it is already covered.

SuggestedRemedy

In Figure 178B-10, in the condition for the transition from ISL_READY to PATH_READY, add "* remote_tf_lock".

Proposed Response Response Status O

CI 178B SC 178B.8.3.5 P 891 L 39 # I-359

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

The RTS timer that runs after the clock swap has a minimum time of 10ms. That duration is shorter than the recovery_timer. We need to ensure that one side can't go to FAIL while the other goes to PATH_READY. See

https://ieee802.org/3/dj/public/26_03/slavick_3dj_01_2603.pdf

Suggested remedy is based on feedback during March plenary though the solution proposed in the presentation is also viable.

SuggestedRemedy

In Figure 178B-10 add "remote_tf_lock *" to the transition requirements from ISL_READY to PATH_READY.

Add the following to the definition of local_rx_ready "When in the RECOVERY state (see Figure 178B-10) this variable should be false."

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 178B SC 178B.8.3.5 P 891 L 46 # [-111]

Ran, Adee Cisco Systems, Inc.

Comment Type TR Comment Status X

As highlighted in <https://www.ieee802.org/3/dj/public/26_03/slavick_3dj_02_2603.pdf>, the transition from PATH_READY to PATH_UP might occur before mission data is available.

Three options for solving this problem have been presented. We should choose one and go with it.

Option 1 (in which the transition is deferred until mission data is available, so training frames are sent) seems less pervasive and is easy to write in the standard and to implement in practice. It is also well-defined and results in a predictable startup behavior.

Options 2 and 3 both require a "random" data stream for the interim period. Option 2 adds this requirement to the PMDs while option 3 adds it to the PMA and inner FEC, but the effect would be identical.

Note that training frames should be considered adequate as a "random" data stream, so implementing option 1 would be valid for option 2 as well. Thus, option 2 provides the most freedom for implementations.

Two alternatives can be discussed, based on options 1 and 2 in slavick_02 (both with editorial adjustments to match existing text):

A (option 1): Add the following term to the transition from PATH_READY to PATH_UP: "adjacent_signal_ok=OK".

B (option 2): Add statements in the "PMD transmit function" subclauses of clauses 179, 180, 181, 182, and 183, as follows (substituting the service interface subclause number): "When tx_mode = data and the SIGNAL_OK parameter of the PMD: IS_SIGNAL.request primitive (see 179.4) is not OK, the PMD shall transmit a locally-generated random data stream (e.g. PRBS31Q). This results in continuous signaling on the medium until valid data is supplied by the client sublayer."

The suggested remedy is option A, but if people prefer option B it is also acceptable.

SuggestedRemedy

In Figure 178B-10, in the condition for the transition from PATH_READY to PATH_UP, add "** (adjacent_signal_ok=OK)".

Proposed Response Response Status O

CI 178B SC 178B.8.3.5 P 891 L 47 # [-368]

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

As shown in https://www.ieee802.org/3/dj/public/26_03/slavick_3dj_02_2603.pdf we need to specify the data that transmitted while chip level datapath logic initializes.

SuggestedRemedy

Insert a new state "WAIT_DATAPATH" between PATH_READY and PATH_UP. Entry from PATH_READY occurs when propagation_timer_done is true, the exit to PATH_UP occurs when "adjacent_signal_ok = OK" and within the state "tx_mode <= fill_pattern"

In 178B.8.3.1 update tx_mode to add another enumeration fill_pattern: transmits either training frames or local_pattern

Proposed Response Response Status O

CI 178B SC 178B.8.3.5 P 891 L 49 # [-144]

Bruckman, Leon NVIDIA

Comment Type TR Comment Status X

There is no guidance how the FAIL state is exited.

SuggestedRemedy

Add to the end of 178B.7 - ILT function, this text:
"Recovery from the FAIL state in the Training control state diagram (Figure 178B-10) requires management to assert mr_restart_training or reset; the timing of this action is implementation dependent and beyond the scope of this standard."

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 178B SC 178B.10 P 894 L 51 # I-209

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type E Comment Status X

Wrong word.

SuggestedRemedy

Replace:

The control and status variables related with this annex and intended to be accessible via a management system are listed in Table 178B-6 and Table 178B-7.

With:

The control and status variables related with this annex are intended to be accessible via a management system are listed in Table 178B-6 and Table 178B-7.

Proposed Response Response Status O

CI 178B SC 178B.10 P 895 L 0 # I-387

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

training_status and rts_status are not mapped to MDIO registers.

SuggestedRemedy

Assign the bits in Table 45-133c as follows:

1.1476.14:13 | rts_status | 0 - FAIL, 1 - IN_PROGRESS, 2- READY, 3 - OK

1.1476.11:10 | training_status | 0 - FAIL, 1-IN_PROGRESS , 2 - READY, 3-OK

In Table 178B-7 add rows for rts_status and training_status referencing those bit assignments.

Proposed Response Response Status O

CI 178B SC 178B.10 P 895 L 22 # I-384

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

Table 178B-6 says its control variables but many status variables are listed in it.

SuggestedRemedy

Move the following from Table 178B-6 to Table 178B-7:

training_status

coef_sts

ic_sts

local_tf_lock

remote_tf_lock

local_rx_ready

remote_rx_ready

remote_rts

Proposed Response Response Status O

CI 178B SC 178B.10 P 895 L 22 # I-386

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

Bit 151.2 is mapped to the variable "training" for the other two startup protocols.

SuggestedRemedy

Change training_status to training.

Proposed Response Response Status O

CI 178B SC 178B.10 P 895 L 34 # I-187

Osorio, Luz Nokia

Comment Type ER Comment Status X

The cross-reference note indicator "c" is not formatted as a superscript for coef_sts

SuggestedRemedy

Fix formatting of note cross-reference

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 178B SC 178B.10 P 895 L 37 # I-362
 Slavick, Jeff Broadcom Inc
 Comment Type ER Comment Status X
 MDIO mapping table for local_tf_lock has a non-superscript for b. It's written as 151.1b
 SuggestedRemedy
 Make the b a reference to the footnote b
 Proposed Response Response Status O

Cl 178B SC 178B.10 P 895 L 40 # I-191
 Osorio, Luz Nokia
 Comment Type ER Comment Status X
 The cross-reference note indicator "c" is not formatted as a superscript for local_rx_ready
 SuggestedRemedy
 Fix formatting of note cross-reference
 Proposed Response Response Status O

Cl 178B SC 178B.10 P 895 L 37 # I-188
 Osorio, Luz Nokia
 Comment Type ER Comment Status X
 The cross-reference note indicator "b" is not formatted as a superscript for local_tf_lock
 SuggestedRemedy
 Fix formatting of note cross-reference
 Proposed Response Response Status O

Cl 178B SC 178B.10 P 895 L 41 # I-193
 Osorio, Luz Nokia
 Comment Type TR Comment Status X
 Incorrect MDIO register/bit number for remote_rx_ready. The referenced MDIO bit is a training complete indicator. The title and the description of the bit are conflicting
 SuggestedRemedy
 Fix the register definition or point to the correct MDIO bit
 Proposed Response Response Status O

Cl 178B SC 178B.10 P 895 L 38 # I-189
 Osorio, Luz Nokia
 Comment Type TR Comment Status X
 Incorrect MDIO register/bit number for remote_tf_lock. It should 1.1420.9
 SuggestedRemedy
 Fix register reference
 Proposed Response Response Status O

Cl 178B SC 178B.10 P 895 L 41 # I-192
 Osorio, Luz Nokia
 Comment Type TR Comment Status X
 Incorrect MDIO register/bit reference for remote_rx_ready. It should 45.2.1.163
 SuggestedRemedy
 Fix register reference
 Proposed Response Response Status O

Cl 178B SC 178B.10 P 895 L 40 # I-190
 Osorio, Luz Nokia
 Comment Type TR Comment Status X
 Incorrect MDIO register/bit number for local_rx_ready. The referenced MDIO bit is a training complete indicator. The title and the description of the bit are conflicting
 SuggestedRemedy
 Fix the register definition or point to the correct MDIO bit
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 178B SC 178B.10 P 895 L 50 # I-67

WANG, Xuebo Huawei Technologies Co., Ltd

Comment Type TR Comment Status X

The variables local_mc_mode and local_tp_mode are set according to control field bits of training frames from the link partner (LP), and are encoded in the status field of training frames of the local device (LD). Thus, these two variables should correspond to 45.2.1.167, the PMD training LD status registers, instead of 45.2.1.165, the PMD training LD control registers. A contribution related to this comment was presented in March plenary meeting. See https://www.ieee802.org/3/dj/public/26_03/mi_3dj_01a_2603.pdf

SuggestedRemedy

Implement the proposed change on slide 5 in https://www.ieee802.org/3/dj/public/26_03/mi_3dj_01a_2603.pdf

Proposed Response Response Status O

Cl 178B SC 178B.10 P 895 L 54 # I-30

Brown, Matthew Qualcomm

Comment Type T Comment Status X

The Table 178B-6 footnote is incorrect. The register/bit numbers in this table are specifically for the PMD. For the PMA immediately above the PMD (connected to an AUJ above) would correctly be the same address but with register number offset by 4000. For other AUJs, a different device number would be used with the AUJ above a PMA offset by 4000.

SuggestedRemedy

MDIO register/bit numbers and references are for a PMD. For the closest AUJ component above the PMD the same addresses, except with the register number offset by 4000, are used. For AUJs, above and below any other PMA, the same addressing is used except the device number is the same as used for the PMA.

Proposed Response Response Status O

Cl 178B SC 178B.11.3 P 898 L 29 # I-148

Bruckman, Leon NVIDIA

Comment Type TR Comment Status X

The polarity test appears twice

SuggestedRemedy

Delete the second appearance of the polarity test in Table 178B.11.3

Proposed Response Response Status O

Cl 179 SC 179.4 P 423 L 47 # I-156

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Reflect the proposal on slide 3 in https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_03a_2603.pdf, incorporating the consensus from Straw Poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf.

SuggestedRemedy

In Table 179-7:

Add note (a) to rows
 Common-mode to common-mode return loss, RLcc (min)
 Common-mode to differential-mode return loss, RLdc (min)
 Insert 3 table rows for with the respective Reference, Value, and Units
 Common-mode to common-mode effective return loss, ERLcc (min) (b); 178A.3; 2dB
 Common-mode to differential-mode effective return loss, ERLdc (min) (b); 178A.3; 17 dB
 Differential -mode to common-mode effective return loss, ERLcd (min) (b); 178A.3; 17 dB
 Add the following notes to the bottom of the table:
 (a & b) The minimum modal return loss is met by exceeding the requirements of either (a) or (b)
 (b) Modal ERL parameter values are taken from 179.9.4.8

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 179 SC 179.5 P434 L44 # I-157

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Reflect the proposal on slide 3 in https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_03a_2603.pdf, incorporating the consensus from Straw Poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf.

SuggestedRemedy

In Table 179-11:
 Add note (a) to rows "Differential-mode to common-mode return loss, RLcd"
 Insert 3 table rows for with the respective Reference, Value, and Units
 Common-mode to common-mode effective return loss, ERLcc (min) (b); 178A.3; 2dB
 Common-mode to differential-mode effective return loss, ERLdc (min) (b); 178A.3; 17dB
 Differential -mode to common-mode effective return loss, ERLcd (min) (b); 178A.3; 17 dB
 Add the following notes to the bottom of the table:
 (a & b) The minimum modal return loss is met by exceeding the requirements of either (a) or (b)
 (b) Modal ERL parameter values are taken from 179.9.5.6

Proposed Response Response Status O

Cl 179 SC 179.8.2 P420 L44 # I-377

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

ILT has two data generation modes TRAINING and LOCAL_PATTERN. The training pattern gen is not necessarily the source of the LOCAL_PATTERN stream of symbols.

SuggestedRemedy

In 179.8.2, 180.5.2, 181.5.2, 182.5.2, 183.5.2
 Change: "When operating in TRAINING mode, the PAM4 symbol stream on each lane is taken from the output of the training pattern generator in the ILT function (see 178B.7.3.3)."
 To: "When operating in TRAINING mode, the PAM4 symbol stream on each lane is provided by the ILT function (see 178B.7)."

Proposed Response Response Status O

Cl 179 SC 179.8.4 P421 L24 # I-379

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

179.8.9 is not called ILT startup protocol.

SuggestedRemedy

change "ILT startup protocol" to "APSU"

Proposed Response Response Status O

Cl 179 SC 179.8.4 P421 L27 # I-378

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

remote_rts is a RTS function variable not an ILT function variable.

SuggestedRemedy

change ILT to RTS

Proposed Response Response Status O

Cl 179 SC 179.8.9 P422 L27 # I-380

Slavick, Jeff Broadcom Inc

Comment Type TR Comment Status X

What pattern is sent when tx_mode = local_pattern should apply regardless of the state of mr_training_enable

SuggestedRemedy

In 179.8.9, 180.5.12, 181.5.12, 182.5.12, 183.5.12
 Remove "when mr_training_enable is false and"

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 179 SC 179.8.10 P422 L 36 # I-381
 Slavick, Jeff Broadcom Inc
 Comment Type TR Comment Status X
 If we're going to call out ILT needs to be reset, so should RTS.
 SuggestedRemedy
 change "ILT function" to "ILT and RTS functions"
 Proposed Response Response Status O

CI 179 SC 179.9.4 P424 L 21 # I-182
 Rysin, Alexander NVIDIA
 Comment Type ER Comment Status X
 The method for the random jitter measurement changed to phase-only (horizontal) jitter, yet the naming remained J_rms, similar to the previous, 12-edge method.
 SuggestedRemedy
 Replace J_rms with JH_rms here and in the explanatory subclauses 179.9.4.7 and 179.9.4.7.1.
 Proposed Response Response Status O

CI 179 SC 179.9.4 P424 L 24 # I-309
 Dudek, Michael Marvell
 Comment Type T Comment Status X
 With the change from J4U to JH4u this jitter parameter is no longer expected to be dependent on channel loss and therefore there shouldn't be different values for different host classes and should match the value allocated to the die.
 SuggestedRemedy
 Remove the different host classes and have a single value of 0.118
 Proposed Response Response Status O

CI 179 SC 179.9.4.2.1 P425 L 17 # I-270
 Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.
 Comment Type TR Comment Status X
 Defining just the corner frequency of CRU is not sufficient for accurate measurement
 SuggestedRemedy
 change to: (CRU) with a corner frequency of 4 MHz and a slope of 20 dB/decade with maximum CRU jitter transfer peak of ≤ 0.3 dB.
 Proposed Response Response Status O

CI 179 SC 179.9.4.2.1 P425 L 33 # I-264
 Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.
 Comment Type TR Comment Status X
 Defining just the corner frequency of CRU is not sufficient for accurate measurement
 SuggestedRemedy
 change to: (CRU) with a corner frequency of 4 MHz and a slope of 20 dB/decade with maximum CRU jitter transfer peak of ≤ 0.3 dB.
 Proposed Response Response Status O

CI 179 SC 179.9.4.2.1 P430 L 33 # I-271
 Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.
 Comment Type TR Comment Status X
 Defining just the corner frequency of CRU is not sufficient for accurate measurement
 SuggestedRemedy
 change to: (CRU) with a corner frequency of 4 MHz and a slope of 20 dB/decade with maximum CRU jitter transfer peak of ≤ 0.3 dB.
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 179 SC 179.9.4.3 P428 L27 # I-303

Dudek, Michael Marvell

Comment Type E Comment Status X

The parameter is called "Level separation mismatch ratio" in table 179-7. but the heading and definition in 179.9.4.3 are called "Transmitter linearity" which is the section title of the reference called in 120D.3.1.2 where RLM is defined. Electrical tables in clause 178, 179, 176C and 176D all have the parameter "Level separation mismatch ratio." The parameters in 178, 179, 176C reference 179.9.4.3, but 176D references 176D.8.6 which is titled "Level Separation mismatch ratio" and does not use "transmitter linearity" in the section. Consistency would be good.

SuggestedRemedy

Change the title of 179.9.4.3 from "Transmitter linearity" to "Level separation mismatch ratio" and also in text on page 428 line 29

Proposed Response Response Status O

Cl 179 SC 179.9.4.6 P429 L42 # I-181

Rysin, Alexander NVIDIA

Comment Type TR Comment Status X

SNDR limits for most of the presets cannot be met even with a test equipment PPG with practical host channels. Data obtained with an instrument-grade pattern generator and practical channels representing the different host classes was presented in rysin_3dj_01a_2509.

SuggestedRemedy

Revise the SNDR limits based on data collected with practical channels.

Proposed Response Response Status O

Cl 179 SC 179.9.4.6 P429 L45 # I-275

Calvin, John Keysight Technologies

Comment Type TR Comment Status X

Signal-to-noise-and-distortion ratio has recently settled on a revised set of values depending on presets (Table 179-9). The SNDR method still exhibits a strong dependency on overall channel loss, and reduces in value as a function of higher loss. Systems with a HH channel range in SNDR values of around 29dB, which is well short of the required 33.5 needed for Preset 1. The systems interop well, with reasonable BLER values, but fail SNDR.

SuggestedRemedy

Examine methods to make Psignal and Sigma e found in equation 179-8 more channel loss resilient. POJ methods may be applied here. The interop report out: https://www.ieee802.org/3/dj/public/26_01/calvin_3dj_01a_2601.pdf Page 22 shows SNDR values in 7 our of 12 test cases fail the SNDR limits. Alternately the table values found in Table 179-9 could be backed off 1.5dB across the board for all presets.

Proposed Response Response Status O

Cl 179 SC 179.9.4.7 P403 L25 # I-426

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This says "Random jitter, RMS", "sigma_RJ" yet it is clear by inspection that what is meant is Gaussian jitter, and the its cause (random, known cause, or unknown cause) is not the point. A new COM definition is our chance to follow OIF and break with this old name from 8B/10B times which in the age of scrambled coding is inaccurate and encourages sloppy thinking.

SuggestedRemedy

Change "Random jitter, RMS", "sigma_RJ" to "Gaussian jitter, RMS", "sigma_GJ" throughout. Add notes as necessary pointing out that similar quantities in older clauses (Annex 93A for example) use the old names.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 179 SC 179.9.4.7 P430 L11 # I-297

Dudek, Michael Marvell

Comment Type TR Comment Status X

This comment is a re-submission of comment #105 on D2.3. With the change to using JH4u, amplitude noise is no longer creating jitter therefore disabling the other lanes should not be done as any true phase noise introduced by the other lanes should be included.

SuggestedRemedy

Delete "JH4u and"

Proposed Response Response Status O

CI 179 SC 179.9.4.7 P430 L17 # I-263

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

Defining just the corner frequency of CRU is not sufficient for accurate measurement

SuggestedRemedy

change to: (CRU) with a corner frequency of 4 MHz and a slope of 20 dB/decade with maximum CRU jitter transfer peak of ≤ 0.3 dB.

Proposed Response Response Status O

CI 179 SC 179.9.4.7.1 P430 L22 # I-272

Calvin, John Keysight Technologies

Comment Type TR Comment Status X

For the Jrms decomposition method, the highly prescriptive text of "using the method described in this subclause" should be softened to permit "equivalent implementations" as would be required in an under sampled measurement system (Equivalent Time /DCA platform)

SuggestedRemedy

Replace the text at line 22 from "using the method described in this subclause" to "using the method described in this subclause or equivalent"

Proposed Response Response Status O

CI 179 SC 179.9.4.7.2 P430 L52 # I-273

Calvin, John Keysight Technologies

Comment Type TR Comment Status X

For the JH4U decomposition method, the highly prescriptive text of "using the method described in this subclause" should be softened to permit "equivalent implementations" as would be required in an under sampled measurement system (Equivalent Time /DCA platform)

SuggestedRemedy

Replace the text at line 52 from "using the method described in this subclause" to "using the method described in this subclause or equivalent"

Proposed Response Response Status O

CI 179 SC 179.9.4.7.2 P431 L10 # I-86

Ran, Adeo Cisco Systems, Inc.

Comment Type TR Comment Status X

"The set may be filtered by eliminating transitions heavily affected by ISI"

The set A_i is the transition times corresponding to a specific transition (location in the test pattern) i .

All these transitions are equally affected by ISI, so this sentence seems to be misplaced. The intent is probably to filter specific sets (values of i) that are heavily affected by ISI.

SuggestedRemedy

Delete the quoted sentence.

Add a sentence instead to the paragraph preceding the dashed list, which describes the set A:

"For example, locations where the transition slope is low due to ISI should be eliminated".

Proposed Response Response Status O

CI 179 SC 179.9.4.7.2 P431 L21 # I-87

Ran, Adeo Cisco Systems, Inc.

Comment Type T Comment Status X

Equation 179-10 includes the term RJ_{dd_i} , which is not defined and not used elsewhere. This seems to be a typo, and the term should be RJ_{rms_i} , which appears in the paragraph and the dashed list preceding the equation.

SuggestedRemedy

Change RJ_{dd_i} to RJ_{rms_i}

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 179 SC 179.9.4.7.2 P431 L26 # I-88

Ran, Adeo Cisco Systems, Inc.

Comment Type TR Comment Status X

"calculate the best-fit coefficients for the polynomial in $1 / s_{ij}$ "

DJdd, the "deterministic jitter component" of the dual-Dirac model, is always a positive value, regardless of the sign of the slope. The noise amplification factor is the inverse absolute value of the slope.

SuggestedRemedy

Change to the absolute value, i.e., $1 / |s_{ij}|$, both in the text and in equation 179-12.

Proposed Response Response Status O

CI 179 SC 179.9.4.7.2 P431 L38 # I-305

Dudek, Michael Marvell

Comment Type TR Comment Status X

For calculating JH4u from Djdd and RJrms Q4 is used with a value of 3.891 approximating $Q(Q4)$ of 5×10^{-5} (equation 179-13). However for the calculation of ADD and σ_{RJ} from JH4u and Jrms in the interference tolerance test in 179.9.5.3.3 Q4d is used with a value of 3.719. approximating $Q(Q4d) \sim 1 \times 10^{-4}$. That means that Add is not equal to Djdd. and σ_{RJ} is not equal to RJRMS. This seems strange. (Note the same Q4d is also used in 178.9.3.4.2)

SuggestedRemedy

Reconcile this difference. Change "Q4" to "Q4d" with value 3.719 in 4 places in 179.9.4.7.2 and change the Q value to 1×10^{-4} .

Proposed Response Response Status O

CI 179 SC 179.11 P443 L9 # I-168

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Channel ILD is covered by COM and ERL. ILdd variations are common in potential passing channels. The ILdd here is overly restrictive.

SuggestedRemedy

In Table 179-16 and section 179.11.2 change Ildd to Ildd fit

Proposed Response Response Status O

CI 179 SC 179.11 P443 L16 # I-158

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Reflect the proposal on slide 3 in https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_03a_2603.pdf, incorporating the consensus from Straw Poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf.

SuggestedRemedy

In Table 179-16:
 Add note (b) to rows
 Differential-mode to common-mode return loss, RLcd
 Common-mode to common-mode return loss, RLcc
 Insert 3 table rows for with the respective Reference, Value, and Units
 Common-mode to common-mode effective return loss, ERLcc (min) (c); 178A.3; 2dB
 Common-mode to differential-mode effective return loss, ERLdc (min) (c); 178A.3; 17 dB
 Differential -mode to common-mode effective return loss, ERLcd (min) (c); 178A.3; 17 dB
 Add the following notes to the bottom of the table:
 (b & c) The minimum modal return loss is met by exceeding the requirements of either (a) or (b)
 (c) Modal ERL parameter values are taken from 179.11.3

Proposed Response Response Status O

CI 179 SC 179.11.4 P444 L22 # I-239

Heck, Howard TE Connectivity

Comment Type TR Comment Status X

Straw poll #12 from the March plenary showed consensus for adding modal ERL as a method for limiting mode conversion in cable assemblies.

SuggestedRemedy

Implement the proposal in https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_02_2603.pdf for copper cables using the pass/fail requirement contained on slide 3 of https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_03a_2603.pdf.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 179 SC 179.11.6 P449 L29 # I-325
 Kocsis, Sam Amphenol Corporation
 Comment Type TR Comment Status X
 The details of the specific MDI name are not relevant in the definition of crosstalk paths used in calculation of COM, and may be confusing to the reader if some PMDs do not have explicit MDI.
 SuggestedRemedy
 Remove the explicit MDI names (e.g. "SFP224", in favor of more generic MDI references by maximal lane count. Contribution planned to demonstrate consensus on nomenclature.
 Proposed Response Response Status O

Cl 179 SC 179.11.6.2.2 P449 L23 # I-89
 Ran, Adeo Cisco Systems, Inc.
 Comment Type E Comment Status X
 (Comment resubmitted from WG ballot)
 A single exception does not require a list (there are many such exceptions in the draft without a list).
 SuggestedRemedy
 Merge the list into the preceding paragraph, with editorial license.
 Proposed Response Response Status O

Cl 179 SC 179.12 P450 L1 # I-327
 Kocsis, Sam Amphenol Corporation
 Comment Type TR Comment Status X
 As detailed in contribution
 <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP-DD224 does not have sufficient reference, and should be removed from the document.
 SuggestedRemedy
 Remove SFP-DD224 from the possible 200GBASE-CR1 MDI connectors
 Proposed Response Response Status O

Cl 179 SC 179.12 P450 L1 # I-326
 Kocsis, Sam Amphenol Corporation
 Comment Type TR Comment Status X
 As detailed in contribution
 <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP224 does not have sufficient reference, and should be removed from the document.
 SuggestedRemedy
 Remove SFP224 from the possible 200GBASE-CR1 MDI connectors
 Proposed Response Response Status O

Cl 179 SC 179.12 P450 L4 # I-328
 Kocsis, Sam Amphenol Corporation
 Comment Type TR Comment Status X
 As detailed in contribution
 <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP-DD224 does not have sufficient reference, and should be removed from the document.
 SuggestedRemedy
 Remove SFP-DD224 from the possible 400GBASE-CR2 MDI connectors
 Proposed Response Response Status O

Cl 179 SC 179.12 P450 L8 # I-90
 Ran, Adeo Cisco Systems, Inc.
 Comment Type TR Comment Status X
 As presented in <https://www.ieee802.org/3/dj/public/26_03/ran_3dj_02a_2603.pdf>, implementations that support multiple combinations of PHY types on the same connector (e.g. 1.6TBASE-CR8 and 8x200GBASE-CR1) need to be configured appropriately for interoperability.
 A proposed NOTE in 179.12 to inform users about this need was included on slide 8 of ran_3dj_02a_2603.
 SuggestedRemedy
 Add an informative note at the end of 179.12 as follows:
 NOTE—Implementations that support multiple combinations of PHY types on the same MDI connector, as described in Annex 179C, must be configured appropriately for interoperability with the connected link partners. Selecting the appropriate configuration requires knowledge of the link partners.
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 179 SC 179.14 P450 L21 # I-363
 Slavick, Jeff Broadcom Inc
 Comment Type T Comment Status X
 Retimers now have two PMA devices, and upper and lower. The 179.14 tables that C2M and C2C point to doesn't account for this (like is done in Table 178B-6).
SuggestedRemedy
 Add the following footnote to Table 179-23 and 179-24 attached to the MDIO register/bit number heading
 "MDIO register/bit numbers and references are for the lower AUI component or PMD. The MDIO register/bit numbers and references for the upper AUI component are at +4000 offset."
 Proposed Response Response Status O

Cl 179A SC 179A.1 P900 L15 # I-349
 Kocsis, Sam Amphenol Corporation
 Comment Type ER Comment Status X
 missing "the"
SuggestedRemedy
 Change sentence from "This annex provides information on transmitter, receiver, and channel parameters associated with test points TP0d and TP5d", to "This annex provides information on the transmitter, receiver, and channel parameters associated with test points TP0d and TP5d"
 Proposed Response Response Status O

Cl 179 SC 179.15.4.2 P454 L42 # I-329
 Kocsis, Sam Amphenol Corporation
 Comment Type TR Comment Status X
 As detailed in contribution
 <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP224 does not have sufficient reference, and should be removed from the document.
SuggestedRemedy
 Remove SFP224 from the table, and renumber the MDI items appropriately.
 Proposed Response Response Status O

Cl 179A SC 179A.1 P900 L23 # I-350
 Kocsis, Sam Amphenol Corporation
 Comment Type ER Comment Status X
 missing "the"
SuggestedRemedy
 Change sentence from "TP0d is depicted in link block diagram of Figure 179-2." to "TP0d is depicted in the link block diagram of Figure 179-2."
 Proposed Response Response Status O

Cl 179 SC 179.15.4.2 P454 L45 # I-330
 Kocsis, Sam Amphenol Corporation
 Comment Type TR Comment Status X
 As detailed in contribution
 <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP-DD224 does not have sufficient reference, and should be removed from the document.
SuggestedRemedy
 Remove SFP-DD224 from the table, and renumber the MDI items appropriately.
 Proposed Response Response Status O

Cl 179A SC 179A.1 P900 L40 # I-351
 Kocsis, Sam Amphenol Corporation
 Comment Type ER Comment Status X
 missing " ".
SuggestedRemedy
 Change "3.45dB" to "3.45 dB".
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 179B SC 179B.3.1 P907 L 34 # I-240

Heck, Howard TE Connectivity

Comment Type TR Comment Status X

There may be multiple configurations of MDI connectors (SMT right angle 1x1, Stacked SMT right angle 2x1, Cabled host, Vertical SMT, etc) which can introduce different high speed performance variabilities. It is requested that this clause reference a specific configuration to minimize variations between MCB suppliers.

SuggestedRemedy

Add text: A single port 1x1 SMT right angle MDI connector is normative for the MCB specifications. Other connector configurations are informative.

Proposed Response Response Status O

CI 179B SC 179B.4.1 P909 L 11 # I-238

Heck, Howard TE Connectivity

Comment Type TR Comment Status X

Prior contributions (e.g. https://iee802.org/3/dj/public/26_03/lusted_3dj_02a_2603.pdf) have proposed tightening the range of the min/max specs by using fitted insertion loss and accounting for differences between the fitted insertion loss of an actual test fixture and the reference insertion loss.

SuggestedRemedy

Change page 909, line 18 to
 ILdd(f) is the fitted insertion loss in dB at frequency f

Change page 907, line 32 to
 The effects of differences between the fitted insertion loss of an actual test fixture and the reference insertion loss are to be accounted for in the measurements.

A supporting presentation is planned.

Proposed Response Response Status O

CI 179B SC 179B.4.1 P910 L 24 # I-348

Kocsis, Sam Amphenol Corporation

Comment Type TR Comment Status X

In an effort to reduce the variability across mated test fixtures, the FOM_ILD should be computed with a rise time of 5ps, consistent with other metrics in Annex 179B.

SuggestedRemedy

Update Tt from 6ps to 5ps.

Proposed Response Response Status O

CI 179B SC 179B.4.1 P911 L 10 # I-13

Lusted, Kent Synopsys, Inc.

Comment Type T Comment Status X

Repeat of comment #306 against D2.2: ILdd_MTFmin is, at fNyquist, 4dB lower than ILdd_MTFmax. This large allowed variation in MTF IL introduces too much uncertainty as to whether a given DUT (host or cable assembly) passes or fails due to variation in the test fixture.

SuggestedRemedy

Apply a fitted ILdd mask and add details on de-embed/re-embed process in the draft. A consensus presentation with a detailed solution is expected to be provided.

See also https://www.ieee802.org/3/dj/public/26_01/ran_3dj_02_2601.pdf,
https://www.ieee802.org/3/dj/public/26_03/lusted_3dj_02a_2603.pdf and straw poll #10 in
https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 179B SC 179B.4.3 P912 L5 # I-170

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Intrapair skew has not been directly considered for the MTF. Although intrapair skew is included in the computed differential mode-to-differential mode insertion loss, the effect of skew has not been explicitly specified. Common mode-to-differential mode insertion loss does contain elements of skew. An either or specification for SCMR_CH should be added to control MTF intrapair skew.

SuggestedRemedy

Replace line 3 with:

The common-mode to differential-mode insertion loss of the mated test fixtures measured in both directions shall meet Equation (179B-6) as illustrated in Figure 179B-3. or the channel signal to common-mode ratio (SCMR_CH) shall exceed 12 dB using the procedure described in 179.11.7.

Proposed Response Response Status O

CI 179B SC 179B.4.4 P913 L3 # I-165

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Reflect proposal on slide 3 in https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_03a_2603.pdf reflecting the consensus from Straw Poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf and augmented with the discussion that MTF specs should be more stringent than for other channels.

SuggestedRemedy

Replace line 3 with:

The common-mode to common-mode return loss of the mated test fixtures measured at each test fixture test interface shall meet Equation (179B-7) as illustrated in Figure 179B-4 or shall meet the following modal ERL requirements.
Common-mode to common-mode effective return loss, ERLcc (min); 178A.3; 2.25 dB
Common-mode to differential-mode effective return loss, ERLdc (min); 178A.3; 20 dB
Differential -mode to common-mode effective return loss, ERLcd (min); 178A.3; 20 dB

Proposed Response Response Status O

CI 179B SC 179B.4.5 P914 L3 # I-164

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Reflect proposal on slide 3 in https://www.ieee802.org/3/dj/public/26_03/mellitz_3dj_03a_2603.pdf reflecting the consensus from Straw Poll #13 in https://www.ieee802.org/3/dj/public/26_03/motions_3dj_2603.pdf and augmented with the discussion that MTF specs should be more stringent than for other channels.

SuggestedRemedy

Replace line 3 with:

The common-mode to differential-mode return loss of the mated test fixtures measured at each test fixture test interface shall meet Equation (179B-8) as illustrated in Figure 179B-5. or shall meet the following modal ERL requirements.
Common-mode to common-mode effective return loss, ERLcc (min); 178A.3; 2.25 dB
Common-mode to differential-mode effective return loss, ERLdc (min); 178A.3; 20 dB
Differential -mode to common-mode effective return loss, ERLcd (min); 178A.3; 20 dB

Proposed Response Response Status O

CI 179B SC 179B.4.5 P914 L9 # I-10

Chen, Chi-Hua Chunghwa Telecom Laboratories

Comment Type T Comment Status X

*** Comment submitted with the file Corrected Equation (179B-8).pdf attached ***

Equation (179B-8) appears to contain a minor numerical inaccuracy. Specifically, the value currently stated as 53.12 should be corrected to 53.125.

SuggestedRemedy

Corrected Equation (179B-8) is written in the attached file.

Proposed Response Response Status O

CI 179B SC 179B.4.5 P914 L9 # I-177

Healey, Adam Broadcom Inc.

Comment Type TR Comment Status X

RLdc(f) is specified to be 15 dB for frequencies greater than or equal to 53.12 GHz and less than 67 GHz. The lower limit should be 53.125 GHz.

SuggestedRemedy

Change "53.12" to "53.125".

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 179B SC 179B.4.6 P915 L 22 # I-331

Kocsis, Sam Amphenol Corporation

Comment Type TR Comment Status X

The MDI reference to SFP224 does have sufficient references and the details for a separate mated test fixtures integrated crosstalk noise requirement is no longer necessary.

SuggestedRemedy

Remove the sentence "The SFP224 mated test fixtures integrated near-end crosstalk noise voltage for the disturber near-end crosstalk loss is determined according to the method in 110B.1.3.6, given the disturber near-end crosstalk loss NEXT_loss(f). The mated test fixtures integrated near-end crosstalk noise voltage shall meet the specification in Table 179B-3." Remove Table 179B-3. Change all references in this section to "multi-lane mated test fixtures" to "mated test fixtures". Add a sentence that to the text in this section to point out that "an MDI utilizing only a single-lane does not have any MDFEXT requirement"

Proposed Response Response Status O

Cl 179B SC 179B.4.19 P909 L 18 # I-169

Mellitz, Richard Samtec, Inc.

Comment Type TR Comment Status X

Channel ILD is covered by FOM_ILD and ERL. . ILdd variations are common in these channels on good fixture channels. The ILdd here is overly restrictive.

SuggestedRemedy

Change line 18 to ILdd(f) is the fitted insertion loss in dB at frequency f

Proposed Response Response Status O

Cl 179B SC 179B.5.4 P917 L 38 # I-332

Kocsis, Sam Amphenol Corporation

Comment Type TR Comment Status X

As detailed in contribution <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP-DD224 does not have sufficient reference, and should be removed from the document.

SuggestedRemedy

Remove reference to SFP224, and point to the appropriate table for MDNEXT requirements.

Proposed Response Response Status O

Cl 179B SC 179B.5.4 P917 L 41 # I-333

Kocsis, Sam Amphenol Corporation

Comment Type TR Comment Status X

Table 179B-5 does not exist.

SuggestedRemedy

Remove Item TF8 from the table.

Proposed Response Response Status O

Cl 179C SC 179C.1 P918 L 15 # I-334

Kocsis, Sam Amphenol Corporation

Comment Type ER Comment Status X

The reference to "multi-lane" connectors is not necessary.

SuggestedRemedy

Remove the sentence "The SFP-DD224, QSFP224, QSFP-DD1600, and OSFP1600 are also referred to as multilane connectors."

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 179C SC 179C.1 P918 L23 # I-112
 Ran, Adee Cisco Systems, Inc.
 Comment Type E Comment Status X
 In Table 179C-1, the heading for the first column, "MDI types", should be "MDI connector type", to match the text in the first paragraph that points to this table.
 SuggestedRemedy
 Change the heading to "MDI connector type".
 Proposed Response Response Status O

Cl 179C SC 179C.1 P918 L24 # I-335
 Kocsis, Sam Amphenol Corporation
 Comment Type TR Comment Status X
 As detailed in contribution
 <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP224 does not have sufficient reference, and should be removed from the document.
 SuggestedRemedy
 Remove the row for MDI type SFP22, in Table 179C-1.
 Proposed Response Response Status O

Cl 179C SC 179C.1 P918 L25 # I-336
 Kocsis, Sam Amphenol Corporation
 Comment Type TR Comment Status X
 As detailed in contribution
 <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP-DD224 does not have sufficient reference, and should be removed from the document.
 SuggestedRemedy
 Remove the row for MDI type SFP-DD224 in Table 179C-1.
 Proposed Response Response Status O

Cl 179C SC 179C.1 P918 L35 # I-337
 Kocsis, Sam Amphenol Corporation
 Comment Type TR Comment Status X
 As detailed in contribution
 <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP224 and SFP-DD224 do not have sufficient reference, and should be removed from the document.
 SuggestedRemedy
 Remove "179C.2.1 (SFP224)" and "179C.2.2 (SFP-DD224)" from the supported 200GBASE-CR1 list.
 Proposed Response Response Status O

Cl 179C SC 179C.1 P918 L39 # I-338
 Kocsis, Sam Amphenol Corporation
 Comment Type TR Comment Status X
 As detailed in contribution
 <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP-DD224 does not have sufficient reference, and should be removed from the document.
 SuggestedRemedy
 Remove "179C.2.2 (SFP-DD224)" from the supported 400GBASE-CR2 list.
 Proposed Response Response Status O

Cl 179C SC 179C.1 P919 L1 # I-113
 Ran, Adee Cisco Systems, Inc.
 Comment Type E Comment Status X
 "An MDI connector type may support one or more PMDs"
 For MDI connector types this is not an option - either they support one, or more than one (and if SFP is removed, all MDI connector types support more than one).
 The actual connector (not type) may be used by one or more PMDs.
 SuggestedRemedy
 Change the quoted sentence to "An MDI connector may be used by one or more PMDs".
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 179C SC 179C.1 P919 L3 # I-114

Ran, Adeo Cisco Systems, Inc.

Comment Type TR Comment Status X

The signal assignment for partially-implemented MDI connectors should be normative, as was explained in <https://www.ieee802.org/3/dj/public/26_03/ran_3dj_02a_2603.pdf>. Improved language of this requirement was proposed on slide 7 of ran_3dj_02a_2603. Since the table heading is "contact mapping", the word "contact" should be used.

SuggestedRemedy

Change the last sentence in the paragraph preceding Table 179C-2:
From: When an MDI connector is not fully utilized the lower PMD numbers in Table 179C-2 should be used.
To: When not all connector contacts in an MDI connector are physically connected to PMD signals, the connector contacts corresponding to lower PMD numbers in Table 179C-2 shall be used.

Proposed Response Response Status O

Cl 179C SC 179C.1 P919 L4 # I-301

Dudek, Michael Marvell

Comment Type TR Comment Status X

Annex 180A provides normative requirements for which fibers should be used when connectors are not fully utilized. Whereas for the equivalent situation for CR there is just a "recommendation" with the use of "should". This was discussed in the March Plenary in ran_3dj_02a_2603

SuggestedRemedy

Implement the change to 179C.1 on slide 7 of ran_3dj_02a_2603

Proposed Response Response Status O

Cl 179C SC 179C.1 P920 L6 # I-339

Kocsis, Sam Amphenol Corporation

Comment Type TR Comment Status X

As detailed in contribution <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP224 and SFP-DD224 do not have sufficient reference, and should be removed from the document.

SuggestedRemedy

Remove Table 179C-3.

Proposed Response Response Status O

Cl 179C SC 179C.2.1 P924 L36 # I-340

Kocsis, Sam Amphenol Corporation

Comment Type TR Comment Status X

As detailed in contribution <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP224 does not have sufficient reference, and should be removed from the document.

SuggestedRemedy

Remove Section 179C.2.1 completely.

Proposed Response Response Status O

Cl 179C SC 179C.2.2 P925 L34 # I-341

Kocsis, Sam Amphenol Corporation

Comment Type TR Comment Status X

As detailed in contribution <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP-DD224 does not have sufficient reference, and should be removed from the document.

SuggestedRemedy

Remove Section 179C.2.2 completely.

Proposed Response Response Status O

Cl 179C SC 179C.2.3 P926 L34 # I-324

Kocsis, Sam Amphenol Corporation

Comment Type TR Comment Status X

This section is the primary place to use the normative reference SFF-8665.

SuggestedRemedy

Add sentence "The combination of connector, cage, and module that can be used to create a QSFP224 solution is defined in SFF-8665, Rev x.x.x, yyyy-mm-dd."

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 179C SC 179C.2.3 P926 L36 # I-34

Turner, Michelle Editorial Coordination

Comment Type TR Comment Status X

The reference to SFF-TA-1027 appears inside a permissive construction (use of "may"). Because "may" indicates an optional choice rather than a requirement, this wording does not cite SFF-TA-1027 normatively, even though the document is listed in the Normative References clause.

SuggestedRemedy

If SFF-TA-1027 is required for proper implementation, please consider rewriting the sentence using normative language.

If SFF-TA-1027 is not required for implementation, please move it to the Bibliography as an informative reference.

Proposed Response Response Status O

Cl 179C SC 179C.2.5 P928 L21 # I-35

Brown, Matthew Qualcomm

Comment Type E Comment Status X

Revision "5.1" does not match revision "5.22" in subclause 1.4. Also, "Specification" should not be capitalized since it is not part of the reference title.

SuggestedRemedy

Change "5.1" to "5.22".
Change "Specification" to "specification".

Proposed Response Response Status O

Cl 179C SC 179C.3.3 P931 L8 # I-342

Kocsis, Sam Amphenol Corporation

Comment Type TR Comment Status X

As detailed in contribution <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP224 and SFP-DD224 do not have sufficient reference, and should be removed from the document.

SuggestedRemedy

Remove Item MDI1 and MDI2 from the PICS table.

Proposed Response Response Status O

Cl 179C SC 179C.3.4 P931 L30 # I-343

Kocsis, Sam Amphenol Corporation

Comment Type TR Comment Status X

As detailed in contribution <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP224 and SFP-DD224 do not have sufficient reference, and should be removed from the document.

SuggestedRemedy

Remove CM1 and CM2 from the PICS table.

Proposed Response Response Status O

Cl 179D SC 179D.1 P932 L19 # I-344

Kocsis, Sam Amphenol Corporation

Comment Type TR Comment Status X

As detailed in contribution <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP224 and SFP-DD224 do not have sufficient reference, and should be removed from the document.

SuggestedRemedy

Remove SFP224 and SFP-DD224 rows from Table 179D-1.

Proposed Response Response Status O

Cl 179D SC 179D.1.1 P932 L46 # I-345

Kocsis, Sam Amphenol Corporation

Comment Type TR Comment Status X

As detailed in contribution <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP224 and SFP-DD224 do not have sufficient reference, and should be removed from the document.

SuggestedRemedy

Remove rows and columns referencing SFP224 and SFP-DD224 in Table 179D-2. Add a note or text that indicates that partially populated MDI connectors may be used to support 200GBASE-CR1. Contribution planned to demonstrate consensus on nomenclature.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 179D SC 179D.1.1 P933 L24 # I-346
 Kocsis, Sam Amphenol Corporation
 Comment Type TR Comment Status X
 As detailed in contribution
 <https://www.ieee802.org/3/dj/public/26_03/kocsis_3dj_01a_2603.pdf>, SFP-DD224 do not
 have sufficient reference, and should be removed from the document.
 SuggestedRemedy
 Remove rows and columns referencing SFP-DD224 in Table 179D-2. Add a note or text
 that indicates that partially populated MDI connectors may be used to support 400GBASE-
 CR2. Contribution planned to demonstrate consensus on nomenclature.
 Proposed Response Response Status O

CI 179D SC 179D.6.2 P820 L25 # I-178
 Healey, Adam Broadcom Inc.
 Comment Type T Comment Status X
 The definitions of HCB and MCB leverage the definitions of TP2/TP3 and cable assembly
 test fixtures in 179B.2 and 179B.3 respectively. These definition refer to "MDI connectors"
 but this term is not used in the chip-to-module reference model. For clarity, it should be
 noted that references to the "MDI connector" in 179B.2 and 179B.3 are equivalent the host
 "connector" in the Annex 176D reference model.
 SuggestedRemedy
 Add a statement to 179D.6.2 clarifying that references to the MDI connetor in 179B.2 and
 179B.3 correspond to the "connector" cited in the chip-to-module reference model.
 Proposed Response Response Status O

CI 179D SC 179D.6.3 P821 L23 # I-277
 Calvin, John Keysight Technologies
 Comment Type TR Comment Status X
 Vf minimum value of .389V still fails the majority of early designs.
 SuggestedRemedy
 The interop report out:
https://www.ieee802.org/3/dj/public/26_01/calvin_3dj_01a_2601.pdf Page 23 shows 9 out
 of 12 modules failing Vf. We either need to review the measurement methodology in Vf
 (which is not new) or consider further reduction of the Vf values to 350mV.
 Proposed Response Response Status O

CI 179D SC 179D.6.4 P821 L22 # I-276
 Calvin, John Keysight Technologies
 Comment Type TR Comment Status X
 Vf minimum value of .372 still fails the majority of early designs.
 SuggestedRemedy
 The interop report out:
https://www.ieee802.org/3/dj/public/26_01/calvin_3dj_01a_2601.pdf Page 23 shows 9 out
 of 12 modules failing Vf. We either need to review the measurement methodology in Vf
 (which is not new) or consider further reduction of the Vf values to 350mV.
 Proposed Response Response Status O

CI 180 SC 180 P468 L34 # I-47
 Mazzini, Marco Cisco Systems
 Comment Type T Comment Status X
 TDECQcer is not stable enough measurement a contribution is forthcoming.
 SuggestedRemedy
 Remove TDECQcer from Table 180-7, row 34
 Proposed Response Response Status O

CI 180 SC 180.1 P457 L49 # I-416
 Dawe, Piers J G NVIDIA
 Comment Type ER Comment Status X
 This says "are required according to the guidelines in 176B.5.1"; 176B.5.1 says "require".
 So it's not guidelines.
 SuggestedRemedy
 Delete "the guidelines in": up to 4 times per PMD clause.
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.1 P458 L 6 # I-417

Dawe, Piers J G NVIDIA

Comment Type ER Comment Status X

Table 180-1 and 2, Physical Layer clauses associated with... are clones of each other. Each really has 3 columns. The status (optional, required or conditional) is the same in each. But the presentation obscures the very high level of commonality.

SuggestedRemedy

Present these as a single table with four columns: Clause number, 200GBASE-DR1 (with the abbreviated titles from Table 180-1), 400GBASE-DR2 (with the abbreviated titles from Table 180-2), Status.

Combine footnotes c and e.

Proposed Response Response Status O

Cl 180 SC 180.1 P460 L 6 # I-418

Dawe, Piers J G NVIDIA

Comment Type ER Comment Status X

Table 180-3 and 4, Physical Layer clauses associated with... are not quite clones of each other. Each really has 3 columns. The status (optional, required or conditional) is the same in each. But the presentation obscures the very high level of commonality and makes it hard to spot the differences (PCS and PMA).

SuggestedRemedy

Present these as a single table with four columns: Clause number, 200GBASE-DR1 (with the abbreviated titles from Table 180-1), 400GBASE-DR2 (with the abbreviated titles from Table 180-2), Status. There will be one more row than in Table 180-3.

Combine footnote d.

Proposed Response Response Status O

Cl 180 SC 180.2 P461 L 37 # I-419

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

Based on the FLR specification and FEC CER of 174A.6 and the sentence at line 41, the sentence at line 37 is applicable to pluggable modules where the decisions are made in the module, errors can be counted at its PMA, and some error budget is reserved for the following AUIs in the receive path. But it is not correct for RTL, LPO, NPO and CPO where there is no C2M AUI.

SuggestedRemedy

Change the first sentence to:

With a compliant input signal, a PMD receiver is expected to meet the block error ratio (BLER) of 1.45×10^{-11} (see 174A.6), measured at the PMA adjacent to the PMD using the method described in 174A.9, with the appropriate BER_{added}. For a receiver in a module with an AUI C2M, BER_{added} is 6.4×10^{-5} . For a receiver where the PMA adjacent to the PMD is the final PMA in the receiver (e.g. in a host ASIC), BER_{added} is 3.2×10^{-5} . For a receiver where the PMA adjacent to the PMD is followed by an AUI C2C then the final PMA in the receiver, BER_{added} is 5×10^{-5} .

Similarly in other optical clauses.

Proposed Response Response Status O

Cl 180 SC 180.2 P461 L 41 # I-420

Dawe, Piers J G NVIDIA

Comment Type ER Comment Status X

The paragraphs in this subclause are ordered top - bottom - middle.

SuggestedRemedy

Swap the second and third paragraphs so that the logic behind these requirements is more apparent. Several clauses.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.3 P461 L49 # I-429

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

"The service interface" language was imposed from the world of software onto 802.3 a very long time ago. For years, it was boilerplate that we did not need to take seriously. Now, with ILT, APSU, RTRLR, LPO, CPO, the distinction becomes interesting and we should get this right so as to prepare solid foundations for future projects.

As is abundantly clear from the base standard and the definitions 1.4.469, Physical Medium Attachment (PMA) sublayer, and 1.4.470 Physical Medium Dependent (PMD) sublayer, a PMA provides functions for transmission, reception, clock recovery and skew alignment while the PMD interfaces to the transmission medium concerned (coax, twinax, MMF, SMF). The PMD is untimed, it's a media convertor. In a traditional retimed optical module, there are formally, a PMA which provides CDR, pattern generation and maybe pattern checking, above a PMD that converts untimed electrical signals between the internal electrical format of the module or an IC within it, and the optical format - and vice versa. Even for a spec where there is a DFE in a reference receiver for a PMD, the spec has no concept of bits or errors at the DFE output; the digital, countable symbol stream is inside the PMA or at the interface above it, and the interface below the PMA (AUI has an analog specification).

SuggestedRemedy

Here, change "The PMD translates the encoded data to and from signals suitable for the specified medium" to "The PMD translates the signals from and to the adjacent PMA to and from signals suitable for the specified medium".

Replace the next paragraph, which describes a digital interface, with a definition for an interface carrying signals (rather than bits or a symbol stream) on the datapath. The auxiliary primitives PMD:IS_SIGNAL.request and PMD:IS_SIGNAL.indication can remain "digital"; they aren't associated with timing-critical pattern generators and such.

Make appropriate changes to 178A (APSU). Items such as the retimer reference model in Figure 178B-13 will be formally in a PMA, always. This will allow a consistent definition framework for copper, IMDD and coherent optical PHYs.

Proposed Response Response Status O

Cl 180 SC 180.3 P462 L10 # I-431

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This says "provides the status from ISLs above the PMD". This is the only use of "ISL" in the clause, and there is no cross-reference. The thing above a PMD is always a PMA, so this unfamiliar term seems unnecessary. "the status" is too vague. Naming a status primitive as "request" is unnatural and confusing (although we have a reason to do it), so it should be explained more thoroughly.

SuggestedRemedy

Change "is used for the PMA above the PMD to indicate the validity of PMD:IS_UNITDATA_i.request".

Give a cross-reference.

Four clauses.

Proposed Response Response Status O

Cl 180 SC 180.3 P462 L10 # I-430

Dawe, Piers J G NVIDIA

Comment Type ER Comment Status X

parameter of the PMD:IS_SIGNAL.request provides

SuggestedRemedy

parameter of the PMD:IS_SIGNAL.request *primitive* provides

Four clauses

Proposed Response Response Status O

Cl 180 SC 180.5.1 P463 L48 # I-432

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This says "The inter-sublayer link training (ILT) and RTS functions indicated in Figure 180-2 are defined in Annex 178B." but 178B is called APSU now.

SuggestedRemedy

Insert APSU:

The inter-sublayer link training (ILT) and RTS functions (APSU) indicated in Figure 180-2 are defined in Annex 178B.

Four clauses.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.5.1 P464 L7 # I-433

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This shows the signal detect after the usual AND gate at the bottom of the diagram, but an unconnected SIGNAL_OK at the top of the diagram. But these are connected; the ILT/RTS functions will be asleep until signal detect reports that there is light coming in and it is worth waking up. A consideration of squelch shows that getting this right can be important.

SuggestedRemedy

Show signal detect as an input to "ILT/RTS functions"

Proposed Response Response Status O

Cl 180 SC 180.5.1 P464 L9 # I-434

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

Sometimes this diagram is taken too literally leading to a belief that the 2 to 5 m patch cord and TP2 are part of a service link. They are not; optical cabling may include a variety of connectors (not the type used on test equipment), patch panels, and maybe optical switches, the length of any first patch cord is not regulated, and there may be no accessible TP2.

SuggestedRemedy

Either: remove TP2 from the medium, and show the patch cord and TP2 (connected to test equipment) as an alternate;
or: at line 2 normative text), add: While TP2 and the patch cord for transmitter measurements and tests are shown in Figure 180-2, they are not part of the medium. The transmit MDI is connected to the medium for use, or to the patch cord and TP2 transmitter measurements and tests.

Proposed Response Response Status O

Cl 180 SC 180.5.2 P464 L37 # I-435

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The PMD transmitter can be in one of three modes, not two.

SuggestedRemedy

Change: The PMD transmit function has two operating modes: DATA and TRAINING. The operating mode is controlled ...
to: The PMD transmit function can be in one of three modes; OFF, DATA and TRAINING. The use of DATA and TRAINING is controlled ...

Proposed Response Response Status O

Cl 180 SC 180.5.4 P465 L29 # I-436

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

In existing optical PMDs, the relation between signal detect function and SIGNAL_OK is simple. In this draft it is not stated in these sections where one would expect it. There should be some text explaining how the global and/or lane-by-lane signal detect function relates to SIGNAL_OK.

SuggestedRemedy

Add text explaining how the global and/or lane-by-lane signal detect function relates to SIGNAL_OK.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 180 SC 180.5.5 P466 L1 # I-437

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

This text, which has been modified from text for 1000BASE-LX and 1000BASE-SX, says: "Implementations need to provide adequate margin between the input optical power level at which the PMD_signal_detect_i variable is set to 1 and the inherent noise level of the PMD". This could be read as a pseudo-requirement that (for decreasing signal strength), the SD should trip before the signal is too noisy to use, or after - the direction of the margin is not indicated. Actually, too noisy to use is not the requirement. The inherent noise level of the PMD is not on the same scale as the input optical power level, and for SD based on average optical power, it is barely relevant. The paragraph would be more use in a copper clause. "need" should be avoided.

SuggestedRemedy

Say what we actually mean: NOTE--Implementors should ensure that the PMD_signal_detect_i variable is not incorrectly set to 1 by the action of the inherent noise level of the PMD, including the effects of crosstalk, power supply noise, etc. Or better, delete the paragraph. It is only an attempt at guidance to designers, and confusing. Six clauses.

Proposed Response Response Status O

CI 180 SC 180.5.12 P466 L38 # I-18

Brown, Matthew Qualcomm
 Comment Type E Comment Status X

"functions" appears twice in title

SuggestedRemedy

change heading to "180.5.12 Autonomous path startup (APSU) functions"
 change heading 181.5.12, 182.5.12, and 183.5.12 similarly

Proposed Response Response Status O

CI 180 SC 180.7.1 P468 L27 # I-438

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

This is an underlined less than symbol

SuggestedRemedy

Use a less than or equal symbol. Scrub the draft.

Proposed Response Response Status O

CI 180 SC 180.7.1 P468 L28 # I-439

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

There is a strong relation between ECQ, and histogram spacing + width. Histogram spacing is very important to protect receivers from narrow eyes caused by transmitter jitter.

SuggestedRemedy

If the histogram spacing + width remains as is, increase the TDECQ and TECQ limits to 3.8 dB. The useful signal strength, OMA-TDECQ, is unchanged. Several clauses.

Proposed Response Response Status O

CI 180 SC 180.7.1 P468 L35 # I-223

Maniloff, Eric Ciena Corporation
 Comment Type TR Comment Status X

Over peaking of transmitters is not effectively prevented. The overshoot limit is not effective as higher bandwidth transmitters could be over peaked and still meet an overshoot specification. Use of Ceq from the Reference Rx gives insight into whether the Tx is overpeaked. With the introduction of the DFE into the Reference Rx, the calculation of Ceq needs to be modified to account for the DFE tap.

SuggestedRemedy

Reintroduce Ceq into Table 180-7 with a Minimum value of 0dB. Similar changes should be made in clauses 181, 182, 183. Supporting contribution to be provided.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.7.1 P468 L36 # I-441

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The transmitter overshoot and undershoot limit is far too high (D2.2 comments 223 and 252). A signal with overshoot like this has been badly set up. It is outside the range of signal shapes a receiver is expected to see, as well as wasting transmitter headroom and receiver ADC resolution.

SuggestedRemedy

For the current 1e-2 hit ratio, the limit should be reduced to from 22% to 13%, and transmitter power excursion should be reduced from 2.3 dBm to 1.8 dBm. See another comment for the hit ratio.

Proposed Response Response Status O

Cl 180 SC 180.7.1 P468 L36 # I-440

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The transmitter functional symbol error histogram method tests transmitter-receiver pairs, not just transmitters. Depending on the receiver used, a transmitter could be falsely failed or falsely passed. The FEC bin 8 criterion is not connected to the FLR objective of this project, nor to a target such as OIF's 1e-15 effective BER. Extrapolation from bin 8 to bins 14-16 which are the ones that matter, is lacking. Although the idea of counting errors can be useful for deploying links in volume where the implementation of transmitter and receiver (technology, supplier, revision) really are paired, 802.3 is an interoperability standard.

SuggestedRemedy

Remove this row from this table. Remove row from Table 180-14. Move 180.9.9 to an annex. Four clauses.

Proposed Response Response Status O

Cl 180 SC 180.7.1 P468 L38 # I-248

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

In D2.0 1T DFE was added to the TDECQ equalizer where DFE is superior to improve TDECQ for bandlimited transmitters over using large overshoot/undershoot which can have 1-2 dB of SNR penalty given TDECQ doesn't incorporate peak-to-average penalty. Overshoot/undershoot of 22% at 1E-2 hit ratio can also result in clipping and frame loss.

SuggestedRemedy

Hit ratio of 1E-2 has no merits given SSPRQ and Ethernet scrambled data. Peak-peak amplitude for example are measured at hit ratio of 1E-7 in DJ. Change hit ratio from 1E-2 to 1E-4 and reduce overshoot/undershoot from 22% to 18% given that TDECQ has DFE no longer such high overshoots are necessary. see ghiasi_3dj_02_2605

Proposed Response Response Status O

Cl 180 SC 180.7.1 P468 L42 # I-442

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The extinction ratio limit is there to protect the receiver from MPI. MPI can get worse at low extinction ratio, when it happens (rarely - fading) but for PAM4 this is a fairly weak function. On the other hand ECQ improves with low extinction ratio (linearity), differently for different technologies but it always happens (not fading). Also, RF power and supply voltage can be reduced at lower extinction ratio.

SuggestedRemedy

Reduce the extinction ratio limit from 3.5 dB to 3 dB. The definition of TDECQ, which is already channel-dependent, can be modified to include MPI, similar to Eq. 95-3; if so, increase the TDECQ limit by 0.1 dB for the reference case in tables 180-9 and 180-12. The definition of TECQ and SECQ, where the optical channel is negligible, are not changed. The receiver sensitivity is lowered by 0.1 dB. Or, TDECQ can remain without MPI: receiver sensitivity and stressed receiver sensitivity are lowered by 0.1 dB. Apply this to all IMDD clauses. I can imagine that it would this would be particularly helpful for 800GBASE-LR4 where a low extinction ratio will enable a good chromatic dispersion penalty.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.7.1 P468 L43 # I-319

Kimber, Mark Semtech

Comment Type T Comment Status X

If transmitter bandwidth is too low then the BER floor will increase. Having a transmitter bandwidth < 35 GHz is detrimental to the BER floor. This would equate to a transition time of 7.2 ps with a 53 GHz SIRC measurement filter

SuggestedRemedy

Change 8 ps transition time to 7.2 ps.

Proposed Response Response Status O

Cl 180 SC 180.7.1 P468 L43 # I-443

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The transmitter transition time limit was scaled from 100G where a retiming (pluggable) receiver with FFE-based or other linear equalization was considered. Today at 200G, receivers are DSP, with design learnings from copper where the signals are *much* slower. Generating high bandwidth signals is far from free, and with today's receivers that tolerate slow signals well, 8 ps max is not necessary.

SuggestedRemedy

Change 8 ps to 12 ps, or remove the item completely and rely on well-chosen ECQ, tap weight and overshoot limits to protect us from bad signals on the far right of the ECQ map.

Proposed Response Response Status O

Cl 180 SC 180.7.1 P468 L47 # I-444

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

It's not RINxxOMA, it's RINxOMA, as defined in 1.4.515. Same name for a thing, every time (style manual, 10.1 Homogeneity).

SuggestedRemedy

Change RINxxOMA to RINxOMA, 25 times (plus contents). Change "xx dB" to "x dB", 5 times. Change " "xx" " to x (in italics, no quotation marks, as in the base standard), four times.

Proposed Response Response Status O

Cl 180 SC 180.7.1 P468 L47 # I-445

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

Transmitter noise is included in TDECQ and TECQ. We introduced a RIN limit too, -132 dB/Hz at 50G/lane, because we don't attempt to find the shape of the RIN spectrum, which determines how the RIN is amplified by the equalizer, so we just keep fairly small. At 100G/lane, the limit is -136 (more noise bandwidth). At 200G/lane, we reduced the limit by another 3 dB, keeping things in proportion. Then we added the DFE (in the reference receiver and in real DSP), so there is much less noise enhancement. TDECQ and TECQ pick up electrical noises such as from power supplies as well as true RIN - these are not at high enough frequencies to undergo noise enhancement.

SuggestedRemedy

Change the RIN limit to -137 dB/Hz. Four clauses.

Proposed Response Response Status O

Cl 180 SC 180.7.2 P470 L7 # I-446

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

Tweaking the receiver sensitivities for MPI accounting (see another comment).

SuggestedRemedy

Change the receiver sensitivity from -3.4, -4.3 + TECQ to -3.5, -4.4 + TECQ. Change the stressed receiver sensitivity from -0.9 to -1. Similarly in other IMDD clauses.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 180 SC 180.7.2 P470 L7 # I-72

HE, MICHAEL TeraHop

Comment Type T Comment Status X

Base on volume production DR transceiver data, Rx sensitivity OMAouter, Tx OMAouter, and other according Tx/Rx specs can be refined/optimized for cost, power efficiency.

SuggestedRemedy

Reduce Rx sensitivity OMAouter, Tx OMAouter, and other according Tx/Rx specs by 0.6dB. (Refer to contribution he_3dj_01_2603, page 10-11)

Details for transmitter---

--180.7.1 Table 180-7, page 468 line 21

Change Average launch power, each lane (min) from -3.1 to -3.7 (dBm)

--180.7.1 Table 180-7, page 468 line 26

Change Tx OMAouter (min) (for TECQ < 0.9 dB) from -0.1 to -0.7 (dBm)

--180.7.1 Table 180-7, page 468 line 27

Change Tx OMAouter (min) (for TECQ >= 0.9 dB) from -1 + max(TECQ, TDECQ) to -1.6 + max(TECQ, TDECQ) (dBm)

--180.7.1 Figure 180-3, page 469 line 27

Shift Tx OMAouter (min) lines down for 0.6 dB

Details for receiver---

--180.7.2 Table 180-8, page 469 line 51

Change Average receive power (min) from -6.1 to -6.7 (dBm)

--180.7.2 Table 180-8, page 470 line 7

Change Receiver sensitivity OMAouter (min) (for TECQ < 0.9 dB) from -3.4 to -4.0 (dBm)

--180.7.2 Table 180-8, page 470 line 8

Change Receiver sensitivity OMAouter (min) (for TECQ >= 0.9 dB) from -4.3 + max(TECQ, TDECQ) to -4.9 + max(TECQ, TDECQ) (dBm)

--180.7.2 Table 180-8, page 470 line 9

Change Stressed receiver sensitivity OMAouter (max) from -0.9 to -1.5 (dBm)

--180.7.2 Figure 180-4, page 470 line 43

Shift Receiver sensitivity OMAouter (max) line down for 0.6 dB

--180.7.3 Figure 180-5, page 471 line 47

Shift Tx OMAouter (min) and Rx sensitivity OMAouter (max) lines down for 0.6 dB

Proposed Response Response Status O

CI 180 SC 180.7.2 P470 L9 # I-447

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

Tweaking the stressed receiver sensitivity for a change to max TDECQ and TECQ (see another comment).

SuggestedRemedy

Change the stressed sensitivity from -0.9 to -0.5 and change SECQ from 3.4 to 3.8 dB. Similarly in other IMDD clauses.

Proposed Response Response Status O

CI 180 SC 180.7.3 P471 L7 # I-448

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

Tweaking the budget for changes to max TDECQ and TECQ and MPI (see other comments).

SuggestedRemedy

Change the power budget from 6.7 to 7.2 dB.
Change the allocation for penalties from 3.7 to 4.2 dB
In table footnotes b and c, change 0.1 dB to 0.2 dB.
Similarly in other IMDD clauses.

Proposed Response Response Status O

CI 180 SC 180.8 P472 L48 # I-449

Dawe, Piers J G NVIDIA

Comment Type ER Comment Status X

There is an informative reference to ITU-T G.652 (08/2024) here. ITU-T G.652 (08/2024) does not appear in Annex A, bibliography. 1.3, normative references, has only: ITU-T Recommendation G.652, 2016--Characteristics of a single-mode optical fibre and cable.

SuggestedRemedy

Preferably, delete "2016".
Scrub the draft for missing and out-of-date references.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 180 SC 180.9.1 P475 L 8 # I-450

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

The square wave was used for an old-fashioned way of measuring RIN, which is no longer in the draft. It is not needed for anything now, as Table 180-14 shows. Given the work on OMA definition and its susceptibility to reflections, it is not clear that allowing transmitter transition time (which relies on OMA; see 180.9.13) to be defined two ways is feasible any more.

SuggestedRemedy

Remove the square wave from tables 180-13 and 14.
 In 180.9.13, change "a test pattern specified for transmitter transition time in Table 180-14" to "the test pattern given in Table 180-14", and delete "with the exception that the square wave test pattern may be used".
 Similarly in other IMDD clauses.
 In 45.2.1.254 Inner FEC Square Wave testing control register (Register 1.2404), add text to say that square wave generation is optional.
 In figures 176-2 and 13, delete "Required, "
 In 176.7.4.6 Square wave (quaternary) test pattern, it is clear that this is optional. Add "(optional)" to the subclause titles of 176.7.4.6 and 177.6.1.6, as in 176.7.2 and 176.7.3.

Proposed Response Response Status O

CI 180 SC 180.9.1 P475 L 16 # I-451

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

Clarification to make multilane testing practical

SuggestedRemedy

Add text to make it clear that pattern 7 includes the use of a single lane of a multilane signal (e.g. one lane of 400GBASE-DR2 generated by a 400GBASE-R PCS) as well as a 200GBASE-DR1 signal from a 200GBASE-R PCS).

Proposed Response Response Status O

CI 180 SC 180.9.1 P475 L 34 # I-388

Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point
 Comment Type TR Comment Status X

Table 180-14 says to use pattern 6 (SSPRQ) to measure TDECQ, but the text in Sec. 180.9.6.1, lines 36-37, says to use test pattern 3 or 5 (PRBS31Q or Scrambled idle).

SuggestedRemedy

Resolve inconsistency between text and Table 180-14.

Proposed Response Response Status O

CI 180 SC 180.9.1 P475 L 36 # I-38

Issenhuth, Tom Huawei Technologies Co., Ltd,Issenhuth Consulting,
 Comment Type E Comment Status X

In Table 180-9 TECQ is listed before TDECQ_CER but for the associated cross references TDECQ_CER comes before TECQ so the cross references for the Table are not listed in order

SuggestedRemedy

In Table 180-9 swap the order for the parameters TECQ and TDECQ_CER so all the parameters and their associated cross references in the Table are listed from smallest to largest

Proposed Response Response Status O

CI 180 SC 180.9.2 P476 L 5 # I-453

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

This sentence extends over 4 lines and it is hard to parse. It can be divided cleanly. Also we should be clear whether it's the Bessel-Thomson response that should not exceed, or what.

SuggestedRemedy

IEEE Std 802.3db has a partial fix but use the wording in IEEE Std 802.3dk: change: at least 1.3 x 106.25 GHz, and at frequencies above 1.3 x 106.25 GHz, the response should ...
 to: at least 1.3 x 106.25 GHz. At frequencies above 1.3 x 106.25 GHz, *its* response should ...
 Four clauses.

Proposed Response Response Status O

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Cl 180 SC 180.9.2 P476 L5 # I-452

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The choice of fourth-order Bessel-Thomson response is a historical accident. Fifth order rolls off a bit steeper at high frequencies, which is more realistic, and has no other significant difference. The better roll-off leads to better measurements. This is also true for measurements where reflections at an instrument's electrical connectors are a concern. This is our chance to make the change, as the industry transitions to a new speed and new test equipment.

SuggestedRemedy

Change fourth-order to fifth-order throughout the draft.

Proposed Response Response Status O

Cl 180 SC 180.9.2 P476 L6 # I-252

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

With TDECQ expected to capture jitter more accurately now that explicit jitter measurement are removed the CRU maximum peaking must be defined, also the slope should be -20 dB not 20 dB.

SuggestedRemedy

Original text: The clock recovery unit (CRU) has a corner frequency of 4 MHz and a slope of 20 dB/decade.

proposed text: The clock recovery unit (CRU) has a 3 dB corner frequency of 4 MHz and a slope of -20 dB/decade. The CRU maximum jitter transfer peak is ≤0.3 dB from 40 kHz to 20 MHz.

Proposed Response Response Status O

Cl 180 SC 180.9.3 P476 L29 # I-454

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

There are multiple patterns allocated for this parameter in Table 180-14. The patterns are not defined there; they are defined by reference in Table 180-13.

SuggestedRemedy

Change "using the test pattern defined in Table 180-14" to "using a test pattern as in Table 180-14" or to "using one of the test patterns given in Table 180-14". Similarly in 180.9.4 and other optical clauses.

Proposed Response Response Status O

Cl 180 SC 180.9.5 P476 L42 # I-218

Maniloff, Eric Ciena Corporation

Comment Type TR Comment Status X

OMA_Outer with pattern 6 (SSPRQ) has multiple runs of ≥ 7 threes and ≥ 6 zeroes. In order to obtain consistent measurements, all runs of 7's and 3's should be measured.

SuggestedRemedy

Change text to: "When measured with pattern 6, OMA_outer is measured as the difference between the average optical launch power level P3, measured over the central 2 UI of the first 7 UI of all runs of 7 threes or more, and the average optical launch power level P0, measured over the central 2 UI of the first 6 UI of all runs of 6 zeroes or more.". Make similar change in clause 181.9.5, 182.9.5, and 183.9.5

Proposed Response Response Status O

Cl 180 SC 180.9.6.1 P477 L34 # I-455

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

It is surprising that ECQ is defined with SSPRQ on all transmit lanes; this means what would appear in service as crosstalk appears in the test as ISI, some of which could be equalized. I see that 121.8.5.1 says the same.

SuggestedRemedy

Add an informative NOTE saying that a more conservative test would use de-correlated PRBS31Q or test pattern 7. (And see another comment against the definition of pattern 7 in Table 180-13.)

Proposed Response Response Status O

Cl 180 SC 180.9.6.1 P477 L36 # I-389

Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point

Comment Type TR Comment Status X

Table 180-14 says to use pattern 6 (SSPRQ) to measure TDECQ, but the text in Sec. 180.9.6.1, pg. 477, lines 36-37, says to use test pattern 3 or 5 (PRBS31Q or Scrambled idle).

SuggestedRemedy

Resolve inconsistency between text and Table 180-14.

Proposed Response Response Status O

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Cl 180 SC 180.9.6.1 P477 L37 # I-456

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

test pattern 3 or pattern 3 - we should be consistent. Table 180-13, column 1, says "Pattern".

SuggestedRemedy

Delete "test" before pattern in several places.

Proposed Response Response Status O

Cl 180 SC 180.9.6.1 P477 L44 # I-258

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

802.3dj has spend last 1 year to best capture jitter in TDECQ and FRx, unless xAUI-n (C2M) interface operate with jitter tolerance condition in 176D.8.14 TDECQ measurement maybe be too optimistic see also unsatisfied comment 147 D2.2

SuggestedRemedy

Add sentence: For those cases where there is an xAUI-n chip-to-chip (C2C) or chip-to-module (C2M) interface (see Table 180-1 through Table 180-4), the clock source for the test pattern is derived from the clock recovered from the xAUI-n input signal. The xAUI-n input signal is that described for the Jitter tolerance test in 176D.8.14. The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal. See ghiasi_3dj_02_2605

Proposed Response Response Status O

Cl 180 SC 180.9.6.1 P477 L46 # I-390

Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point

Comment Type TR Comment Status X

This says that the pattern of the xAUI-n input signal can be a valid xBASE-R signal (in addition to PRBS31Q and scrambled idle), but that contradicts lines36-37 on the same page, and it contradicts Table 180-14 on pg 475 line 34.

SuggestedRemedy

Resolve inconsistencies on allowed input patterns and update affected text and Table.

Proposed Response Response Status O

Cl 180 SC 180.9.6.1 P477 L46 # I-457

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

SSPRQ contains a section for challenging CDRs. There is no point challenging the CRU in the scope; that only degrades the measurement. SSPRQ is not used for testing receivers. So it must be there to challenge the PMAs between the PCS and the Tx PMD. Yet this says "The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal" - which I believe is for practical considerations in ICs, some years ago.

SuggestedRemedy

Change "The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal." to "The pattern of the xAUI-n input signal should be SSPRQ on the lane under test, and test patterns 3, 5 or 6 on the other lanes. However, test patterns 3, 5 or 6 may be used on the lane under test.

Proposed Response Response Status O

Cl 180 SC 180.9.6.2 P478 L32 # I-458

Dawe, Piers J G NVIDIA

Comment Type ER Comment Status X

Table layout

SuggestedRemedy

Make the table full width. Make the first two columns wide enough for the equations. The feature to "size columns to contents" with table full width might do this.

Proposed Response Response Status O

Cl 180 SC 180.9.6.2 P478 L37 # I-459

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This says "does not significantly stress the tester receiver". tester receiver is the wrong term; it's called reference receiver as in the figure above. It's an oscilloscope; a small or no signal will not stress it, a very large one might. The intention was to advise the reader that with too much loss, the uncertainty in the noise of the scope (not the noise itself, which is accounted for) would degrade the measurement. But this is trying to teach the test engineer how to do his job.

SuggestedRemedy

Delete the column, and with it note b.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 180 SC 180.9.6.3 P479 L3 # I-391

Swenson, Norman Nokia Corporation, Norman Swenson Consulting, Point

Comment Type ER Comment Status X

The reference equalizer is not a 15-tap, T-space, feed-forward equalizer followed by a 1-tap decision feedback equalizer. It is a DFE with 14 feedforward taps and one feedback tap. These are not the same thing; if it were the former, the coefficients for each equalizer would be independently optimized. Instead, the correct approach is to jointly optimize the feedforward taps and the feedback tap(s).

SuggestedRemedy

Change to "The reference equalizer is composed of a feed-forward filter and a feedback filter. The input to the feedback filter is an estimate of the transmitted PAM-4 symbol which is assumed to be correct." This is similar to the text used in Clause 178A.1.8.1.

Proposed Response Response Status O

CI 180 SC 180.9.6.3 P479 L4 # I-224

Maniloff, Eric Ciena Corporation

Comment Type ER Comment Status X

The text says that the FFE is "followed by a 1-tap decision feedback equalizer (DFE)". The reference equalizer in Fig 180-10 does not have a DFE, instead it feeds back a 1UI delayed synchronized test pattern, which removes the aspect of error propagation.

SuggestedRemedy

Change the text to remove "followed by a 1-tap decision feedback equalizer (DFE)" to "followed by a 1 UI delayed synchronized test pattern, implementing functionality similar to a 1-tap decision feedback equalizer (DFE)". The synchronized test pattern is an ideal PAM4 signal of outer amplitude +/-OMATDECQ/2 and its transitions aligns with the zero crossing of the captured waveform at the output of the feed forward equalizer. Make similar changes in Clauses 181, 182, 183.

Proposed Response Response Status O

CI 180 SC 180.9.6.3 P479 L7 # I-460

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This says "This reference equalizer ... does not imply any particular receiver equalizer implementation." Clearly that is not the case; it says "The reference equalizer is a 15-tap, T-spaced, feed-forward equalizer (FFE), followed by a 1-tap decision feedback equalizer (DFE)..." That's particular.

SuggestedRemedy

Change "does not imply any particular receiver equalizer implementation" to "does not imply that a compliant product should contain any particular receiver equalizer implementation".

Proposed Response Response Status O

CI 180 SC 180.9.6.3 P479 L10 # I-19

Brown, Matthew Qualcomm

Comment Type E Comment Status X

In Figure 180-10, the arrow-line goes through the summer beside the detector.

SuggestedRemedy

Split the line on each side of the summer.

Proposed Response Response Status O

CI 180 SC 180.9.6.3 P479 L11 # I-461

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The output from the TDECQ reference equalizer is a large number of samples of a waveform. This "Detector" implies some sort of decision circuit that outputs a stream of bits or PAM4 symbols, which is wrong. The output is from the analysis, and it is a set of numbers: ECQ, Ceq, thresholds, tap weights, phase.

SuggestedRemedy

Instead of "Detector", show "To Analysis". In Figure 180-9, indicate that the output is from the analysis.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.9.6.3 P479 L12 # I-20

Brown, Matthew Qualcomm

Comment Type ER Comment Status X

In Figure 180-10, the detector and "AWGN" source are not part of the reference equalizer.

SuggestedRemedy

Clearly show which portion of this figure is the reference equalizer. For instance, draw a box around all except the detector and AWGN + summer and label it as "reference equalizer".

Proposed Response Response Status O

Cl 180 SC 180.9.6.3 P479 L17 # I-463

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This shows 1 UI delay, but it is not clear from what or where. In a classical DFE, the delay from decision time to feedback should be about 1/2 UI, not 1 UI.

SuggestedRemedy

Show the clock from the CRU feeding the DFE with appropriate delay.

Proposed Response Response Status O

Cl 180 SC 180.9.6.3 P479 L17 # I-180

Healey, Adam Broadcom Inc.

Comment Type T Comment Status X

In Figure 180-10, the term "synchronized test pattern" is introduced but is not defined. The signal to which the test pattern is synchronized needs to be defined. I believe that, in this case, the test pattern symbols should be aligned to the sequence of symbols at the detector output. Since TDECQ is computed from an eye diagram, it seems that the "synchronized test pattern" needs to be a continuous time signal (or over-sampled discrete-time approximation) which suggests some continuous-time pulse shape also needs to be defined. I believe the intent is for the "synchronized test pattern" to be a sequence of square pulses whose amplitudes are scaled from the test pattern symbol sequence. Finally, the phase relationship between the "synchronized test pattern" and the output of the feed-forward equalizer should be defined. The "1 UI delay block" is ambiguous since the pulse shape used to convert the sequence of symbols to a continuous-time signal could be defined to have a variety of different delays e.g., the pulse can be centered at $t = 0$ or its rising edge could be at $t = 0$. In this case, I believe that phase need only be constrained to the extent that the intended (and same) feedback value is present within the histogram windows at the sampling time ± 0.05 UI.

SuggestedRemedy

Add text to 180.9.6.3 defining the "synchronized test pattern". The definition is suggested to include that it is a sequence of square pulses, that the pulse amplitudes are scaled from the test pattern symbol sequence aligned to the symbol sequence at the detector output, and that the amplitude scale is referenced to $OMA_{outer}/2$ (per note b in Table 180-15, or some other appropriate value). Define the feedback delay so that the intended feedback value is subtracted from the feed-forward equalizer in both the left and right histogram windows.

Proposed Response Response Status O

Cl 180 SC 180.9.6.3 P479 L17 # I-462

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

There is very little information about the DFE. Its pulse shape or bandwidth, which is a variable to choose in the scope, is not stated.

SuggestedRemedy

Determine what the bandwidth of the DFE signal should be and write it down.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.9.6.3 P479 L20 # I-21
 Brown, Matthew Qualcomm
 Comment Type TR Comment Status X
 Per discussions at previous CRG sessions, the noise source shown at the input to the reference equalizer is not AWGN.
 SuggestedRemedy
 Relabel appropriately, e.g., "noise" or "noise source" tying in with defining text later in this subclause.
 Proposed Response Response Status O

Cl 180 SC 180.9.6.3 P479 L22 # I-22
 Brown, Matthew Qualcomm
 Comment Type E Comment Status X
 The variable "a" is not well defined here. It would be helpful to the reader to clearly associate this with the permitter number of precursor taps as specified in Table 180-16.
 SuggestedRemedy
 Change the note the the following or similar:
 "NOTE—The variable a is an integer in the range -3 to 0 associated with the permitted number of precursor taps as specified in Table 180-16."
 Proposed Response Response Status O

Cl 180 SC 180.9.6.3 P479 L20 # I-464
 Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X
 The noise at the input to the FFE is not AWGN. It was AWGN at the input to the "reference receiver"; here it has the spectral shape of the ideal Gaussian response.
 SuggestedRemedy
 Change "AWGN" to "Noise" or better, show AWGN at the input to the reference receiver in Figure 180-9. (If we do the latter, spell out AWGN as on page 485 which we have not got to yet.)
 Proposed Response Response Status O

Cl 180 SC 180.9.6.3 P479 L36 # I-465
 Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X
 A floating main tap is not attractive, whether in a reference equalizer (software) or a real product equalizer - it is more trouble than small floating taps well after the main tap.
 SuggestedRemedy
 Fix the main tap position e.g. at position 4, and add up to 3 more FFE taps as necessary to preserve the FFE's effectiveness. Remove the variable a in Figure 180-10.
 Proposed Response Response Status O

Cl 180 SC 180.9.6.3 P479 L20 # I-307
 Dudek, Michael Marvell
 Comment Type TR Comment Status X
 AWGN is wrong in figure 180-10. The noise is not white at this point. It is the noise N(f) filtered by the reference Rx and is described in 180.9.6.4
 SuggestedRemedy
 Replace "AWGN" with "added noise (N(f))" in Figure 180-10 and on page 485 line 2 (in TDECQcer) replace "additive white Gaussian noise (AWGN) with RMS noise σ added to the waveform". with "additive Gaussian noise (N(f)) with RMS noise σ added to the waveform. N(f) is defined in 180.9.6.4 " Also on page 486 line 35 replace "AWGN" with "added noise (N(f))"
 Proposed Response Response Status O

Cl 180 SC 180.9.6.3 P479 L37 # I-466
 Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X
 The main tap minimum 0.8 allows an excessively over-emphasised signal (this is not affected by the addition of the DFE). Relative to the signalling rate, 200G silicon is slower than 100G or 50G silicon and 200G receivers are designed to cope well with such signals. Designing them to cope with badly set-up signals as well would be wasteful. We allow somewhat less than 1 for tolerancing, but 20% off is too much. A properly revised overshoot spec can catch some of these signals, but we should write down what we mean here in any case.
 SuggestedRemedy
 Change 0.8 to 0.9.
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 180 SC 180.9.6.3 P479 L37 # I-467

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

The tap weights were created by drawing limit lines that passed a population of transmitters, some time ago. The main tap maximum and the other FFE tap limits need review, taking the DFE into account and considering what is cost-effective for receivers. In particular, the we will see less of the characteristic alternating FFE tap weights because the DFE can do that job better, so taps 4+ should be tightened up.

SuggestedRemedy

Review the tap weight limits and make changes as appropriate.

Proposed Response Response Status O

CI 180 SC 180.9.6.3 P480 L17 # I-468

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

Causal vs. anticausal pulse shapes
 This pre-post equalizer coefficient difference limit $|w(1)/w(0) - b(1) - w(-1)/w(0)|$ seeks to keep the attack and decay of the signal pulse similar. Yet the evidence from https://iee802.org/3/dj/public/25_05/chayeb_3dj_01_2505.pdf#page=8 and 9, plotted in https://iee802.org/3/dk/public/2511/3dk_dawe_2511_1.pdf, shows that for a real receiver, the situation is very far from symmetrical; relatively fast attack (c(-1) close to zero) and slow decay (c(+1) strongly -ve) is tolerated well, but the opposite is not.

SuggestedRemedy

Remove the absolute bars | |

Proposed Response Response Status O

CI 180 SC 180.9.6.3 P480 L17 # I-70

EI-Chayeb, Ahmad Keysight Technologies Inc
 Comment Type TR Comment Status X

Including the DFE tap b1 in the limit: $|w(1)/w(0)-b(1)-w(-1)/(w0)| \leq .25$ makes the implementation makes the limit non-linear limit, introduces complexity and increases the measurement time.

SuggestedRemedy

Suggested remedy: Remove b(1) from the equation

Proposed Response Response Status O

CI 180 SC 180.9.6.3 P480 L22 # I-469

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

The DFE tap limit seems too weak. Copper clauses use a limit of 0.85, but with a different definition.

SuggestedRemedy

Set the limit to at least 0.35 on the old scale, or the equivalent of 0.55 on the new scale or as defined in copper clauses and COM. This leaves another 0.3 for losses between TP2 and TP5.

Proposed Response Response Status O

CI 180 SC 180.9.6.3 P480 L22 # I-221

Maniloff, Eric Ciena Corporation
 Comment Type TR Comment Status X

The DFE coefficient limit value of 0.3 uses prior normalization, and with the reference change would be 0.43. This value is too high. [ref: kimber_3dj_01a_2603.pdf]. The recommended value of 0.25 using the previous normalization results in a value with the updated normalization of 0.33.

SuggestedRemedy

Update the value for DFE coefficient limit in Table 180-16 to 0.33. Make similar changes in Clauses 181, 182, 183.

Proposed Response Response Status O

CI 180 SC 180.9.6.3 P481 L36 # I-219

Maniloff, Eric Ciena Corporation
 Comment Type TR Comment Status X

OMA_TDECQ needs to be defined in the text

SuggestedRemedy

At line 36, page 481, add the following text : "OMATDECQ is measured on the equalized captured waveform as per method described in SC180.9.5 on the detector input (i.e. sum of FFE and DFE equalizer filters, referring fig 180-10)". Make similar changes in Clauses 181, 182, 183.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 180 SC 180.9.6.3 P482 L24 # I-220

Maniloff, Eric Ciena Corporation

Comment Type TR Comment Status X

DFE Normalization 1: Labeling location

SuggestedRemedy

In Table 180-16, line 24, p482 : the DFE coefficient b(1) should be referenced to OMA_TDECQ /2. Note: to be consistent with figure 180-10, and the normalized b(1) tap value, the synchronized PAM4 test pattern should have an outer amplitude of +/- OMA_TDECQ/2 . Make similar changes in Clauses 181, 182, 183.

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P480 L32 # I-392

Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point

Comment Type ER Comment Status X

"The test pattern specified for TDECQ (see Table 180-13)..." The test pattern for TDECQ is not specified in Table 180-13. It is specified in Table 180-14 in combination with Table 180-13.

SuggestedRemedy

Change Table 180-13 to Tables 180-13 and 180-14.

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P480 L46 # I-393

Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point

Comment Type TR Comment Status X

"The reference equalizer specified in 180.9.6.3 is applied to the waveform. An eye diagram is formed from the equalized captured waveform." The problem with this is that the output of the equalizer shown in Figure 180-10 is the decided PAM-4 symbols. These values stay constant over a 1 UI period. So the eye diagram at the output would simply be 4 ideal PAM-4 levels.

SuggestedRemedy

This can be solved by describing the reference equalizer as a continuous-time equalizer with an appropriate delay d between the output of the decision element and the input to the summer before the decision element. The eye diagram would then be measured at the input to the decision element, not at the output indicated in Figure 180-10. A presentation will provide detailed changes to the text.

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P480 L50 # I-470

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This text about the crossing points is irrelevant. It became obsolete when we decided to let the sampling phase of the histogram-pair be optimised, several years ago.

SuggestedRemedy

Delete "and the 0 UI and 1 UI crossing points are determined by the average of the eye diagram crossing times, as measured at P_ave , as illustrated in Figure 180-11" In Figure 180-11, replace the incorrect "0.45 0.55" by an indication that the time-centres of the histogram windows are 0.1 UI apart. Remove the 0 and 1 bars. Change "nominally centered at 0.45 UI and 0.55 UI" to "with histogram windows centered 0.1 UI apart."

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P481 L7 # I-394

Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point

Comment Type TR Comment Status X

The eye diagram shown is not representative of a continuous-time DFE. (A continuous-time eye diagram requires a continuous-time DFE.)

SuggestedRemedy

Show an eye diagram with the abrupt change in value representative of a continuous-time DFE. A presentation will provide an example.

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P481 L24 # I-308

Dudek, Michael Marvell

Comment Type T Comment Status X

The time position of the histograms is not tied to the zero crossings as they are moved relative to

SuggestedRemedy

Change "nominally" to "approximately". In Figure 180-11. Delete the 0.45 and 0.55 and show 0.1 between these centers. Delete the 0 and 1 lines.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 180 SC 180.9.6.4 P481 L26 # I-471

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

A histogram is a table of value, count pairs. A histogram *window* is a box on the scope screen.

SuggestedRemedy

Change "The precise time position of the pair of histograms is adjusted to minimize TDECQ while keeping the histograms spaced 0.1 UI apart."

to: "The precise time position of the pair of histogram windows is adjusted to minimize TDECQ while keeping the histogram windows spaced 0.1 UI apart."

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P481 L27 # I-472

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The apparent TDECQ or TECQ is a very strong function of histogram window spacing. Reducing the spacing does not make the signal any better, but it lowers our guard against signals with a jitter problem. This should be treated very carefully.

SuggestedRemedy

As in another comment, increase the headline TDECQ, TECQ limit from 3.4 to 3.8 dB. Reduce the histogram window spacing from 0.1 UI between centres to 0.09 UI (if sampling at 50 s/UI is feasible) or 3/32 = 0.09375 UI (if sampling at 32/UI is preferred).

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P481 L29 # I-473

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The histogram window width should be chosen carefully. A wide width allows points in the windows to be collected more quickly, but the samples towards the time-centre of the eye are benign samples that just dilute the measurement, making it less discriminating. The evidence in rodes_3dj_01_2601.pdf slide 4 (which is for TDECQcer) shows that a narrower window improves repeatability. Common practice is to collect very close to 32, 64 or 128 samples/UI, for which 0.04 is not optimal.

SuggestedRemedy

Make the histogram window a little narrower according to what sampling ratio is appropriate: 1/32 = 0.03125 UI for 32 s/UI or 0.02 UI for 50 s/UI.

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P481 L33 # I-23

Brown, Matthew Qualcomm

Comment Type TR Comment Status X

The variable OMA_TDECQ appears in many places in this subclause but is never defined though it might be inferred from Figure 180-11.

SuggestedRemedy

Define OMA_TDECQ.

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P481 L33 # I-474

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This says that the sub-eye threshold levels Pth1, Pth2, and Pth3, are given by equations 180-1 to 3. Two pages further on, it transpires that this is not the case. There, they are called "nominal values" which isn't very informative, and the symbols Pth1... are re-used (which one would do in a computer program but it's bad in a document).

SuggestedRemedy

Change "The sub-eye threshold levels Pth1, Pth2, and Pth3" to "The centers of the three sub-eye threshold ranges, P0th1, P0th2, and P0th3, are ...

Adjust the symbol names in equations 180-1 to 3.

Add: "The actual sub-eye thresholds, Pth1, Pth2, and Pth3, are found by the optimization process as described below, or equivalent."

Leave Pth1, Pth2, and Pth3 as they are in equations 180-5 to 8.

On page 483, change "Pth1, Pth2, and Pth3 are varied from their nominal values by up to ±1% of OMA_TDECQ in order to optimize TDECQ."

to "Pth1, Pth2, and Pth3 are adjusted to optimize TDECQ within ranges +/-1% of OMA_TDECQ around P0th1, P0th2, and P0th3 +/-1%.

See another comment for a better +/-%

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 180 SC 180.9.6.4 P481 L 50 # I-396
 Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point
 Comment Type TR Comment Status X
 An eye diagram and the histograms are not realistic representation of how a discrete-time DFE would perform in the presence of jitter.
 SuggestedRemedy
 Change the calculation of TDECQ to oversample the received waveform, perform a MMSE optimization at each sample phase, find the optimal sample phase, freeze the taps at the optimal coefficients, then compute the BER at a .05UI early sample phase and at a .05UI late sample phase using a methodology similar to that in the current TDECQ. A presentation will give details.
 Proposed Response Response Status O

CI 180 SC 180.9.6.4 P482 L 1 # I-475
 Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X
 These are not functions: unlike the Gaussian probability density function mentioned later, there is no smooth formula. They are distributions, from measurement.
 SuggestedRemedy
 Change "cumulative probability function" to " cumulative probability distribution", several times.
 Proposed Response Response Status O

CI 180 SC 180.9.6.4 P482 L 13 # I-415
 Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point
 Comment Type TR Comment Status X
 The CDF(y) method of calculating SER assumes that the eye is open to begin with before noise is added. But with a TDECQ of 3.4 dB, there may be some points that cross the nearest threshold without added noise.
 SuggestedRemedy
 Since the transmitted symbol sequence is known and synchronized with the received waveform, the probability of symbol error can be computed for a particular y given x using a Q function, even when y is in the wrong decision region. Use this method to compute the SER. A presentation will be given with details.
 Proposed Response Response Status O

CI 180 SC 180.9.6.4 P482 L 20 # I-397
 Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point
 Comment Type TR Comment Status X
 The method of estimating SER using a CDF for y and a Gaussian approximation is unnecessarily complex and double or triple counts errors. It also excludes the Gaussian tail probabilities as described in swenson_3dj_01a_2603.pdf
 SuggestedRemedy
 Revise calculation of SER by using Q functions (tabulated integrals of the Gaussian distribution). A presentation will give details.
 Proposed Response Response Status O

CI 180 SC 180.9.6.4 P482 L 26 # I-24
 Brown, Matthew Qualcomm
 Comment Type T Comment Status X
 The noise represented by $G_{th}(y+i)$ is ambiguous in terms of where it is applied. Figure 180-10 includes a noise source, currently labelled as AWGN, that is likely the intended location for this noise source.
 SuggestedRemedy
 Define the noise source especially the location where it is applied and tying it in with Figure 180-10.
 Proposed Response Response Status O

CI 180 SC 180.9.6.4 P483 L 5 # I-91
 Ran, Adee Cisco Systems, Inc.
 Comment Type TR Comment Status X
 (Comment resubmitted from WG ballot)
 "the normalized frequency response $H_{eq}(f)$ of the reference equalizer"
 The reference equalizer now includes a DFE, a nonlinear element, so it does not have a frequency response.
 The noise amplification is only due to the FFE.
 SuggestedRemedy
 Change "the normalized frequency response $H_{eq}(f)$ of the reference equalizer" to "the normalized frequency response $H_{eq}(f)$ of the FFE in the reference equalizer".
 Implement with editorial license.
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 180 SC 180.9.6.4 P483 L23 # I-476

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The appropriate probability for ECQ, for the right correlation, should be considered. It won't be the same as the target pre-FEC SER because of geometrical factors. The target pre-FEC SER should not be 4.56e-4 anyway; we know that is not adequate for the FLR objective.

SuggestedRemedy

Choose a more appropriate probability. Adjust Qt consistent with this.

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P483 L27 # I-477

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The threshold adjust range of 1% is far too restrictive and a cause of the disappointing scatter that we see in TDECQ measurements. IEEE Std 802.3db (100GBASE-SR1 family) adopted 2% and I have not heard any complaints. Real receivers are pretty tolerant of this.

SuggestedRemedy

Change +/-1% to +/-2.5%

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P483 L30 # I-395

Swenson, Norman Nokia Corporation,Norman Swenson Consulting,Point

Comment Type TR Comment Status X

No method is given to optimize the coefficients in a reasonable amount of time. A global optimization is not practical.

SuggestedRemedy

Change the optimization method to MMSE.

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P483 L31 # I-478

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

The sampling phase is optimised too.

SuggestedRemedy

Change "the equalizer tap coefficients or the sub-eye threshold levels," to "the equalizer tap coefficients, the sub-eye threshold levels or the time position of the pair of histograms"

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P483 L39 # I-222

Maniloff, Eric Ciena Corporation

Comment Type TR Comment Status X

Ceq is currently referenced to the low frequency signal content after FFE normalization. It needs to be aligned with the same TDECQ reference of OMA_outer and take into account the DFE tap to be meaningful interpreted as a transmitter bandwidth limiting metric.

SuggestedRemedy

Appending to TDECQ definition in line 39 thru. 48, p483, the following new metric definitions "CEQ_DFE [dB]= 10log10(Ceq) + [10log10(OMA)_outer]- 10log10([OMA]_TDECQ) represents the equalizable ISI penalty associated with the reference DFE receiver, which can be subtracted from TDECQ CEQ_FFE [dB] = CEQ_DFE -10*log10(1+b) where b is the normalized DFE coefficient defined in Table 180-16 represents the bandwidth limiting metric of the transmitter". Make similar changes in Clauses 181, 182, 183.

Proposed Response Response Status O

CI 180 SC 180.9.6.4 P483 L45 # I-69

El-Chayeb, Ahmad Keysight Technologies Inc

Comment Type TR Comment Status X

OOMA measurement location for TDECQ was changed in draft 2.4 to the reference equalizer input waveform. Input waveform tends to be unstable before the equalizer. OOMA measurement location should be verified using data from real transmitters, not just simulations.

SuggestedRemedy

Suggested remedy: Change OMAouter definition in equation 180-12 from "OMAouter is measured as defined in 180.9.5" to "OMAouter is measured as defined in 180.9.5 except using waveforms captured at the output of the reference equalizer".

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.9.6.4 P483 L 50 # I-92

Ran, Adeo Cisco Systems, Inc.

Comment Type T Comment Status X

The final paragraph of the TDECQ measurement method specification in 180.9.6.4 states that "Alternative optimization methods such as minimum mean squared error (MMSE) may be used <...> [but] These alternative methods should not be used for receiver sensitivity and stressed receiver sensitivity calibration".

The text does not state what the alternative is for, but a common interpretation is that the normative optimization method requires something equivalent to a "brute force search" that covers all valid coefficient values across all sampling phases to identify the phase + equalization that yields the minimum SECQ for SRS test.

However, it has not been demonstrated or even stated that such a search involving 15 FFE taps and a DFE tap, across multiple sampling phases, and repeated for multiple values of sigma_G, can be performed within a reasonable calculation time.

If the time required for a brute-force search (for any reported implementation) is not considered suitable for receiver test calibration, users will be forced to use some faster "optimization" method. Since no such method is specified, this would result in implementation-dependent values.

To avoid that, a realizable optimization method should be specified normatively.

SuggestedRemedy

A contribution is planned.

Proposed Response Response Status O

Cl 180 SC 180.9.7 P484 L 1 # I-294

Dudek, Michael Marvell

Comment Type TR Comment Status X

Although the concept behind TDECQcer is promising results presented to date are not sufficiently repeatable (in a reasonable test time) to provide value to the specification

SuggestedRemedy

Delete TDECQcer from the draft (i.e. clauses 180, 181, 182, and 183).

Proposed Response Response Status O

Cl 180 SC 180.9.7 P484 L 1 # I-71

El-Chayeb, Ahmad Keysight Technologies Inc

Comment Type TR Comment Status X

TDECQ_CER captures additional penalties that TDECQ does not. While TDECQ_CER can be useful to improve correlation to link performance, the measurement needs more time to mature particularly to improve measurement variability which could be as high as 0.5dB in its current form. Given we are at SA ballot, TDECQ_CER should be removed from the spec.

SuggestedRemedy

Remove TDECQ-CER from clauses 181, 182 and 183 (180.9.7, 181.9.7, 182.9.7 and 183.9.7).

Remove TDECQ-CER from tables 180-7, 180-14, 181-5, 181-12, 182-7 and 183-6.

Remove editors notes on pages 484, 541 and 573.

Proposed Response Response Status O

Cl 180 SC 180.9.7.1 P485 L 47 # I-479

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

Mass is defined in kilograms, scientifically. This TDECQ_CER method is about statistics, it has nothing to do with mass. The if ... then ... if equation 180-19 is a lookup, not a function worthy of the name.

SuggestedRemedy

Change "the probability mass function (PMF) for the number of symbol errors is" to "the probability of the number of symbol errors, P_n(e, sigma) is"

Proposed Response Response Status O

Cl 180 SC 180.9.7.1 P486 L 33 # I-120

Huber, Thomas Nokia

Comment Type ER Comment Status X

"probability of receiving an FEC symbol incorrectly" is ambiguous. I think the intended meaning of "incorrectly" is a FEC symbol that has uncorrected errors.

SuggestedRemedy

Change "an FEC symbol incorrectly" to "an FEC symbol with uncorrected errors"

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.9.9 P487 L13 # I-43

Issenhuth, Tom Huawei Technologies Co., Ltd,Issenhuth Consulting,

Comment Type T Comment Status X

The Transmitter functional symbol error histogram (TFSEH) subclauses should be revised. A supporting presentation with the proposed changes for 180.9.9, 181.9.9, 182.9.9 and 183.9.9 will be provided.

SuggestedRemedy

Update the noted subclauses per the supporting presentation

Proposed Response Response Status O

Cl 180 SC 180.9.9 P487 L13 # I-481

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

A real compliant receiver will have better jitter tolerance and other properties than a spec-worst receiver, so "passing" transmitter-receiver pairs can contain unsatisfactory transmitters because of the lack of receiver calibration.

SuggestedRemedy

Calibrate the receiver or delete the subclause.

Proposed Response Response Status O

Cl 180 SC 180.9.9 P487 L13 # I-480

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

This functional symbol error histogram method tests transmitter-receiver pairs. As the receiver is not calibrated, and subject to much more possible variation than a CRU/scope, it tests transmitter-receiver pairs, not transmitters.

SuggestedRemedy

Remove spec row from Table 180-7. Remove row from Table 180-14. Move 180.9.9 to an annex. Four clauses.

Proposed Response Response Status O

Cl 180 SC 180.9.9 P487 L31 # I-225

Maniloff, Eric Ciena Corporation

Comment Type TR Comment Status X

For symbol errors ≥ 9 Table 180-18 specifies flat counts, consistent with a pre FEC BER $\sim 2.3E-4$. This implies that a transmitter could have a large error floor and still pass the test. It would be preferable to specify the actual probabilities consistent with a value of $\sim 1e-26$ or include no values with an informative note indicating these bins should have no measured occurrences.

The measurement time to determine the probabilities for $k \geq 9$ is unreasonably long for the $2.4e-5$ BER defined in this clause.

SuggestedRemedy

Update the values in Table 180-18 for symbol errors ≥ 9 to remove the flat mask. Remove these values and include a note that these bins should record zero counts. Make similar changes in Clauses 181, 182, 183.

Proposed Response Response Status O

Cl 180 SC 180.9.9 P487 L40 # I-262

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

802.3dj has spend last 1 year to best capture jitter in TDECQ and FRx, unless xAUI-n (C2M) interface operate with jitter tolerance condition in 176D.8.14 TDECQ measurement maybe be too optimistic see also unsatisfied comments against D2.1 and D2.2

SuggestedRemedy

Add sentence: For those cases where there is an xAUI-n chip-to-chip (C2C) or chip-to-module (C2M) interface (see Table 180-1 through Table 180-4), the clock source for the test pattern is derived from the clock recovered from the xAUI-n input signal. The xAUI-n input signal is that described for the Jitter tolerance test in 176D.8.14. The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal. See ghiasi_3dj_02_2605

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.9.9 P488 L 8 # I-484

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

A transmitter-receiver pair that is marginal to this mask (i.e. close to the limit at bin 8) would probably have a FLR in the 1e-20 to 1e-25 region, which is far removed from the project objective (FLR 6.2e-11 = effective BER 1e-13) or the OIF's target (effective BER 1e-15) or reasonable market expectations. The difference between bin 8 and bins 14-16 is very large. Just drawing a line sideways from bin 9 is not adequate.

SuggestedRemedy

Decide what the performance objective of this test should be. The obvious candidate is the OIF's target (effective BER 1e-15). Use FEC bin extrapolation as we do for receiver testing.
 Or delete the subclause.

Proposed Response Response Status O

Cl 180 SC 180.9.9 P488 L 8 # I-483

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

If this mask were useful, there should be a figure showing it. But actually, any transmitter-receiver pair will have the least margin at bin 8 so none of the others matter.

SuggestedRemedy

If there will be a thought-through mask, illustrate it.

Proposed Response Response Status O

Cl 180 SC 180.9.9 P488 L 18 # I-482

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

A receiver is not required to meet 1.75e-12 in bin 8 under any circumstances. A receiver that exceeds this will make any transmitter-receiver pair "fail" this test.

SuggestedRemedy

Provide a thought-through mask or delete the subclause.

Proposed Response Response Status O

Cl 180 SC 180.9.9.1 P488 L 35 # I-25

Brown, Matthew Qualcomm
 Comment Type TR Comment Status X

The optical receiver portion of the functional receiver is defined as complying with the characteristics in Table 180-8. In other words, it meets and may likely exceed these requirements. For instance, the receiver jitter tracking bandwidth may exceed the minimum implied by the the jitter tolerance mask for the receiver sensitivity test. The effects of excessive jitter at a transmitter might therefore not be evident in this functional test. This functional test would be an ideal means to catch the effects of low-frequency jitter which may cause significant correlation (clustering) of errors. The other transmitter tests would not catch this effect.

SuggestedRemedy

Define the optical receiver such that the jitter tracking bandwidth is constrained to be close to barely passing the jitter tolerance requirements. For instance, define the tracking bandwidth to be no higher than 4 MHz.

Proposed Response Response Status O

Cl 180 SC 180.9.9.1 P488 L 36 # I-121

Huber, Thomas Nokia
 Comment Type ER Comment Status X

Using "FRx" to mean "functional receiver" is very confusing, since FR is also used to indicate the 2 km CWDM PMD family, and "FRx" or "FRn" are commonly used to indicate a set of FR PHYs.

SuggestedRemedy

It appears that "FRx" is used only in the title of the clause and in the first and last sentences of the first paragraph. Delete "(FRx)" in the title and first sentence, and replace "FRx" with "functional receiver" in the last sentence.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.9.9.1 P 488 L 40 # I-487

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

This is 802.3. We specify observable signals at compliance points. In the context of an optical spec, "DUT will be interpreted as device = optical module, while what is intended to be tested is the transmitter under test as it says on line 44, and what is actually tested is a transmitter-receiver pair.

SuggestedRemedy

Change "DUT" to "PUT", and when the receiver calibration is sorted out, change to "TUT".

Proposed Response Response Status O

Cl 180 SC 180.9.9.1 P 488 L 40 # I-486

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

AGCs have levels but attenuators have attenuations

SuggestedRemedy

Change "VOA_level " to "OA" for optical attenuation

Proposed Response Response Status O

Cl 180 SC 180.9.9.1 P 488 L 50 # I-488

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

Variable names with @ in the middle is horrible. Programming languages won't tolerate it.

SuggestedRemedy

Don't do it.

Proposed Response Response Status O

Cl 180 SC 180.9.9.1 P 489 L 16 # I-485

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

Estimating actual MPI and DGD penalty is impractical; we don't do it for TDECQ with much the same channel. MPI depends on transmitter and receiver as well as channel. But we expect that for a decent test channel in the lab, with good well-maintained connectors and typical not worst-case fibre, these will be very small.

SuggestedRemedy

Delete Test_fiber_MPI+DGD_penalty
 or delete the subclause.

Proposed Response Response Status O

Cl 180 SC 180.9.10 P 489 L 40 # I-265

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.
 Comment Type TR Comment Status X

140.7.7 Hit Ratio of 1E-2 doesn't make sense

SuggestedRemedy

Add exception hit ratio is 1E-4

Proposed Response Response Status O

Cl 180 SC 180.9.10 P 489 L 42 # I-489

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

The overshoot probability criterion (hit ratio) in 140.7.7, 1e-2, is far too weak and lets a surprising number of UI exceed the limit (D2.2 comment 223). 167.8.8 for 100GBASE-SR1 says "Overshoot and undershoot are calculated relative to OMA_outer using the methods in 140.7.7 except that a hit ratio of 3×10^{-3} is used." This was what we could do at the time but it isn't really enough.

SuggestedRemedy

Use a hit ratio of 1e-4, here and in 180.9.11, transmitter power excursion.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 180 SC 180.9.12 P490 L4 # I-490

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

The definition of extinction ratio can be simplified, and it should be made 100% consistent with the definition of OMA, which is changing.

SuggestedRemedy

Change "The extinction ratio of a PAM4 optical signal is defined as the ratio of the average optical launch power level P3, measured over ... waveforms captured at the output of the reference receiver defined in 180.9.2. to "The extinction ratio of a PAM4 optical signal is defined as the ratio of the average optical launch power levels P3 and P0, as defined for OMA_outer (see 180.9.5). In Table 180-14, change the row "Outer optical modulation amplitude (OMA_outer)" to "Outer optical modulation amplitude (OMA_outer) and extinction ratio" and delete the separate row for extinction ratio.
 Subclause 180.9.12 could be combined with 180.9.5 also.

Proposed Response Response Status O

CI 180 SC 180.9.13 P490 L44 # I-491

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

"linear units" is ambiguous: it could be field or equivalent, or power or equivalent. One is the square of the other, both are "linear".

SuggestedRemedy

Change "linear units" to "milliwatts", twice

Proposed Response Response Status O

CI 180 SC 180.9.14 P490 L47 # I-492

Dawe, Piers J G NVIDIA
 Comment Type TR Comment Status X

"on a region in a place in the pattern that is selected to minimize the measurement error": too cryptic, and without a second opinion, one does not know which region/place has the minimum error. Actually, what one can do is minimize the apparent N0 or N3, not the (unknown) error. It is not clear how many UI wide a "place" is. Compare 179.9.4.6 for SNDR "Measure the RMS deviation from the mean voltage at a fixed low-slope point in runs of at least 6 consecutive identical PAM4 symbols, where the focus is on the rule not the purpose". "A region in a place": tautology. One can't measure N3 and N0 at the same place.

SuggestedRemedy

Change "N0 and N3 are measured in linear units on a region in a place in the pattern that is selected to minimize the measurement error." to "N0 and N3 are each measured in milliwatts in a histogram window placed so that the slope of the waveform across the histogram window is negligible. These might be 1 UI wide or narrower, and they are expected to give lower readings for N0 or N3 than other positions or wider histogram windows."

Proposed Response Response Status O

CI 180 SC 180.9.15 P491 L1 # I-44

Issenhuth, Tom Huawei Technologies Co., Ltd, Issenhuth Consulting,
 Comment Type T Comment Status X

The receiver sensitivity subclauses should be revised. A supporting presentation with the proposed changes for 180.9.15, 181.9.15, 182.9.15 and 183.9.15 will be provided.

SuggestedRemedy

Update the noted subclauses per the supporting presentation

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.9.15 P491 L3 # I-493

Dawe, Piers J G NVIDIA

Comment Type TR Comment Status X

Receiver sensitivity is a property of the lanes together ("interface BER" concept), not each lane separately. We ensure that each transmit lane is good enough, and each channel lane. We test a receiver by applying the same optical power on each lane, but the receiver can share its error allocation across its lanes how it chooses, just as it can allocate errors to LSB and MSB within a lane as it chooses. This is what happens naturally if the errors are checked at the PCS. 174A.9.5 says "If this test passes for each lane, then the PHY or xMII Extender will meet the expected codeword error ratio. If this test fails, then the performance may be further verified using the method in 174A.9.6 or 174A.9.7."

SuggestedRemedy

Delete "of each lane" here and in 180.9.16. In Table 180-8, the table entries are optical powers which are by lane, not error ratios which are not, so maybe "each lane" can stay there, although it is misleading.

Proposed Response Response Status O

Cl 180 SC 180.9.15 P491 L18 # I-226

Maniloff, Eric Ciena Corporation

Comment Type TR Comment Status X

Current text for block error extrapolation performs a linear fit from 1 to n. Because this is unlikely to be linear, it would be more accurate to only extrapolate over the 4 highest bins with sufficient counts.

SuggestedRemedy

Replace: "If the statistical projection is modeled accurately by a linear fit extrapolation, a means to provide statistical projection of the measured histograms (see174A.9.3) in order to reduce test time follows. Extrapolate the measured histogram to $H_m(i)(16)$ using a line determined by a linear fit of $\log_{10}(H_m(i)(k))$, for $k = 1$ to n , where n is the largest value of k , where all bins from 0 to n have a count greater than 2."

With

"If the statistical projection is modeled accurately by a linear fit extrapolation, a means to provide statistical projection of the measured histograms (see174A.9.3) in order to reduce test time follows. Extrapolate the measured histogram to $H_m(i)(16)$ using a line determined by a linear fit of $\log_{10}(H_m(i)(k))$, for $k = n-3$ to n , where n is the largest value of k , where all bins from $n-3$ to n have a count greater than 2." Make similar changes in Clauses 181, 182, 183.

Proposed Response Response Status O

Cl 180 SC 180.9.15 P491 L18 # I-296

Dudek, Michael Marvell

Comment Type T Comment Status X

The note could be misinterpreted as suggesting extrapolation is also needed for higher probabilities resulting in failures with random errors where the measurements meet the requirement without extrapolation

SuggestedRemedy

Insert "for $H_m(i)(k)$ less than 10^{-6} " before "Extrapolate the measured histogram....." Also in 180.9.16. Make the equivalent changes in clauses 181, 182 and 183 .

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 180 SC 180.9.15 P491 L 20 # I-93

Ran, Adee Cisco Systems, Inc.

Comment Type TR Comment Status X

The definition of n in the NOTE is:
"where n is the largest value of k, where all bins from 0 to n have a count greater than 2"

This is awkward ("where" twice) and, strictly speaking, incorrect: if all bins from 0 to n have a count greater than 2 then n is likely not the largest value of k.

n should be the largest number of k that satisfies a condition that is independent of n.

Also applies to the similar comments in 180.9.16, 181.9.15, 181.9.16, 182.9.15, 182.9.16, 183.9.15, and 183.9.16.

SuggestedRemedy

Change the quoted phrase to
"where n is the largest value of k for which all bins from 0 to k have a count greater than 2".

Make the same change in 180.9.16, 181.9.15, 181.9.16, 182.9.15, 182.9.16, 183.9.15, and 183.9.16.

Proposed Response Response Status O

Cl 180 SC 180.9.15 P491 L 22 # I-295

Dudek, Michael Marvell

Comment Type E Comment Status X

This comment is a re-submission of comment #101 against D2.3 where it was ruled out of scope but encouraged to be resubmitted. It would be better to describe the precoding before the details of the BLER test in this Receiver Sensitivity and stressed receiver sensitivity sub sections.

SuggestedRemedy

Move "Precoding (see 176.7.1.2) is enabled if the receiver requests precoding using the ILT function." to page 491 line 10. Also in 180.9.16. Make the equivalent changes in clauses 181, 182 and 183 .

Proposed Response Response Status O

Cl 180 SC 180.9.15 P492 L 32 # I-94

Ran, Adee Cisco Systems, Inc.

Comment Type TR Comment Status X

The values in Table 180-20 mostly match the calculation of H_max in 174A.9.5 with BER_max=2.28e-4, but the values for k=16 with p=1, p=2, and p=4 have a slight mismatch, while for p=8 there is a match.

Note that the text in 174A.9.5 does not include a special treatment for k=16.

A spreadsheet for the calculation will be contributed.

SuggestedRemedy

In Table 180-20, row k=16, change the values as follows:

p=1: Change from 3.8e-13 to 3.5e-13

p=2: Change from 8.3e-18 to 8.0e-18

p=4: Change from 1.1e-22 to 1.0e-22

Proposed Response Response Status O

Cl 180 SC 180.9.16 P492 L 42 # I-302

Dudek, Michael Marvell

Comment Type TR Comment Status X

The frequency of the sinusoidal amplitude interferer in the stressed Rx test is not specified. If it's period is significantly longer than a FEC code-word it will cause significant degradation in BLER for the same BER and TECQ due to it significantly increasing the probability of correlated errors

SuggestedRemedy

Add an additional exception at line 42. "- The frequency of the sinusoidal interferer is greater than 200MHz. Add the same exception to 181.9.16 , 182.9.16 and 183.9.16

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 180A SC 180A.2 P935 L29 # I-115

Ran, Adeo Cisco Systems, Inc.

Comment Type T Comment Status X

Annex 180A refers to the three listed connectors (single-fiber, 12-fiber, and 16-fiber) as "MDI type".

MDI is defined as "The mechanical and electrical or optical interface between the transmission medium and <...> the PHY". Thus, a connector that serves multiple PHYs has multiple MDIs; the connector is not an "MDI type".

In Annex 179C, the term used is "MDI connector".

SuggestedRemedy

Edit the text in Annex 180A to align the language with 179C, using "MDI connector" for the connector, such that an MDI connector can support one or more PMDs. The single-fiber, 12-fiber, and 16-fiber are connector types.

Implement with editorial license.

Proposed Response Response Status O

CI 180A SC 180A.4.1 P936 L3 # I-116

Ran, Adeo Cisco Systems, Inc.

Comment Type ER Comment Status X

The text describing the requirement for partially-implemented MDI connectors can be improved, as was proposed in <https://www.ieee802.org/3/dj/public/26_03/ran_3dj_04a_2603.pdf>, slides 4-5.

SuggestedRemedy

Implement the proposed text changes on slides 4-5 of ran_3dj_04a_2603, with editorial license.

Proposed Response Response Status O

CI 180A SC 180A.4.1 P937 L33 # I-117

Ran, Adeo Cisco Systems, Inc.

Comment Type TR Comment Status X

As presented in <https://www.ieee802.org/3/dj/public/26_03/ran_3dj_04a_2603.pdf>, implementations that support multiple combinations of PHY types on the same MDI connector (e.g. 1.6TBASE-DR8 and 8x200GBASE-DR1) need to be configured appropriately for interoperability.

A proposed NOTE in 180A.4.1 and 180A.4.2 to inform users about this need was included on slide 3 of ran_3dj_04a_2603.

SuggestedRemedy

Add informative notes at the end of 180A.4.1 and 180A.4.2, as follows:

NOTE—Implementations that support multiple combinations of PHY types on the same MDI must be configured appropriately for interoperability with the connected link partners. Selecting the appropriate configuration requires knowledge of the fiber plant and the link partners.

Another comment suggests changing "MDI" to "MDI connector" in Annex 180A. If that comment is accepted, it should be applied in this note too.

Proposed Response Response Status O

CI 181 SC 181 P509 L28 # I-48

Mazzini, Marco Cisco Systems

Comment Type T Comment Status X

TDECQcer is not stable enough measurement a contribution is forthcoming.

SuggestedRemedy

Remove TDECQcer from Table 181-5, row 28

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 181 SC 181.5.5 P 506 L 39 # I-26

Brown, Matthew Qualcomm

Comment Type ER Comment Status X

In Table 181-2, the text "For any lane" is redundant since the specification in this clause is for each lane. This text should have been deleted when 181.5.5 and 181.5.4 were updated in an early draft. Should align this table with Table 181-5 and Table 182-5. Same for Table 183-2.

SuggestedRemedy

In Table 181-2 and Table 183-2, delete "For any lane;" twice.

Proposed Response Response Status O

CI 181 SC 181.7.1 P 509 L 17 # I-150

Ran, Adeo Cisco Systems, Inc.

Comment Type TR Comment Status X

200G/L transmitter are found to be optimized with a lower extinction ratio; for this there's the need to raise power close to the maximum limits to meet minimum OMAouter specifications.

For manufacturing purposes it would be good to have some extra room to allow for maximum OMAouter specified.

While 1.6TBASE-DR8/DR8-2 specifies OMAouter (max) = 4.2dBm and Average power (max) = 4.0 dBm, this is not true for FR4/FR4-500 which are specified with a lower OMAouter (max) = 4.8 dBm then Average power (max) = 4.9 dBm.

Proposed to normalize the tuning range across PMDs and set maximum Outer optical modulation amplitude (OMAouter) = 5.1 dBm for both FR4-500 and FR4.

SuggestedRemedy

In Table 181-5, change Outer optical modulation amplitude (OMAouter), each lane (max) from 4.8 to 5.1 dBm.

In Table 183-6, for 800GBASE-FR4, change Outer optical modulation amplitude (OMAouter), each lane (max) from 4.8 to 5.1dBm.

Proposed Response Response Status O

CI 181 SC 181.7.1 P 509 L 31 # I-249

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

In D2.0 1T DFE was added to the TDECQ equalizer where DFE is superior to improve TDECQ for bandlimited transmitters over using large overshoot/undershoot which can have 1-2 dB of SNR penalty given TDECQ doesn't incorporate peak-to-average penalty. Overshoot/undershoot of 22% at 1E-2 hit ratio can also result in clipping and frame loss.

SuggestedRemedy

Hit ratio of 1E-2 has no merits given SSPRQ and Ethernet scrambled data. Peak-peak amplitude for example are measured at hit ratio of 1E-7 in DJ. Change hit ratio from 1E-2 to 1E-4 and reduce overshoot/undershoot from 22% to 18% given that TDECQ has DFE no longer such high overshoots are necessary. see ghiasi_3dj_02_2605

Proposed Response Response Status O

CI 181 SC 181.7.1 P 509 L 35 # I-320

Kimber, Mark Semtech

Comment Type T Comment Status X

If transmitter bandwidth is too low then the BER floor will increase. Having a transmitter bandwidth < 35 GHz is detrimental to the BER floor. This would equate to a transition time of 7.2 ps with a 53 GHz SIRC measurement filter

SuggestedRemedy

Change 8 ps transition time to 7.2 ps.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 181 SC 181.7.2 P511 L26 # I-73

HE, MICHAEL TeraHop

Comment Type T Comment Status X

Base on volume production FR-500 transceiver data, Rx sensitivity OMAouter, Tx OMAouter, and other according Tx/Rx specs can be refined/optimized for cost, power efficiency.

SuggestedRemedy

Reduce Rx sensitivity OMAouter, Tx OMAouter, and other according Tx/Rx specs by 0.8dB. (Refer to contribution he_3dj_01_2603, page 12-13)
 Details for transmitter---
 --181.7.1 Table 181-5, page 509 line 16
 Change Average launch power, each lane (min) from -2.1 to -2.9 (dBm)
 --181.7.1 Table 181-5, page 509 line 20
 Change Tx OMAouter (min) (for TECQ < 0.9 dB) from 0.9 to 0.1 (dBm)
 --181.7.1 Table 181-5, page 509 line 21
 Change Tx OMAouter (min) (for TECQ >= 0.9 dB) from 0 + max(TECQ, TDECQ) to -0.8 + max(TECQ, TDECQ) (dBm)
 --181.7.1 Figure 181-3, page 510 line 22
 Shift Tx OMAouter (min) lines down for 0.8 dB

Details for receiver---
 --181.7.2 Table 181-6, page 511 line 18
 Change Average receive power (min) from -5.6 to -6.4 (dBm)
 --181.7.2 Table 181-6, page 511 line 26
 Change Receiver sensitivity OMAouter (min) (for TECQ < 0.9 dB) from -3.2 to -4.0 (dBm)
 --181.7.2 Table 181-6, page 511 line 27
 Change Receiver sensitivity OMAouter (min) (for TECQ >= 0.9 dB) from -4.1 + max(TECQ, TDECQ) to -4.9 + max(TECQ, TDECQ) (dBm)
 --181.7.2 Table 181-6, page 511 line 28
 Change Stressed receiver sensitivity OMAouter (max) from -0.7 to -1.5 (dBm)
 --181.7.2 Figure 181-4, page 512 line 21
 Shift Receiver sensitivity OMAouter (max) line down for 0.8 dB

--181.7.3 Figure 181-5, page 513 line 25
 Shift Tx OMAouter (min) and Rx sensitivity OMAouter (max) lines down for 0.8 dB

Proposed Response Response Status O

CI 181 SC 181.9.2 P517 L3 # I-253

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

With TDECQ expected to capture jitter more accurately now that explicit jitter measurement are removed the CRU maximum peaking must be defined

SuggestedRemedy

Original text: The clock recovery unit (CRU) has a corner frequency of 4 MHz and a slope of 20 dB/decade.
 proposed text: The clock recovery unit (CRU) has a 3 dB corner frequency of 4 MHz and a slope of -20 dB/decade. The CRU maximum jitter transfer peak is ≤0.3 dB from 40 kHz to 20 MHz.

Proposed Response Response Status O

CI 181 SC 181.9.6 P517 L46 # I-95

Ran, Adeo Cisco Systems, Inc.

Comment Type T Comment Status X

TDECQ is defined based on 180.9.6, with three exceptions.

The first exception (signaling rate and pattern) is not required (for FR4-500 these are the same as in DR).
 The second exception (source clock of the SSPRQ) is not required (the same requirement exists in 180.9.6.1).
 The third exception is to use optical channel specified in 181.9.6.1 (instead of the one in 180.9.6.2). This should be expanded to include an optical filter in the test setup (similar to Figure 122-4), unlike 180.9.6.1.

SuggestedRemedy

Remove the first and second exceptions.
 Expand the third exception, or add another exception, to use an optical filter in the test setup.
 Consider adding a figure of the setup with the optical filter.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 181 SC 181.9.6 P 517 L 53 # I-259

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

802.3dj has spend last 1 year to best capture jitter in TDECQ and FRx, unless xAUI-n (C2M) interface operate with jitter tolerance condition in 176D.8.14 TDECQ measurement maybe be too optimistic see also unsatisfied comments against D2.1 and D2.2

SuggestedRemedy

Add sentence: For those cases where there is an xAUI-n chip-to-chip (C2C) or chip-to-module (C2M) interface (see Table 180-1 through Table 180-4), the clock source for the test pattern is derived from the clock recovered from the xAUI-n input signal. The xAUI-n input signal is that described for the Jitter tolerance test in 176D.8.14. The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal. See ghiasi_3dj_02_2605

Proposed Response Response Status O

Cl 181 SC 181.9.9 P 519 L 8 # I-122

Huber, Thomas Nokia

Comment Type ER Comment Status X

Using "FRx" to mean "functional receiver" is very confusing, since FR is also used to indicate the 2 km CWDM PMD family, and "FRx" or "FRn" are commonly used to indicate a set of FR PHYs.

SuggestedRemedy

It appears that FRx is used only in this bullet point. Delete "(FRx)" in the first sentence and replace FRx in the last sentence with "functional receiver"

Proposed Response Response Status O

Cl 181 SC 181.9.9 P 519 L 11 # I-293

Dudek, Michael Marvell

Comment Type TR Comment Status X

The test calls out a fiber that is compliant to Table 181-13, but that table shows a minimum and maximum chromatic dispersion, so a patch cord is compliant to that table. This test is intended to include the effects of chromatic dispersion. The proposed solution uses the same channel as the TDECQ test.

SuggestedRemedy

Implement the changes proposed in issenhuth_3dj_01a_2603.pdf

Proposed Response Response Status O

Cl 181 SC 181.9.10 P 519 L 35 # I-266

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

140.7.7 Hit Ratio of 1E-2 doesn't make sense

SuggestedRemedy

Add exception hit ratio is 1E-4

Proposed Response Response Status O

Cl 182 SC 182 P 540 L 36 # I-49

Mazzini, Marco Cisco Systems

Comment Type T Comment Status X

TDECQcer is not stable enough measurement a contribution is forthcoming.

SuggestedRemedy

Remove TDECQcer from Table 182-7, row 36

Proposed Response Response Status O

Cl 182 SC 182.7.1 P 516 L 24 # I-250

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

In D2.0 1T DFE was added to the TDECQ equalizer where DFE is suprior to improve TDECQ for bandlimited transmitters over using large overshoot/undershoot which can have 1-2 dB of SNR penalty given TDECQ doesn't incorporate peak-to-average penlaty. Overshoot/undershoot of 22% at 1E-2 hit ratio can also result in clipping and frame loss.

SuggestedRemedy

Hit ratio of 1E-2 has no merits given SSPRQ and Ethernet scrambled data. Peak-peak amplitude for example are measurd at hit ratio of 1E-7 in DJ. Change hit ratio from 1E-2 to 1E-4 and reduce overshoot/undershoot from 22% to 18% given that TDECQ has DFE no longer such high overshoots are necessary. see ghiasi_3dj_02_2605

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 182 SC 182.7.1 P 541 L 8 # I-321
 Kimber, Mark Semtech
 Comment Type T Comment Status X
 If transmitter bandwidth is too low then the BER floor will increase. Having a transmitter bandwidth < 35 GHz is detrimental to the BER floor. This would equate to a transition time of 7.2 ps with a 53 GHz SIRC measurement filter
 SuggestedRemedy
 Change 8 ps transition time to 7.2 ps.
 Proposed Response Response Status O

CI 182 SC 182.9.1 P 548 L 5 # I-39
 Issenhuth, Tom Huawei Technologies Co., Ltd,Issenhuth Consulting,
 Comment Type E Comment Status X
 In Table 182-14, the parameter Transmitter eye closure for PAM4 (TECQ) has an incorrect cross reference to 182.9.7. It should be cross referenced to 182.9.8
 SuggestedRemedy
 Change the TECQ cross reference to 182.9.8
 Proposed Response Response Status O

CI 182 SC 182.9.1 P 548 L 5 # I-40
 Issenhuth, Tom Huawei Technologies Co., Ltd,Issenhuth Consulting,
 Comment Type E Comment Status X
 In Table 182-14 the parameter and associated cross reference to TDECQ_CER is missing
 SuggestedRemedy
 In Table 182-14 add the parameter TDECQ_CER after TDECQ with a pattern of 6 and cross reference to 182.9.7
 Proposed Response Response Status O

CI 182 SC 182.9.2 P 548 L 18 # I-254
 Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.
 Comment Type TR Comment Status X
 With TDECQ expected to capture jitter more accurately now that explicit jitter measurement are removed the CRU maximum peaking must be defined
 SuggestedRemedy
 The CRU maximum jitter transfer peak is ≤ 0.3 dB from 42.7 kHz to 20 MHz.
 Proposed Response Response Status O

CI 182 SC 182.9.2 P 548 L 18 # I-255
 Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.
 Comment Type TR Comment Status X
 Missing CRU definition
 SuggestedRemedy
 The clock recovery unit (CRU) has a 3 dB corner frequency of 4 MHz and a slope of -20 dB/decade.
 Proposed Response Response Status O

CI 182 SC 182.9.2 P 548 L 27 # I-96
 Ran, Adee Cisco Systems, Inc.
 Comment Type E Comment Status X
 (Comment resubmitted from WG ballot)
 The reference receiver is defined by reference to 180.9.2 with a single exception which is almost the whole definition.
 SuggestedRemedy
 Define the reference receiver using text as in the first paragraph of 180.9.2. Refer to 180.9.2 for the CRU and the block diagram.
 Implement with editorial license.
 Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 182 SC 182.9.6 P 549 L 23 # I-97

Ran, Adeo Cisco Systems, Inc.

Comment Type T Comment Status X

TDECQ is defined based on 180.9.6, with a list of exceptions.

The penultimate exception (source clock of the SSPRQ) is not required (the same requirement exists in 180.9.6.1).

SuggestedRemedy

Remove the exception for clock source of SSPRQ.

Proposed Response Response Status O

Cl 182 SC 182.9.6 P 549 L 38 # I-260

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

802.3dj has spend last 1 year to best capture jitter in TDECQ and FRx, unless xAUI-n (C2M) interface operate with jitter tolerance condition in 176D.8.14 TDECQ measurement maybe be too optimistic see also unsatisfied comments against D2.1 and D2.2

SuggestedRemedy

Add sentence: For those cases where there is an xAUI-n chip-to-chip (C2C) or chip-to-module (C2M) interface (see Table 180-1 through Table 180-4), the clock source for the test pattern is derived from the clock recovered from the xAUI-n input signal. The xAUI-n input signal is that described for the Jitter tolerance test in 176D.8.14. The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal. See ghiasi_3dj_02_2605

Proposed Response Response Status O

Cl 182 SC 182.9.6.1 P 550 L 12 # I-98

Ran, Adeo Cisco Systems, Inc.

Comment Type E Comment Status X

In Table 182-15 the first column "PMD type" is unnecessary, because all PMD types have the same parameters and values. Compare with the similar Table 180-15, which does not include this column.

SuggestedRemedy

Remove the first column.

Proposed Response Response Status O

Cl 182 SC 182.9.9 P 551 L 32 # I-123

Huber, Thomas Nokia

Comment Type ER Comment Status X

Using "FRx" to mean "functional receiver" is very confusing, since FR is also used to indicate the 2 km CWDM PMD family, and "FRx" or "FRn" are commonly used to indicate a set of FR PHYs.

SuggestedRemedy

It appears that FRx is used only in this bullet point. Delete "(FRx)" in the first sentence and replace FRx in the last sentence with "functional receiver"

Proposed Response Response Status O

Cl 182 SC 182.9.10 P 552 L 5 # I-267

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

140.7.7 Hit Ratio of 1E-2 doesn't make sense

SuggestedRemedy

Add exception hit ratio is 1E-4

Proposed Response Response Status O

Cl 183 SC 183 P 572 L 37 # I-50

Mazzini, Marco Cisco Systems

Comment Type T Comment Status X

TDECQcer is not stable enough measurement a contribution is forthcoming.

SuggestedRemedy

Remove TDECQcer from Table 183-6, row 37

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 183 SC 183.7.1 P540 L41 # I-251

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

In D2.0 1T DFE was added to the TDECQ equalizer where DFE is superior to improve TDECQ for bandlimited transmitters over using large overshoot/undershoot which can have 1-2 dB of SNR penalty given TDECQ doesn't incorporate peak-to-average penalty. Overshoot/undershoot of 22% at 1E-2 hit ratio can also result in clipping and frame loss.

SuggestedRemedy

Hit ratio of 1E-2 has no merits given SSPRQ and Ethernet scrambled data. Peak-peak amplitude for example are measured at hit ratio of 1E-7 in DJ. Change hit ratio from 1E-2 to 1E-4 and reduce overshoot/undershoot from 22% to 18% given that TDECQ has DFE no longer such high overshoots are necessary. see ghiasi_3dj_02_2605

Proposed Response Response Status O

Cl 183 SC 183.7.1 P572 L45 # I-322

Kimber, Mark Semtech

Comment Type T Comment Status X

If transmitter bandwidth is too low then the BER floor will increase. Having a transmitter bandwidth < 35 GHz is detrimental to the BER floor. This would equate to a transition time of 7.2 ps with a 53 GHz SIRC measurement filter. This is for the 800G-FR4 spec only.

SuggestedRemedy

Change 8 ps transition time to 7.2 ps.

Proposed Response Response Status O

Cl 183 SC 183.8.2 P578 L52 # I-141

Johnson, John Broadcom Corporation

Comment Type TR Comment Status X

2 dB allocation for fiber cable attenuation for 800GBASE-FR4 is incorrect given 2 km maximum fiber length and 0.5 dB/km attenuation. For reference, clauses 122, 155 and 182 have the correct value of 1 dB.

SuggestedRemedy

Change:

"The maximum link distance for 800GBASE-FR4 is based on an allocation of 2 dB total fiber cable attenuation,"

To:

"The maximum link distance for 800GBASE-FR4 is based on an allocation of 1 dB total fiber cable attenuation,"

Also change:

"a total connection and splice loss allocation of 2 dB supports four connections"

To:

"a total connection and splice loss allocation of 3 dB supports six connections"

Proposed Response Response Status O

Cl 183 SC 183.9.1 P581 L15 # I-41

Issenhuth, Tom Huawei Technologies Co., Ltd,Issenhuth Consulting,

Comment Type E Comment Status X

In Table 183-14 the parameter and associated cross reference to TDECQ_CER is missing

SuggestedRemedy

In Table 183-14 add the parameter for TDECQ_CER after TDECQ with a pattern of 6 and cross reference to 183.9.7

Proposed Response Response Status O

Cl 183 SC 183.9.1 P581 L17 # I-42

Issenhuth, Tom Huawei Technologies Co., Ltd,Issenhuth Consulting,

Comment Type E Comment Status X

In Table 183-14, the parameter Transmitter functional symbol error histogram is missing the related subclause cross reference

SuggestedRemedy

In Table 183-14 for transmitter functional symbol error histogram add a cross reference to 183.9.9

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 183 SC 183.9.2 P 581 L 36 # I-99

Ran, Adee Cisco Systems, Inc.

Comment Type E Comment Status X

(Comment resubmitted from WG ballot)

The reference receiver is defined by reference to 180.9.2 with a single exception which is almost the whole definition.

SuggestedRemedy

Define the reference receiver using text as in the first paragraph of 180.9.2. Refer to 180.9.2 for the CRU and the block diagram. Implement with editorial license.

Proposed Response Response Status O

Cl 183 SC 183.9.2 P 581 L 38 # I-256

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

With TDECQ expected to capture jitter more accurately now that explicit jitter measurement are removed the CRU maximum peaking must be defined

SuggestedRemedy

The CRU maximum jitter transfer peak is ≤ 0.3 dB from 42.7 kHz to 20 MHz.

Proposed Response Response Status O

Cl 183 SC 183.9.2 P 581 L 38 # I-257

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

Missing CRU definition

SuggestedRemedy

The clock recovery unit (CRU) has a 3 dB corner frequency of 4 MHz and a slope of -20 dB/decade.

Proposed Response Response Status O

Cl 183 SC 183.9.6 P 582 L 44 # I-100

Ran, Adee Cisco Systems, Inc.

Comment Type T Comment Status X

TDECQ is defined based on 180.9.6, with a list of exceptions.

The penultimate exception (source clock of the SSPRQ) is not required (the same requirement exists in 180.9.6.1).

The last exception is to use optical channel specified in 183.9.6.1 (instead of the one in 180.9.6.2). This should be expanded to include an optical filter in the test setup (similar to Figure 122-4), unlike 180.9.6.1.

SuggestedRemedy

Remove the exception for clock source of SSPRQ. Expand the last exception, or add another exception, to use an optical filter in the test setup. Consider adding a figure of the setup with the optical filter.

Proposed Response Response Status O

Cl 183 SC 183.9.6 P 582 L 46 # I-261

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.

Comment Type TR Comment Status X

802.3dj has spend last 1 year to best capture jitter in TDECQ and FRx, unless xAUI-n (C2M) interface operate with jitter tolerance condition in 176D.8.14 TDECQ measurement maybe be too optimistic see also unsatisfied comments against D2.1 and D2.2

SuggestedRemedy

Add sentence: For those cases where there is an xAUI-n chip-to-chip (C2C) or chip-to-module (C2M) interface (see Table 180-1 through Table 180-4), the clock source for the test pattern is derived from the clock recovered from the xAUI-n input signal. The xAUI-n input signal is that described for the Jitter tolerance test in 176D.8.14. The pattern of the xAUI-n input signal may be PRBS31Q, scrambled idle, or a valid xBASE-R signal. See ghiasi_3dj_02_2605

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 183 SC 183.9.9 P 584 L 33 # I-124

Huber, Thomas Nokia
 Comment Type ER Comment Status X

Using "FRx" to mean "functional receiver" is very confusing, since FR is also used to indicate the 2 km CWDM PMD family, and "FRx" or "FRn" are commonly used to indicate a set of FR PHYs.

SuggestedRemedy

It appears that FRx is used only in this bullet point. Delete "(FRx)" in the first sentence and replace FRx in the last sentence with "functional receiver"

Proposed Response Response Status O

Cl 183 SC 183.9.10 P 585 L 10 # I-268

Ghiasi, Ali Ghiasi Quantum LLC,Marvell Semiconductor, Inc.
 Comment Type TR Comment Status X

140.7.7 Hit Ratio of 1E-2 doesn't make sense

SuggestedRemedy

Add exception hit ratio is 1E-4

Proposed Response Response Status O

Cl 183 SC 183.9.13 P 585 L 42 # I-33

Brown, Matthew Qualcomm
 Comment Type E Comment Status X

Per style manual, use of the word "can" in the sense of "is permitted" is deprecated. Instead, use the word "may".

SuggestedRemedy

Change "the square wave test pattern can be used" to "the square wave test pattern may be used".

Proposed Response Response Status O

Cl 184 SC 184 P 595 L 1 # I-314

Nicholl, Gary Cisco Systems, Inc.
 Comment Type TR Comment Status X

An 800GBASE-LR1 PHY must be able to participate in Annex 178B APSU, to minimize the amount of human intervention needed to initialize a path and preserve the plug-and-play nature of Ethernet.

SuggestedRemedy

A contribution will be provided containing a complete proposal for how an 800GBASE-LR1 PHY may participate in Annex 178B APSU, including the detailed text changes that are necessary to the draft.

Proposed Response Response Status O

Cl 184 SC 184.3 P 598 L 48 # I-101

Ran, Adeo Cisco Systems, Inc.
 Comment Type TR Comment Status X

"When SIGNAL_OK is FAIL, the tx_symbol parameters of the FEC:IS_UNITDATA_i.indication primitives are undefined"
 FEC:IS_UNITDATA_i.indication parameter is rx_symbol, not tx_symbol.

SuggestedRemedy

Change tx_symbol to rx_symbol.

Proposed Response Response Status O

Cl 184 SC 184.4 P 599 L 5 # I-125

Huber, Thomas Nokia
 Comment Type TR Comment Status X

The text indicates that the alignment lock and deskew are the same as specified in 172.2.5.1, except that deskew is only required to a 2-symbol boundary. However, 172.2.5.1 specifies the state machine in figure 172-6 is required. That state machine counts FEC codeword errors and restarts lock if 3 consecutive uncorrected codewords are received. The LR1 inner FEC does not decode the FEC, so it doesn't need this state machine.

SuggestedRemedy

Change the sentence to read:
 The alignment lock and deskew function shall be identical to the processes specified in 172.2.5.1 except that only a deskew to 20-bit (two RS-FEC symbols) boundaries across all PCS lanes is required, and the codeword monitor function in Figure 172-6 is not required.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 184 SC 184.10 P 615 L 45 # I-5

Marris, Arthur self

Comment Type TR Comment Status X

In "Table 184-5—Inner FEC status variables and MDIO mapping" are defined to use PMA registers test_block_error_bin_0_<0:15> and test_block_error_bin_0_16p. These registers are required by the AUI so a new set of inner fec registers need to be defined for the PRBS31 checker.

SuggestedRemedy

Create 51 new "Inner FEC test error bin" registers at 1.2644 through 1.2694, with similar functionality to the existing PMA registers test_block_error_bin_0_k and test_block_error_bin_0_16p.

In 184.6.2 and Table 184-5:

Rename "test_block_error_bin_0_k" to "Inner_FEC_test_block_error_bin_k"
Rename "test_block_error_bin_0_16p" to "Inner_FEC_test_block_error_bin_16p"

Proposed Response Response Status O

Cl 185 SC 185.5.1 P 626 L 5 # I-228

Maniloff, Eric Ciena Corporation

Comment Type E Comment Status X

Labels and locations in Fig 185-3 are inconsistent with other clauses.

SuggestedRemedy

Modify Fig 185-3 to align with Fig 185-2. Move "Inner FEC." Inside box. Change Optical transmitter label to PMD transmit function. Add PMD_signal_detect

Proposed Response Response Status O

Cl 185 SC 185.5.1 P 626 L 5 # I-227

Maniloff, Eric Ciena Corporation

Comment Type T Comment Status X

The label for TP1 and TP2 on Fig 185-3 are not correct, TP1 and TP4 do not belong in this figure

SuggestedRemedy

Remove TP1 and TP4

Proposed Response Response Status O

Cl 185 SC 185.10 P 640 L 15 # I-229

Maniloff, Eric Ciena Corporation

Comment Type ER Comment Status X

Control Variable Reset is labeled improperly

SuggestedRemedy

Change "Reset" to "PMD_reset"

Proposed Response Response Status O

Cl 185 SC 185.10 P 640 L 30 # I-230

Maniloff, Eric Ciena Corporation

Comment Type ER Comment Status X

Status variables "fault" "Transmit fault" and "receive fault" are labeled improperly

SuggestedRemedy

Change to "PMD_fault", "PMD_transmit_fault", and "PMD_receive_fault"

Proposed Response Response Status O

Cl 185 SC 185.11.4.3 P 644 L 8 # I-118

Issenhuth, Tom Huawei Technologies Co., Ltd,Issenhuth Consulting,

Comment Type E Comment Status X

In optical measurements PICS table the term "Tx clock phase noise: total periodic jitter (max)" should not include "(max)"

SuggestedRemedy

Remove "(max)" from the feature description

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 185A SC 185A.2.3 P947 L 38 # I-36

Brown, Matthew Qualcomm

Comment Type E Comment Status X

Regarding this text... "Processing steps can be consolidated and changed in order but may not perform any additional signal processing with the purpose of compensating for transmitter signal distortions except for those explicitly mentioned below."
Per style manual, use of the word "can" in the sense of "is permitted" is deprecated. Instead, use the word "may".

SuggestedRemedy

Change "Processing steps can be consolidated" to "Processing steps may be consolidated".

Proposed Response Response Status O

Cl 185A SC 185A.2.3 P948 L 8 # I-235

Maniloff, Eric Ciena Corporation

Comment Type TR Comment Status X

The low pass filter has minimal impact on ETCC, and can be removed

SuggestedRemedy

Remove the Bessel-Thomson filter from the reference DSP. This will also remove 185.A.2.3.2

Proposed Response Response Status O

Cl 185A SC 185A.2.3.5 P948 L 8 # I-237

Maniloff, Eric Ciena Corporation

Comment Type T Comment Status X

The current ETCC methodology already requires a preprocessing stage to recover the transmitted pattern for subsequent BER measurement. Given that the transmitted sequence is already available within the processing flow, using known data symbols for equalization is a natural and consistent extension of the existing methodology. Data-aided equalization is also more representative of practical system operation, and it generally provides faster convergence and more reliable equalizer adaptation than blind methods. This is an optional implementation but it would be preferable to specify this.

SuggestedRemedy

Add text to the reference equalizer in 185A.2.3.7 to indicate that the adaptation may be based on known data symbols.

Proposed Response Response Status O

Cl 185A SC 185A.2.3.5 P948 L 52 # I-236

Maniloff, Eric Ciena Corporation

Comment Type TR Comment Status X

The T spaced filter is inconsistent with typical implementations. T/2 -spaced equalization does not mitigate transmitter impairments more effectively in this context; its primary benefit is to support the clock recovery algorithm when residual symbol timing error is present. Moving to T/2-spaced taps makes the processing less dependent on the specific clock recovery implementation and therefore more robust and algorithm-agnostic.

SuggestedRemedy

Change the reference equalizer tap spacing from T-spaced to T/2-spaced.

Proposed Response Response Status O

Cl 185A SC 185A.2.4.1 P949 L 23 # I-37

Brown, Matthew Qualcomm

Comment Type T Comment Status X

There are two issues with the following text: "ENOB can be measured using sine waves as described in IEEE Standard 1241-2023, Section 9.4 provided that the amplitude and frequency of the sine wave used for the measurement are specified."
Per style manual, use of the word "can" in the sense of "is permitted" is deprecated. Instead, use the word "may".
However, if the ENOB is not measured using the method in 1241-2023 then how should one measure it. Can it be measured in any way that one wants?

SuggestedRemedy

Change "ENOB can be measured using" to "ENOB is measured using"

Proposed Response Response Status O

Cl 186 SC 186 P645 L 1 # I-315

Nicholl, Gary Cisco Systems, Inc.

Comment Type TR Comment Status X

An 800GBASE-ER1/ER1-20 PHY must be able to participate in Annex 178B APSU, to minimize the amount of human intervention needed to initialize a path and preserve the plug-and-play nature of Ethernet.

SuggestedRemedy

A contribution will be provided containing a complete proposal for how an 800GBASE-ER1/ER1-20 PHY may participate in Annex 178B APSU, including the detailed text changes that are necessary to the draft.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 186 SC 186.2.3.5 P 653 L 23 # I-126

Huber, Thomas Nokia

Comment Type TR Comment Status X

The MNT bits in the ITU-T G.709.1 description of CSTAT need to be specified, as they are needed to support ER1 PHY participation in APSU

SuggestedRemedy

Update figure 186-6 to show the MNT bits as bits 1-3 (bit 0 will stay as reserved)

Proposed Response Response Status O

Cl 186 SC 186.2.3.5.11 P 656 L 6 # I-127

Huber, Thomas Nokia

Comment Type TR Comment Status X

The MNT bits in the ITU-T G.709.1 description of CSTAT need to be specified, as they are needed to support ER1 PHY participation in APSU

SuggestedRemedy

Add a bullet to the list describing the MNT field and how the value is determined. A presentation regarding support for APSU on ER1 PHYs will be provided.

Proposed Response Response Status O

Cl 186 SC 186.2.3.12 P 659 L 33 # I-210

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type TR Comment Status X

Clarification needed. Are 257-bit blocks from the PRBS31 generator distributed into the eight tributary frames in a round-robin fashion? Or is the output of the PRBS31 generator copied to each of the eight tributary frames?

SuggestedRemedy

Please clarify.

Proposed Response Response Status O

Cl 186 SC 186.2.4 P 660 L 1 # I-211

Mascitto, Marco Infinera Canada Inc.,Nokia

Comment Type TR Comment Status X

Just as the Transmit function has a Test-pattern generator (subclause 186.2.3.12), there should be a Test-pattern checker subclause to 186.2.4. Figure 186-3 shows both a Test-pattern injection point in the transmit path and a Test-pattern extraction point in the receive path. The Test-pattern checker would be similar in functionality to that in subclause 184.6.2. Support of the subclause could be optional.

SuggestedRemedy

A presentation that proposes text for this new subclause will be provided.

Proposed Response Response Status O

Cl 186 SC 186.2.4.7.6 P 663 L 10 # I-128

Huber, Thomas Nokia

Comment Type TR Comment Status X

The MNT bits in the ITU-T G.709.1 description of CSTAT need to be specified, as they are needed to support ER1 PHY participation in APSU

SuggestedRemedy

Add a bullet to the list describing the MNT field and how the value is processed and used. A presentation regarding support for APSU on ER1 PHYs will be provided.

Proposed Response Response Status O

Cl 186 SC 186.3.4.3 P 673 L 50 # I-405

Opsasnick, Eugene Broadcom Inc.

Comment Type TR Comment Status X

It is stated that "... the transmit X and Y polarization symbol streams are identified and deskewed." However, there is no stated limit to the maximum skew and skew variation that must be tolerated anywhere in clause 186.

SuggestedRemedy

Add the maximum skew and skew variation that must be tolerated. Is it the same as what is specified in the table in 187.11.4.3 plus some extra for the logic between the PMD and PMA?

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

CI 186 SC 186.4.3 P 685 L 25 # I-61

WANG, Xuebo Huawei Technologies Co., Ltd

Comment Type TR Comment Status X

In 5_BAD state of state diagram 186-19, the assignment "mfas_lock<x> <= false" is redundant with the same assignment in LOSS_OF_ALIGNMENT state, and should be removed. Setting fec_mfas_restart_lock <= true will restart all 8 instances of state diagram 186-19 (x=0,...,7), and they will go to LOSS_OF_ALIGNMENT with mfas_lock<x> <= false there. Having the redundant assignment in 5_BAD seems to imply that just the single instance is being reset, but if that was the case then fec_mfas_restart_lock should also be indexed with <x>. Similar issues in state diagram 186-17 and 186-18 had been resolved per comment #386 against D2.2.

SuggestedRemedy

In 5_BAD state of state diagram 186-19, remove the assignment of mfas_lock<x> to false, and leave only the assignment of fec_mfas_restart_lock to true.

Proposed Response Response Status O

CI 186 SC 186.4.3 P 685 L 25 # I-129

Huber, Thomas Nokia

Comment Type T Comment Status X

In Figure 186-19, in the 5_BAD state, there is no need to set mfas_lock<x> to false. Setting fec_mfas_restart_lock to true will cause a transition to the loss of alignment state, which sets mfas_lock<x> to false.

SuggestedRemedy

remove "mfas_lock<x> <= false" from the 5_BAD state

Proposed Response Response Status O

CI 186 SC 186.4.3 P 685 L 26 # I-407

Opsasnick, Eugene Broadcom Inc.

Comment Type TR Comment Status X

In state diagram Figure 186-19, the assignment "mfas_lock<x> <= false" in the state 5_BAD is redundant with the same assignment in the LOSS_OF_ALIGNMENT state.

See comment #386 against D2.2 (https://www.ieee802.org/3/dj/comments/D2p2/8023dj_D2p2_comments_final_id.pdf) which removed similar assignments from the state diagrams 186-17 and 186-19. This figure is similar to those and was just missed in the D2.2 comment, and it should be cleaned up now. Note that one figure was removed in D2.3 -- Figures 186-19 and 186-20 in Draft 2.2 became Figures 186-18 and 186-19 in Draft 2.3, respectively.

SuggestedRemedy

Remove "mfas_lock<x> <= false" from the 5_BAD state in Figure 186-19.

Proposed Response Response Status O

CI 186 SC 186.4.3 P 686 L 1 # I-408

Opsasnick, Eugene Broadcom Inc.

Comment Type TR Comment Status X

State diagram Figure 186-20 is used for the RX alignment marker location field syncing. As stated in another comment, the statement to "start multiframe_counter" is missing. The state diagram also requires either 8 non-zero values or 5 zero values in a row to match in order to use the new value, but this should not be necessary since the AML value used is after FEC correction. This state diagram is actually two state diagrams that interact and the interaction is not very clear. This process could be simplified to use the aml_value as-is unless the expected RAML location it is part of an uncorrectable codeword. The state diagram can then be simplified and made easier to understand.

SuggestedRemedy

Simplify and make more clear the state diagram figure 186-20 for alignment marker location tracking. A consensus presentation with changes for this state daigram is planned.

Proposed Response Response Status O

IEEE P802.3dj D3.0 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Initial Sponsor ballot comments

Cl 186 SC 186.4.3 P 686 L 26 # I-406
 Opsasnick, Eugene Broadcom Inc.
 Comment Type TR Comment Status X
 The condition to exit the WAIT_FOR_MULTIFRAME state in the Figure 186-20 state diagram is "multiframe_counter_done". The multiframe_counter is defined in 186.4.2.4 as counting a number of bytes between successive AML overhead blocks. However, there is no "start multiframe_counter" statement in any of the state diagram figures and it is impossible to tell when to start the counter.
 SuggestedRemedy
 Update Figure 186-20 (or another appropriate state diagram figure in clause 186) to start the multiframe_counter before entering the WAIT_FOR_MULTIFRAME state.
 Proposed Response Response Status O

Cl 186 SC 186.7.2 P 689 L 39 # I-404
 Opsasnick, Eugene Broadcom Inc.
 Comment Type TR Comment Status X
 The Status variable "FEC_hi_ser" is missing from Table 186-8.
 SuggestedRemedy
 Add variable FEC_hi_ser to Table 186-8. Also add it to a bit definitions in Clause 45 if needed.
 Proposed Response Response Status O

Cl 186 SC 186.7.2 P 690 L 10 # I-11
 Marris, Arthur self
 Comment Type TR Comment Status X
 Missing status variables in Table 186-8—800GBASE-ER1 FEC sublayer status variables and MDIO mapping
 SuggestedRemedy
 In Table 186-8
 Add IFEC_high_SER status variable mapping to 1.2201.2
 Add remote PHY fault indication status variable as described in 186.2.3.5.2 and map to new status bit 1.2411.2
 Proposed Response Response Status O

Cl 186 SC 186.7.2 P 690 L 12 # I-8
 Marris, Arthur self
 Comment Type T Comment Status X
 In Table 186-8 IFEC_degraded_SER points to bit 1.2201.2.
 This is incorrect as 1.2201.2 is for high SER
 SuggestedRemedy
 Create new bit in Clause 45 at register location 1.2201.12 to indicate IFEC degraded SER.
 Change 1.2201.2 to 1.2201.12 on line 12 in Table 168-8 for IFEC_degraded_SER and make appropriate additions in "45.2.1.217 IFEC status register (Register 1.2201)" for this new bit
 Proposed Response Response Status O

Cl 186A SC 186A P 954 L 1 # I-316
 Nicholl, Gary Cisco Systems, Inc.
 Comment Type TR Comment Status X
 As noted in Draft 2.2 Comment #44 (https://www.ieee802.org/3/dj/comments/D2p3/8023dj_D2p3_comments_final_clause.pdf), test vectors are required to be provided for the 800GBASE-ER1 FEC and PMA.
 SuggestedRemedy
 Two contributions will be provided:
 1) A contribution containing the test vectors. This will be based on the test vectors files provided against Draft 2.2 Comment #44 (https://www.ieee802.org/3/dj/comments/D2p3/8023dj_D2p3_comments_final_clause.pdf) and posted as https://www.ieee802.org/3/dj/public/26_01/sluyiski_3dj_02_2601.7z.
 2) A contribution containing the proposed text for Annex 186A.
 Proposed Response Response Status O

Cl 187 SC 187.5.1 P 701 L 8 # I-231
 Maniloff, Eric Ciena Corporation
 Comment Type T Comment Status X
 The label for TP1 and TP2 on Fig 187-3 are not correct, TP1 and TP4 do not belong in this figure
 SuggestedRemedy
 Remove TP1 and TP4
 Proposed Response Response Status O

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Cl 187 SC 187.5.1 P701 L8 # I-232
 Maniloff, Eric Ciena Corporation
 Comment Type E Comment Status X
 Labels and locations in Fig 187-3 are inconsistent with other clauses.
 SuggestedRemedy
 Change Optical transmitter label to PMD transmit function and Optical receiver to "PMD receive function". Add PMD_signal_detect
 Proposed Response Response Status O

Cl 187 SC 187.11.4.3 P718 L9 # I-119
 Issenhuth, Tom Huawei Technologies Co., Ltd,Issenhuth Consulting,
 Comment Type E Comment Status X
 In optical measurements PICS table the term "Tx clock phase noise: total periodic jitter (max)" should not include "(max)"
 SuggestedRemedy
 Remove "(max)" from the feature description
 Proposed Response Response Status O

Cl 187 SC 187.10 P714 L9 # I-233
 Maniloff, Eric Ciena Corporation
 Comment Type ER Comment Status X
 Control Variable Reset is labeled improperly
 SuggestedRemedy
 Change "Reset" to "PMD_reset"
 Proposed Response Response Status O

Cl 187 SC 187.10 P714 L20 # I-234
 Maniloff, Eric Ciena Corporation
 Comment Type ER Comment Status X
 Labels and locations in Fig 187-3 are inconsistent with other clauses.
 SuggestedRemedy
 Change Optical transmitter label to PMD transmit function and Optical receiver to "PMD receive function". Add PMD_signal_detect
 Proposed Response Response Status O