

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI **FM** SC **FM** P **10** L **16** # **231**  
 Brown, Matt Huawei  
 Comment Type **E** Comment Status **A** bucket  
 "physical layer" should be capitalized  
 SuggestedRemedy  
 Change "physical layer" to "Physical Layer"  
 Also, at the following locations  
 page 12, line 42  
 page 39, line 8  
 Response Response Status **C**  
 ACCEPT IN PRINCIPLE.  
 The use of lower case "physical layer" on page 10 is from the 802.3 FrameMaker template and will not be changed. Change "physical layer" to "Physical Layer" as noted on pages 12 and 39.

CI **00** SC **0** P **12** L **47** # **1**  
 Laubach, Mark Ciena  
 Comment Type **E** Comment Status **A** bucket  
 If you look at the 802.3cy project, it states the annexes that were added.  
 SuggestedRemedy  
 Change "Clause 155 and Clause 156" to "Clause 155, Clause 156, Annex 155A, and Annex 156A".  
 Response Response Status **C**  
 ACCEPT.

CI **00** SC **0** P **20** L **6** # **8**  
 Grow, Robert RMG Consulting  
 Comment Type **E** Comment Status **A** bucket  
 Oops! How did 2022 get inserted here.  
 SuggestedRemedy  
 Delete "2022"  
 Response Response Status **C**  
 ACCEPT.

CI **00** SC **00** P **35** L **54** # **254**  
 Law, David Hewlett Packard Enterprise  
 Comment Type **T** Comment Status **A**  
 Does figure 117-1 'RS and MII relationship to the ISO/IEC Open Systems Interconnection (OSI) reference model and IEEE 802.3 Ethernet model' need to be redrawn, as figure 116-1 'Architectural positioning of 200 Gigabit and 400 Gigabit Ethernet' has already been, to add a third 400GBASE-ZR sublayer 'stack'. Currently, figure 117-1 only shows a 400GBASE-R PCS below the 400GMII.  
 SuggestedRemedy  
 Add a third 400GBASE-ZR sublayer 'stack' to figure 117-1.  
 Response Response Status **C**  
 ACCEPT IN PRINCIPLE.  
 Bring Figure 117-1 into the draft. In Figure 117-1, change "200GBASE-R PCS" to "PCS", change "400GBASE-R PCS" to "PCS", below the medium change "200GBASE-R" to "200GBASE" and 400GBASE-R" to "400GBASE".  
 With editorial license.

CI **1** SC **1.3** P **21** L **8** # **5**  
 Marris, Arthur Cadence Design Systems  
 Comment Type **T** Comment Status **A** bucket  
 Because it is mentioned in 155.2.5.10 include reference to:  
 ITU-T Recommendation G.709.3—Flexible OTN long-reach interfaces  
 SuggestedRemedy  
 Add: "ITU-T Recommendation G.709.3—Flexible OTN long-reach interfaces"  
 Response Response Status **C**  
 ACCEPT.

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Cl 1 SC 1.5 P 21 L 28 # 9

Ran, Adee Cisco

Comment Type ER Comment Status A

"AM" typically stands for "Amplitude Modulation" in engineering. It seems unreasonable to redefine it globally in 802.3 just for one clause that uses it as a different term.

We have used the unabbreviated term "alignment marker" in many previous clauses.

*SuggestedRemedy*

Delete the abbreviation "AM" in 1.5.

In clause 155, change occurrences of the abbreviation "AM" to either "alignment marker" or "AM field" as appropriate.

Alternatively, add a definition of AM local to clause 155.

Response Response Status C

ACCEPT IN PRINCIPLE.

Remove AM from 1.5. Use "AM field" when referring to the alignment marker field and fully spell out "alignment marker" when it is not a field throughout clause 155.

With Editorial license.

Cl 1 SC 1.5 P 21 L 29 # 10

Ran, Adee Cisco

Comment Type E Comment Status A

Having abbreviations that are not commonly used and are specific to one clause is not useful for readers, and potentially conflicting with existing clauses that use the same abbreviations with other meaning.

There are several abbreviations which are only used as field names in the CFEC block. Fields names are typically not listed here.

It would be better to define such abbreviations only in the clause where they are used (155). This way, readers of the clause will be more likely to encounter them.

This applies to the abbreviations CFEC, FAW (field name), LDI (defined but never used), MBASE (field name), PS (field name), RPF (field name), SD-FEC, TS (field name).

*SuggestedRemedy*

Delete these abbreviations from 1.5.

If considered necessary, add an abbreviation subclause in clause 155.

Response Response Status C

ACCEPT IN PRINCIPLE.

Remove LDI, RPF, MBAS, RPF, TS and PS from 1.5.

With editorial license following the IEEE style guidelines for the first use of the abbreviations.

Cl 45 SC 45.2.1.151.1 P 25 L 37 # 11

Ran, Adee Cisco

Comment Type E Comment Status A bucket

"For 100GBASE-ZR the specific optical frequency corresponding to each channel index number is listed in Table 154-5 and for 400GBASE-ZR the specific optical frequency corresponding to each channel index number is listed in Table 156-4"

The newly added text (starting with "and") makes the sentence hard to read, and it does not match the text in the subsequent paragraph.

*SuggestedRemedy*

Change the quoted text to

"The specific optical frequency corresponding to each channel index number is listed in Table 154-5 for 100GBASE-ZR and in Table 156-4 for 400GBASE-ZR".

Response Response Status C

ACCEPT.

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CI 45 SC 45.2.1.151.1 P 25 L 49 # 12

Ran, Adeo Cisco

Comment Type E Comment Status R

"For 100GBASE-ZR see Table 154-5 and for 400GBASE-ZR see Table 156-4."

The text of this subclause in the base standard has the sentence "The optical frequencies that correspond to these index values are given in the appropriate PMD clause" before the sentence above. The resulting sequence is repetitive and unhelpful.

People reading the amendment may not understand what this change means without going to the base standard. This subclause is short enough to be quoted in its entirety.

Comment applies similarly in 45.2.1.152.1, 45.2.1.153.1, 45.2.1.155.1, 45.2.1.156.1, 45.2.1.157.1.

*SuggestedRemedy*

Bring in the full subclause text from the base document.

Mark the sentence "The optical frequencies that correspond to these index values are given in the appropriate PMD clause" as deleted.

Change the last sentence to  
"The optical frequencies that correspond to these index values are given in Table 154-5 for 100GBASE-ZR and in Table 156-4 for 400GBASE-ZR."

Apply similarly in the other subclauses listed.

Response Response Status C

REJECT.

Editing instruction is clear and unambiguous, no need to bring in the full text. Instruction to change one sentence is consistent with precedence set in IEEE 802.3ck-2022.

CI 45 SC 45.2.1.153a.1 P 27 L 37 # 13

Ran, Adeo Cisco

Comment Type E Comment Status A bucket

There is only one appropriate PMD clause. The text can be made clearer.

Comment applies similarly in 45.2.1.157a.1.

*SuggestedRemedy*

Change to "The optical frequencies that correspond to these index values are given in Table 156-4 for 400GBASE-ZR".

Apply similarly in the other subclause.

Response Response Status C

ACCEPT.

CI 45 SC 45.2.1.153a.1 P 27 L 39 # 14

Ran, Adeo Cisco

Comment Type E Comment Status A bucket

Paragraph break before the period.

*SuggestedRemedy*

Delete it.

Response Response Status C

ACCEPT.

CI 45 SC 45.2.1.227 P 30 L 16 # 94

Bruckman, Leon Huawei

Comment Type T Comment Status A bucket

Wrong reference

*SuggestedRemedy*

Replace "and 155.2.6.1" with "and 155.2.6.5"

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #15.

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CI 45 SC 45.2.1.227 P 30 L 17 # 15

Ran, Adee Cisco  
 Comment Type ER Comment Status A bucket

"See 153.2.5.1 and 155.2.6.1 for a definition of this counter."

("this" is the SC-FEC corrected codewords counter)

However, 155.2.6.1 is titled "Hamming SD-FEC decoder" - a very different FEC, and does not define this counter.

The appropriate reference seems to be 155.5.1.

*SuggestedRemedy*

Change the reference to 155.5.1

Response Response Status C  
 ACCEPT.

CI 45 SC 45.2.1.228 P 30 L 22 # 95

Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket

This counter is for uncorrected errors

*SuggestedRemedy*

Replace "aSC-FEC corrected codewords counter" with "SC-FEC uncorrected codewords counter"

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Resolve using the response to comment #16.

CI 45 SC 45.2.1.228 P 30 L 23 # 16

Ran, Adee Cisco  
 Comment Type ER Comment Status A bucket

The title of this subclause does not match the base document.

*SuggestedRemedy*

Change to "SC-FEC uncorrected codewords counter (Register 1.2278, 1.2279)".

Response Response Status C  
 ACCEPT.

CI 45 SC 45.2.1.228 P 30 L 24 # 96

Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket

Wrong reference

*SuggestedRemedy*

Replace "and 155.2.6.1" with "and 155.2.6.5"

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Resolve using the response to comment #17.

CI 45 SC 45.2.1.228 P 30 L 25 # 17

Ran, Adee Cisco  
 Comment Type ER Comment Status A bucket

155.2.6.1 is an incorrect cross reference.

*SuggestedRemedy*

Change to 155.5.2.

Response Response Status C  
 ACCEPT.

CI 45 SC 45.2.1.229 P 30 L 32 # 18

Ran, Adee Cisco  
 Comment Type ER Comment Status A bucket

155.2.6.1 is an incorrect cross reference.

*SuggestedRemedy*

Change to 155.5.3.

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Resolve using the response to comment #97. 155.5.3 only points to 153.2.5.3 which is already stated in the subclause.

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CI 45 SC 45.2.1.229 P 30 L 32 # 97  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket  
 Total bits is fully defined in 153.2.5.3, clause 155 does not add anything.  
 SuggestedRemedy  
 Delete reference to 155.2.6.1  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Deleting reference to 155.2.6.1 means there is no change to the existing 45.2.1.229 text so delete this subclause.

CI 45 SC 45.2.1.230 P 30 L 40 # 98  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket  
 Wrong reference  
 SuggestedRemedy  
 Replace "and 155.2.6.1" with "and 155.2.6.5"  
 Response Response Status C  
 ACCEPT.

CI 45 SC 45.2.1.230 P 30 L 41 # 19  
 Ran, Adee Cisco  
 Comment Type ER Comment Status A bucket  
 155.2.6.1 is an incorrect cross reference.  
 SuggestedRemedy  
 Change to 155.5.4.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #98. 155.5.4 only points to 153.2.5.4 which is already stated in the subclause.

CI 45 SC 45.2.3.61.1 P 31 L 4 # 99  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket  
 Wrong reference  
 SuggestedRemedy  
 Replace: "155.2.5.1" with: "155.2.5.5.2"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #20.

CI 45 SC 45.2.3.61.1 P 31 L 5 # 20  
 Ran, Adee Cisco  
 Comment Type ER Comment Status A bucket  
 155.2.5.1 is an incorrect cross reference.  
 SuggestedRemedy  
 Change to 155.4.2.  
 Response Response Status C  
 ACCEPT.

CI 45 SC 45.2.3.61.4 P 31 L 21 # 100  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket  
 Wrong reference  
 SuggestedRemedy  
 Replace: "155.2.5.2" with: "155.2.6.5"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #21.

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CI 45 SC 45.2.3.61.4 P 31 L 22 # 21  
 Ran, Adee Cisco  
 Comment Type ER Comment Status A bucket  
 155.2.5.2 is an incorrect cross reference.  
 SuggestedRemedy  
 Change to 155.2.6.5.  
 Response Response Status C  
 ACCEPT.

CI 116 SC 116.1.2 P 32 L 20 # 136  
 Dudek, Mike Marvell  
 Comment Type T Comment Status A bucket  
 In figure 116-2 the 200GBASE-R PHY should use the 200GBASE-R PCS and PMA, not a 200GBASE-ZR PCS and PMA.  
 SuggestedRemedy  
 Change 200GBASE-ZR PCS and PMA to 200GBASE-R PCS and PMA  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 The comment is actually for Figure 116-1. Change "200GBASE-ZR" to "200GBASE-R" for PCS and PMA.

CI 116 SC 116.1.3 P 33 L 12 # 280  
 Dawe, Piers Nvidia  
 Comment Type TR Comment Status R  
 As is made clear by the non-BASE-R Table 116-5a and 116.4.3 and 116.4.4, "400GBASE-ZR" is not BASE-R. However, the "R in the name implies that it is, which causes confusion. Clause 155 describes a "WAN PHY" like 10GBASE-W: an Ethernet signal is carried in a telecoms wrapper (then, based on SONET, here, based on OTN). Also, misnaming this spec blocks the way for a future native BASE-R 400G Z class PHY. The name "400GBASE-ZW", while correct, doesn't flow very easily, but "400GBASE-Z" avoids the misrepresentation and provides a cleaner name.

SuggestedRemedy  
 Change "400GBASE-ZR" to "400GBASE-Z" throughout.  
 Response Response Status U  
 REJECT.  
 Changing the name from 400GBASE-ZR was previously considered in D2.0 comment #419 ([https://www.ieee802.org/3/cw/comments/D2p0/8023cw\\_D2p0\\_comments\\_final\\_by\\_clause.pdf](https://www.ieee802.org/3/cw/comments/D2p0/8023cw_D2p0_comments_final_by_clause.pdf)) and there was no consensus to make a change.  
 The comment does not provide sufficient justification to support the suggested remedy.  
 There was no consensus to make a change.

CI 116 SC 116.1.3 P 33 L 12 # 22  
 Ran, Adee Cisco  
 Comment Type E Comment Status A bucket  
 The new entry in Table 116-2 says "using 400GBASE-ZR PCS and PMA encoding". This is different from all other rows which simply use "encoding". This detail is not helpful.  
 SuggestedRemedy  
 Change to "using 400GBASE-ZR encoding".  
 Response Response Status C  
 ACCEPT.

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CI 116 SC 116.3 P 33 L 3 # 155  
 D'Ambrosia, John Futurewei, U.S. Subsidiary of Huawei  
 Comment Type ER Comment Status A bucket  
 The insertion of Table 116-5a is showing up as part of 116.3. It is not clear to commenter if this is a Frame issue.  
 SuggestedRemedy  
 Ensure that the addition of Table 116-5a is in 116.1.4.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #23.

CI 116 SC 116.3 P 33 L 33 # 161  
 Huber, Thomas Nokia  
 Comment Type E Comment Status A bucket  
 This clause is in the wrong place - the material on the next page (about inserting table 116-5a) is still part of clause 116.1.4  
 SuggestedRemedy  
 Move the material from line 33 to the bottom of page 33 to after what is currently (and incorrectly) numbered clause 116.4.5.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the responses to comments #23 and 24.

CI 116 SC 116.3 P 34 L 1 # 23  
 Ran, Adee Cisco  
 Comment Type E Comment Status A bucket  
 Table 116-5a should be placed in 116.1.3 after the existing tables, not in the service interface subclause 116.3.  
 Also, the table ruling needs cleaning.  
 SuggestedRemedy  
 Move the table and format it per comment.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Move Table 116-5a to 116.1.4 and cleanup table formatting. With editorial license

CI 116 SC 116.4 P 34 L 24 # 162  
 Huber, Thomas Nokia  
 Comment Type E Comment Status A bucket  
 The heading here should be 116.2 rather than 116.4 - this applies to all the subheadings 116.4.3, 116.4.4, 116.4.5 as well.  
 SuggestedRemedy  
 Correct the heading numbers (it may be that moving the incorrectly placed 116.3 will fix this automatically)  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #24.

CI 116 SC 116.4 P 34 L 24 # 24  
 Ran, Adee Cisco  
 Comment Type ER Comment Status A bucket  
 Incorrect subclause number: "Summary of 200 Gigabit and 400 Gigabit Ethernet sublayers" is 116.2 in the base standard.  
 SuggestedRemedy  
 Change the heading numbering to get the correct numbering for this subclause and its descendants.  
 Response Response Status C  
 ACCEPT.

CI 116 SC 116.4.4 P 34 L 35 # 25  
 Ran, Adee Cisco  
 Comment Type E Comment Status A bucket  
 A "replace" instruction makes the reader wonder how the new text changes the existing definitions.  
 In fact, the new text adds some sentences to the existing text, so the instruction should be "change" rather than "replace".  
 SuggestedRemedy  
 Change the instruction, and underline the new sentences.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change editing instruction to "change" from "replace" and use standard editorial markups to show modifications in the text.

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CI 116 SC 116.4.4 P 34 L 42 # 26

Ran, Adeo Cisco  
 Comment Type ER Comment Status A bucket

This paragraph is now specific to 200GBASE-R and 400GBASE-R PMAs, but it still uses the generic terms "PMA", "PCS" and "PMD" - unlike the subsequent paragraph in which everything is explicit to 400GBASE-ZR.

"PMA" should be changed to "200GBASE-R and 400GBASE-R PMAs" or "these PMAs".

Similarly "PMD" should be change to "200GBASE-R and 400GBASE-R PMDs".

Alternatively, the paragraph could be rephrased to start with "For 200GBASE-R and 400GBASE-R, the PMA performs" - this way the whole paragraph becomes specific to the BASE-R family (which includes PCS and PMD). A similar change should be applied in the subsequent clause.

*SuggestedRemedy*

Preferably use the second option:

Change "The 200GBASE-R and 400GBASE-R PMAs perform" to "For 200GBASE-R and 400GBASE-R, the PMA performs".

In the subsequent paragraph, change "The 400GBASE-ZR PMA performs" to "For 400GBASE-R, the PMA performs" and delete the "400GBASE-ZR" qualifiers for PCS, PMA and PMD in the rest of the paragraph.

Response Response Status C

ACCEPT IN PRINCIPLE.

In the second paragraph change "The 200GBASE-R and 400GBASE-R PMAs perform" to "For 200GBASE-R and 400GBASE-R, the PMA performs". In the third paragraph change "The 400GBASE-ZR PMA performs" to "For 400GBASE-ZR, the PMA performs" and delete the "400GBASE-ZR" qualifiers for PCS, PMA and PMD in the rest of the paragraph.

CI 116 SC 116.4.5 P 35 L 5 # 27

Ran, Adeo Cisco  
 Comment Type E Comment Status A bucket

"400GBASE-ZR PMD and its corresponding media" - plural.

*SuggestedRemedy*

Change "is specified" to "are specified".

Response Response Status C

ACCEPT.

CI 118 SC 118.1 P 38 L 2 # 28

Ran, Adeo Cisco  
 Comment Type E Comment Status D

Since Figure 118-1 is being replaced, it would be good to clarify the structure of the extenders, which have xGAUI-n internally and xGMII at the boundaries.

The xGMII are specified as parallel interfaces while the xGAUI-n are narrower and faster serial interfaces; but they are all shown as identical rectangles.

It would be good to make a visible distinction.

This could be argued for other diagrams too but this diagram is the most important one.

*SuggestedRemedy*

Make the xGMII's significantly wider rectangles than the xGAUI-n and MDIs; the labels can go inside the rectangles instead of having arrows.

Proposed Response Response Status Z

REJECT.

This comment was WITHDRAWN by the commenter.

CI 118 SC 118.1 P 38 L 10 # 29

Ran, Adeo Cisco  
 Comment Type E Comment Status D

The labels include the word "Optional", but this clause defines the Extender and states that it is optional in the first sentence of 118.1. No need to repeat, and the XS is not optional within its own definition.

(this exists in the original figure but since it's replaced it's worth doing right).

*SuggestedRemedy*

Delete "Optional" in the two labels.

Proposed Response Response Status Z

REJECT.

This comment was WITHDRAWN by the commenter.



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CI 155 SC 155 P 39 L 1 # 281

Dawe, Piers Nvidia

Comment Type TR Comment Status R

This PCS/PMA is way too complicated for just a "directive" specification, and much more complicated than the mainstream 256/257/RS-FEC. We need examples, as in Annex 91A, RS-FEC codeword examples, or Annex 76A, FEC Encoding example.  
If no-one is willing to provide them, we don't have a quorum to complete the project.

*SuggestedRemedy*

Create examples of e.g. FEC and other blocks before and after coding. Smallish ones can go in the document, all can be uploaded to the directory that IEEE provides for these things.  
Alternatively, cancel the project.

Response Response Status U

REJECT.

No data was provided for the editors to be able to implement this change. Contributions of such material would be welcomed.

Regarding the project cancel proposal see response to comment #278.

CI 155 SC 155 P 39 L 1 # 278

Dawe, Piers Nvidia

Comment Type TR Comment Status R

This PCS/PMA is over-complicated and messy. We would not engineer it like this now (see nicholl\_3dj\_optx\_01\_230413 for a small step in the right direction, and maniloff\_3dj\_01a\_2303 for an example of how to do coherent cleanly). OIF's so-called "400ZR" has had a draft since 2018, was issued in 2020 and revised last year. 800G coherent is coming in OIF and P802.3dj, which will take much of the market away. This P802.3cw project is on about its ninth draft and still the actual specifications are vague and incomplete, the previous draft was issued 8 months ago; not the usual two-monthly cadence we expect from an active project and an enthusiastic group. The moment for doing this spec in 802.3 has passed, it doesn't add significantly to 400ZR, and I observe there are not enough active participants in P802.3cw to justify it.

*SuggestedRemedy*

Cancel this project.  
Encourage those interested to feed their learnings into OIF's "400ZR" maintenance.  
Re-use relevant parts of the draft in P802.3dj when the time comes.

Response Response Status U

REJECT.

In the D2.0 review, 582 comments from 22 commentators were received which shows continued interest in the project.

In the D2.1 review, 290 comments from 13 commentators were received which shows continued interest in the project.

No consensus to cancel the project at this time.

CI 155 SC 155 P 39 L 1 # 2

Laubach, Mark Ciena

Comment Type E Comment Status A bucket

Other projects have indicated the start of new material.

*SuggestedRemedy*

Insert "Insert new clauses and corresponding annexes as follows:" as the first line of this page.

Response Response Status C

ACCEPT IN PRINCIPLE.

Add the following editing instruction before the 155 clause title: "Insert new Clause 155 and Clause 156 as follows:"

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CI 155 SC 155.1 P 39 L 5 # 255

Law, David Hewlett Packard Enterprise

Comment Type E Comment Status A

Suggest that the 'Overview' subclause is split into two, a 'Scope' (which IEEE 802.3 often provides for a PHY related Clause) with a reference to Table 116–2 and a 'Summary of operation'. In addition, suggest that the 'Relationship of 400GBASE-ZR PCS and PMA to other standards' subclause is placed between the 'Scope' and 'Summary of operation' so that the 'layer diagram' will be before the 'high level block diagram' since IEEE 802.3 PHY related Clauses generally start with the layer diagram.

*SuggestedRemedy*

Assuming that my other comment on 155.1 is accepted, suggest that subclause 155.1 and its subclauses are changed to read:

155.1 Overview

155.1.1 Scope

This clause specifies the physical coding sublayer (PCS) and physical medium attachment (PMA) sublayer for the physical layer implementation known as 400GBASE-ZR. The 400GBASE-ZR PCS and 400GBASE-ZR PMA are sublayers of the 400 Gb/s 400GBASE-ZR PHY listed in Table 116–2. The term 400GBASE-ZR is used when referring to the 400GBASE-ZR PHY, which uses the PCS and PMA defined in this clause.

155.1.2 Relationship of 400GBASE-ZR PCS and PMA to other standards

Figure 155–2 depicts the relationship of the 400GBASE-ZR PCS and 400GBASE-ZR PMA sublayers (shown shaded), the Ethernet MAC and reconciliation sublayers, and the higher layers. The sublayers within a 400GMII Extender Sublayer (400GXS) are specified in Clause 118.

155.1.3

The eight 400GMII data octets are encoded into 66-bit blocks using 64B/66B encoding, which supports the transmission of data and control characters. The 64B/66B code is transcoded to 256B/257B encoding to reduce the overhead before the addition of forward error correction (FEC). In the transmit direction the PCS and PMA together provide mapping, FEC encoding, and generation of dual polarization, 16-state quadrature amplitude modulation (DP-16QAM) symbols at the PMD service interface. In the receive direction the PCS and PMA together decode DP-16QAM symbols from the PMD service interface, perform FEC error detection, correction, demapping and decoding, and map received data into 400GMII data octets at the PCS service interface. A high-level block diagram of the PCS and the PMA is shown in Figure 155–1.

Response Response Status C

ACCEPT IN PRINCIPLE.

Replace 155.1 and its subclauses with: 155.1 Overview 155.1.1 Scope This

clause specifies the physical coding sublayer (PCS) and physical medium attachment (PMA) sublayer for the physical layer implementation known as 400GBASE-ZR. The 400GBASE-ZR PCS and 400GBASE-ZR PMA are sublayers of the 400 Gb/s 400GBASE-ZR PHY listed in Table 116–2. The term 400GBASE-ZR is used when referring to the 400GBASE-ZR PHY, which uses the PCS and PMA defined in this clause.

155.1.2 Relationship of 400GBASE-ZR PCS and PMA to other standards Figure 155–2 depicts the relationship of the 400GBASE-ZR PCS and 400GBASE-ZR PMA sublayers (shown shaded), the Ethernet MAC and reconciliation sublayers, and the higher layers. The sublayers within a 400GMII Extender Sublayer (400GXS) are specified in Clause 118.

155.1.3 Summary of operation

The eight 400GMII data octets are encoded into 66-bit blocks using 64B/66B encoding, which supports the transmission of data and control characters. The 64B/66B code is transcoded by the PCS to 256B/257B encoding to reduce the overhead before the addition of forward error correction (FEC). In the transmit direction the PCS and PMA together provide mapping, FEC encoding, and generation of dual polarization, 16-state quadrature amplitude modulation (DP-16QAM) symbols at the PMD service interface. In the receive direction the PCS and PMA together decode DP-16QAM symbols from the PMD service interface, perform FEC error detection, correction, demapping and decoding, and map received data into 400GMII data octets at the PCS service interface. A high-level block diagram of the PCS and the PMA is shown in Figure 155–1.

Also: Move Figure 155-2 to appear before Figure 155-1

With editorial license.

CI 155 SC 155.1 P 39 L 8 # 163

Huber, Thomas Nokia

Comment Type E Comment Status A

The second sentence is redundant with the first one. "This clause specifies the physical coding sublayer (PCS) and physical medium attachment (PMA) sublayer for the physical layer implementation known as 400GBASE-ZR. The term 400GBASE-ZR is used when referring to the 400GBASE-ZR PHY, which uses the PCS and PMA defined in this clause."

*SuggestedRemedy*

Delete the second sentence.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #255

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.1 P 39 L 8 # 30  
 Ran, Adee Cisco  
 Comment Type E Comment Status A bucket  
 "The term 400GBASE-ZR is used when referring to the 400GBASE-ZR PHY, which uses"  
 Too wordy.  
 SuggestedRemedy  
 Change to "The 400GBASE-ZR PHY uses".  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.1 P 39 L 9 # 164  
 Huber, Thomas Nokia  
 Comment Type E Comment Status A  
 In the third sentence it would be good to clarify that the 64B/66B code is used by this PCS.  
 SuggestedRemedy  
 Change "The 64B/66B code supports transmission of data and control characters." to "The PCS uses a 64B/66B code to support transmission of data and control characters."  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #255

CI 155 SC 155.1 P 39 L 14 # 165  
 Huber, Thomas Nokia  
 Comment Type E Comment Status A  
 The penultimate sentence of this paragraph is not quite right. The service interface to the PCS is the 400GMII (there is no 'PCS service interface' in figure 155-1), and the process of encoding/decoding 64B/66B codewords is part of the PCS, so the PCS service interface cannot be 66B codewords.  
 SuggestedRemedy  
 Change "In the receive direction the PCS and PMA together decode DP-16QAM symbols from the PMD service interface, perform FEC error detection and correction, and map received data into 64B/66B codewords at the PCS service interface."  
 to  
 "In the receive direction, the PCS and PMA together provide decoding of DP-16QAM symbols from the PMD service interface, FEC error detection and correction, and demapping at the 400GMII."  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comments #255.

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.1 P 39 L 15 # 256

Law, David Hewlett Packard Enterprise

Comment Type T Comment Status A

PCS subclause 155.1 'Overview' says 'In the receive direction the PCS and PMA together ... map received data into 64B/66B codewords at the PCS service interface.' (page 39, line 15). Since the PCS service interface is the 400GMII (see subclause 155.2.1), I don't think this is correct as the 400GMII doesn't use 64B/66B encoding. Instead, the last stage in the receive direction is a 64B/66B decoder (see page 43, line 43). I believe that this decoding occurs in the block marked 'Decode and error marking' in Figure 155-3. Similarly, the subclause also says 'The 64B/66B code supports transmission of data and control characters.' (page 39, line 9) without any reference to where the 64B/66B encoding occurs. I believe that this encoding occurs in the block marked 'Encode' in Figure 155-3 (see page 43, line 15).

SuggestedRemedy

Suggest that:

[1] The text (page 39, line 9) 'The 64B/66B code supports transmission of data and control characters.' is changed to read 'The eight 400GMII data octets are encoded into 66-bit blocks using 64B/66B encoding, which supports transmission of data and control characters.'

[2] The text (page 39, line 15) '... error detection and correction, and map received data into 64B/66B codewords at the PCS service interface.' is changed to read '... error detection, correction, demapping and decoding, and map received data into 400GMII data octets at the PCS service interface.'

[3] The text (page 40, line 6) '400GMII' is changed to read 'PCS service interface (400GMII)'.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #255 and in the current Figure 155-1 change "400GMII" to "PCS service interface (400GMII)"

CI 155 SC 155.1.1 P 40 L 41 # 157

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

Comment Type ER Comment Status A

After noting 155-2 and various sublayers, a sentence notes "The sublayers within a 400GMII Extender Sublayer (400GXS) are specified in Clause 118." which is not shown in Fig 155-2. Furthermore, this sentence should be pointing to the 400GMII Extender, not the Extender sublayer, which is part of the 400GMII Extender.

SuggestedRemedy

Two choices

1. Delete sentence.
2. Given the importance of the 400GMII Extender for the 400GBASE-ZR PHY, modify Fig 155-2 to include the optional 400GMII Extender, and change the sentence to read, "The sublayers within a 400GMII Extender are specified in Clause 118."

Response Response Status C

ACCEPT IN PRINCIPLE.

The extender figure is in Annex 155A (Figure 155A-1). Change: "The sublayers within a 400GMII Extender Sublayer (400GXS) are specified in Clause 118." to:

"The 400GBASE-ZR Physical layer may optionally include a 400GMII Extender (see Figure 155A-1). The sublayers within a 400GMII Extender are specified in Clause 118."

CI 155 SC 155.1.1 P 40 L 46 # 31

Ran, Adeo Cisco

Comment Type ER Comment Status A

"The sublayers within a 400GMII Extender Sublayer (400GXS) are specified in Clause 118."

400GXS is not shown in Figure 155-2, so this sentence seems out of place. Context should be provided.

SuggestedRemedy

Change to "The 400GBASE-ZR Physical layer may optionally include a 400GMII Extender sublayer (400GXS), specified in Clause 118."

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #157.

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.1.1 P 40 L 47 # 233  
 Brown, Matt Huawei  
 Comment Type E Comment Status A  
 Since this paragraph explicitly calls out the extender it would be sensible to include a the extender in Figure 155-2 and maybe create a new figure after Figure 155-1 with the extender, as well.  
 SuggestedRemedy  
 Create a new figure like Figure 155-1 with a 400GMII extender.  
 Add a stack in figure 155-2 with a 400GMII extender.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Modify Figure 155-1 to include the extender sublayer and encircle with a dashed line box and list as optional. With editorial license.

CI 155 SC 155.1.1 P 40 L 47 # 232  
 Brown, Matt Huawei  
 Comment Type E Comment Status A  
 400GXS is a sublayer in the 400GMII extender  
 SuggestedRemedy  
 Change "sublayers within a 400GMII Extender Sublayer (400GXS) are"  
 To "sublayers within a 400GMII Extender are"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #157.

CI 155 SC 155.1.1 P 41 L 14 # 234  
 Brown, Matt Huawei  
 Comment Type E Comment Status R  
 Given that this PCS/PMA only works with the 400GBASE-ZR PMD, the PMD in the diagram should be "400GBASE-ZR PMD", like the PMA and PCS sublayers.  
 SuggestedRemedy  
 Change "PMD" to "400GBASE-ZR PMD".  
 Response Response Status C  
 REJECT.  
 No consensus to make a change at this time.

CI 155 SC 155.2 P 41 L 41 # 158  
 D'Ambrosia, John Futurewei, U.S. Subsidiary of Huawei  
 Comment Type E Comment Status A bucket  
 Suggest rewording the following sentence due to its briefness - The PCS service interface is the Media Independent Interface (400GMII), which is defined in Clause 117.  
 SuggestedRemedy  
 The upper interface of the PCS may connect to the Reconciliation Sublayer through the 400GMII, which is defined in Clause 117.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change "The PCS service interface is the Media Independent Interface (400GMII), which is defined in Clause 117" to "The service interface of the PCS connects to Reconciliation Sublayer. The PCS service interface is the 400 Gb/s Media Independent Interface (400GMII) (see Clause 117)."

CI 155 SC 155.2.1 P 41 L 34 # 235  
 Brown, Matt Huawei  
 Comment Type E Comment Status A bucket  
 It is specifically the 400 Gb/s MII.  
 SuggestedRemedy  
 Change the sentence to "The PCS service interface is the 400 Gb/s Media Independent Interface (400GMII) (see Clause 117)."  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #158.

CI 155 SC 155.2.2 P 42 L 12 # 166  
 Huber, Thomas Nokia  
 Comment Type E Comment Status A bucket  
 In Figure 155-3, the block labeled "Encode" should probably say "64B/66B Encode"  
 SuggestedRemedy  
 Add "64B/66B" to the label.  
 Response Response Status C  
 ACCEPT.

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

Cl 155 SC 155.2.2 P 42 L 15 # 167  
 Huber, Thomas Nokia  
 Comment Type E Comment Status A  
 The dashed lines indicating higher-level processes are sort of helpful, but at the same time they aren't entirely accurate - e.g., scrambling would be needed whether or not there is FEC encoding.  
 SuggestedRemedy  
 Since other PCS diagrams (in particular those associated with the 100GBASE-ZR PMD) don't have these higher level groupings of processes, delete them from this figure as well.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 At the end of new subclause 155.1.3 add a sentence clarifying that the dashed lines in figure 155-3 relate to the functions shown in current Figure 155-1.  
 With editorial license.

Cl 155 SC 155.2.2 P 43 L 5 # 32  
 Ran, Adeo Cisco  
 Comment Type E Comment Status A bucket  
 What does "n" stand for and what values does it take?  
 SuggestedRemedy  
 Either specify what it is, or change to "transmit control signals (TXC) and receive control signals (RXC)".  
 A reference to 117.3 or to 81.3 may be appropriate here.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change "transmit control signals (TXC<n> = 1) and receive control signals (RXC<n> = 1)" to "transmit control signals (TXC) and receive control signals (RXC)" and add a reference to 81.3.

Cl 155 SC 155.2.2 P 42 L 23 # 236  
 Brown, Matt Huawei  
 Comment Type E Comment Status A bucket  
 Use style consistent in both transmit and receive direction.  
 SuggestedRemedy  
 Change "OH & AM insertion" to "OH/AM insertion".  
 Response Response Status C  
 ACCEPT.

Cl 155 SC 155.2.2 P 43 L 6 # 168  
 Huber, Thomas Nokia  
 Comment Type E Comment Status A bucket  
 The sentence describing communication from PCS to PMA is a bit awkward, and doesn't really need to discuss what the PMA does since this subcluse is about the PCS.  
 SuggestedRemedy  
 Change "When communicating with the PMA in the transmit direction, the 400GBASE-ZR PCS provides 128-bit soft decision forward error correction (SD-FEC) codewords from the 400GBASE-ZR PCS to the PMA, which the PMA encodes into two streams of 16QAM symbols."  
 to  
 "When communicating with the PMA in the transmit direction, the 400GBASE-ZR PCS uses a single lane carrying 128-bit soft decision forward error correction (SD-FEC) codewords."  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #33.

Cl 155 SC 155.2.2 P 43 L 1 # 159  
 D'Ambrosia, John Futurewei, U.S. Subsidiary of Huawei  
 Comment Type ER Comment Status A bucket  
 There is inconsistent usage of the terms 400GBASE-ZR PCS and PCS, as well as 400GBASE-ZR PMA and PMA throughout this subclause  
 SuggestedRemedy  
 Review all of Clause 155 and implement a consistent approach to use of 400GBASE-ZR PCS / PCS and 400GBASE-ZR PMA / PMA.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change "PCS" to "400GBASE-ZR PCS" and change "PMA" to "400GBASE-ZR PMA" throughout clause 155. With editorial license.

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.2.2 P 43 L 7 # 33

Ran, Adee Cisco  
 Comment Type E Comment Status A bucket

"the 400GBASE-ZR PCS provides 128-bit soft decision forward error correction (SD-FEC) codewords"

"Soft decision" is a feature of the FEC decoder. Calling this code SD-FEC is a bad terminology; it is a Hamming code (as stated on Line 21) that may (and ideally should) be decoded with soft input.

Also, there are other soft-decision decoders in 802.3, so using this term just for this specific code is inappropriate.

The code should be named appropriately where it is initially mentioned.

*SuggestedRemedy*

Preferably replace the label "SD-FEC" to a more appropriate one such as "Extended Hamming code FEC" or "EH-FEC" across the document.

If this isn't done, Change "128-bit soft decision forward error correction (SD-FEC) codewords" to "codewords of a systematic (128, 119) double-extended Hamming code (denoted "SD-FEC" within this clause)".

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Keep "SD-FEC" and change "When communicating with the PMA in the transmit direction, the 400GBASE-ZR PCS provides 128-bit soft decision forward error correction (SD-FEC) codewords from the 400GBASE-ZR PCS to the PMA, which the PMA encodes into two streams of 16QAM symbols." to "When communicating with the PMA in the transmit direction, the 400GBASE-ZR PCS provides codewords (see 155.3.2.1) of a systematic (128, 119) double-extended Hamming code (denoted "SD-FEC" within this clause) from the 400GBASE-ZR PCS to the 400GBASE-ZR PMA".

CI 155 SC 155.2.2 P 43 L 7 # 237

Brown, Matt Huawei  
 Comment Type E Comment Status A bucket

Redundant words. It is quite clear that if the PCS provides it, it is from the PCS.

*SuggestedRemedy*

Change "the 400GBASE-ZR PCS provides 128-bit soft decision forward error correction (SD-FEC) codewords from the 400GBASE-ZR PCS to the PMA" To "the 400GBASE-ZR PCS provides 128-bit soft decision forward error correction (SD-FEC) codewords to the PMA"

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Resolve using the response to comment #33

CI 155 SC 155.2.2 P 43 L 9 # 257

Law, David Hewlett Packard Enterprise  
 Comment Type E Comment Status A

Suggest that '... receives SD-FEC codewords in 128 × m bits.' should be changed to read '... receives 128 × m bit SD-FEC codewords (see 155.3.2.2.1) from the PMA.'

*SuggestedRemedy*

See comment.

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Resolve using the response to comment #34

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.2.2 P 43 L 9 # 34

Ran, Adeo Cisco  
 Comment Type TR Comment Status A

What does "m" stand for and what values does it take?

It seems that this is the ADC resolution; if it needs to be defined, please define it.

However, ADC resolution is implementation dependent, so it may be better to define the service interface in terms of samples rather than bits.

*SuggestedRemedy*

Either define m (before its first usage) or change "in 128 x m bits" to "as 128 sampled values".

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "the 400GBASE-ZR PCS receives SD-FEC codewords in 128 x m bits." to "the 400GBASE-ZR PCS receives 128 x m bit SD-FEC codewords (see 155.3.2.2.1) from the 400GBASE-ZR PMA, where m is the implementation-dependent sampling resolution of each component of the DP-16QAM symbol in bits."

CI 155 SC 155.2.2 P 43 L 9 # 169

Huber, Thomas Nokia  
 Comment Type T Comment Status A

128xm bits implies a multiple of 128 bits of data, which is not really what is happening here. It would be more clear to say the PCS receives m-bit digitizations of 16 DP16QAM symbols, which correspond to 128-bit SD-FEC codewords that the SD-FEC will process.

*SuggestedRemedy*

Change "... the 400GBASE-ZR PCS receives SD-FEC codeswords in 128 x m bits" to "... the 400GBASE-ZR PCS receives m-bit digitizations of sixteen DP-16QAM symbols which will be decoded by the SD-FEC. The value of m is implementation-dependent."

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #34.

CI 155 SC 155.2.2 P 43 L 13 # 238

Brown, Matt Huawei  
 Comment Type E Comment Status A bucket

The word "can" in this context is deprecated per style guide.

*SuggestedRemedy*

Change "The PCS transmit function can operate in normal mode or test-pattern mode." To "The PCS transmit function operates in normal mode or test-pattern mode."

Response Response Status C

ACCEPT.

CI 155 SC 155.2.2 P 43 L 17 # 7

Marris, Arthur Cadence Design Systems  
 Comment Type TR Comment Status A bucket

This is the first place "400GBASE-ZR frame" and "GMP" are mentioned. It would be helpful to include a reference to where they are defined

*SuggestedRemedy*

Change "The transcoded blocks are then mapped into a 400GBASE-ZR frame using generic mapping procedure (GMP)," to "The transcoded blocks are then mapped into a 400GBASE-ZR frame using generic mapping procedure (GMP) (see 155.2.5.3),"

Response Response Status C

ACCEPT.



IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.2.2 P 43 L 17 # 258

Law, David Hewlett Packard Enterprise

Comment Type ER Comment Status A bucket

The terms '400GBASE-ZR frame' (e.g., page 43, line 17) and 'frame' (e.g., page 43, line 19) seem to be used interchangeably in subclause 155.2 'Physical Coding Sublayer (PCS)' and its subclauses. In addition, the term 'frame' is used in subclause 155.2 'Physical Coding Sublayer (PCS)' in reference to figure 155-4 '400GBASE-ZR frame structure' yet in subclause 155.3 'Physical Medium Attachment (PMA) sublayer, type 400GBASE-ZR' it is used in reference to the figure 155-11 'Multi-frame and frame formats'.

SuggestedRemedy

Since Figure 3-1 'Packet format' defines 'frame' as the Destination Address through the Frame Check Sequence, and this is what 'frame' generally refers to elsewhere in IEEE Std 802.3, suggest that:

- [1] The terms 'frame' and '400GBASE-ZR frame', when used in reference to figure 155-4, should be replaced with '400GBASE-ZR PCS frame'.
- [2] The term 'frame', when used in reference to figure 155-11, should be replaced with '400GBASE-ZR PMA frame' in subclause 155.2.
- [3] The term 'multi-frame' should be replaced with '400GBASE-ZR PMA multi-frame' in subclause 155.2.

Response Response Status C

ACCEPT.

CI 155 SC 155.2.2 P 43 L 18 # 35

Ran, Adeo Cisco

Comment Type TR Comment Status R

"with the ±100 ppm 257-bit blocks stream being mapped into a ±20 ppm timing domain"

This phrase makes no sense unless the reader already knows what it is about (in which case, it is not required).

This is an introductory subclause so this level of detail seems unnecessary.

SuggestedRemedy

Delete this phrase or rephrase such that it makes sense to an uninformed reader.

Response Response Status C

REJECT.

Location of the the time domain change of the signal is a basic function that the reader should be aware at this point in the document.

CI 155 SC 155.2.2 P 43 L 18 # 170

Huber, Thomas Nokia

Comment Type E Comment Status A bucket

The phrase '257-bit blocks stream' is awkward; 'stream of 257-bit blocks' would be better.

SuggestedRemedy

Change "...with the ±100 ppm 257-bit blocks stream being mapped..." to "with the ±100 ppm stream of 257-bit blocks being mapped..."

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #259

CI 155 SC 155.2.2 P 43 L 18 # 259

Law, David Hewlett Packard Enterprise

Comment Type T Comment Status A bucket

Suggest that a ± ppm value should be applied to a rate.

SuggestedRemedy

Suggest that the text '... with the ±100 ppm 257-bit blocks stream being mapped into a ±20 ppm timing domain.' should be changed to read '... with the 257-bit block stream in the 401.542892 Gb/s ± 100 ppm timing domain being mapped into a 402.489753 Gb/s ± 20 ppm timing domain.'

Response Response Status C

ACCEPT.

CI 155 SC 155.2.2 P 43 L 21 # 243

Maniloff, Eric Ciena

Comment Type E Comment Status A bucket

The text currently reads "an outer staircase FEC (SC-FEC) code and an inner Hamming code SD-FEC", SC-FEC and SD\_FEC should both be in parentheses.

SuggestedRemedy

Replace "an outer staircase FEC (SC-FEC) code and an inner Hamming code SD-FEC" with "an outer staircase FEC (SC-FEC) code and an inner Hamming (SD-FEC) code."

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the responses to comments #36.

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Cl 155 SC 155.2.2 P 43 L 21 # 36

Ran, Adeo Cisco  
 Comment Type E Comment Status A bucket

SD-FEC should be in parentheses to match SC-FEC.

(I understand that the parentheses in SC-FEC are due to the acronym - but it would make the text more readable).

*SuggestedRemedy*

Per comment.

Response Response Status C

ACCEPT IN PRINCIPLE.

This is the first use of SC-FEC abbreviation which is why it is in ( ). The SD-FEC abbreviation was previously used in line 7 so there is no need to repeat it here. Change "and an inner Hamming code SD-FEC" to "and a SD-FEC"

Cl 155 SC 155.2.2 P 43 L 22 # 37

Ran, Adeo Cisco  
 Comment Type ER Comment Status A bucket

"The 128-symbol SD-FEC codeword blocks are sent to the PMA"

Two paragraphs above this was referred to as "128-bit soft decision forward error correction (SD-FEC) codewords" - very different language referring to the same thing.

I assume the symbols are bits and that codewords and codeword blocks are the same.

*SuggestedRemedy*

Change to consistent language, preferably bits and codewords.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the responses to comments #6 and #171.

Cl 155 SC 155.2.2 P 43 L 22 # 6

Marris, Arthur Cadence Design Systems  
 Comment Type TR Comment Status A bucket

Should this be "128 bit"?

This is a resubmission of a comment against draft 2.0 that was not considered during draft 2.0 comment resolution (hence TR classification).

*SuggestedRemedy*

Consider changing "128-symbol" to "128 bit symbol". Similar issue with "119-symbol" on line 37.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "128-symbol" to "128 bit" twice, and "119-symbol" to "119-bit".

Cl 155 SC 155.2.2 P 43 L 22 # 171

Huber, Thomas Nokia  
 Comment Type T Comment Status A bucket

The text here switches from "128 bit SD-FEC codewords" to "128 symbol SD-FEC codewords". Better to keep consistent.

*SuggestedRemedy*

Change "The 128-symbol SD-FEC codeword blocks are sent to the PMA..." to "The 128-bit SD-FEC codewords are sent to the PMA..."

Response Response Status C

ACCEPT.

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.2.2 P 43 L 25 # 206

Slavick, Jeff Broadcom

Comment Type TR Comment Status A

The paragraph talking about test pattern mode sorta implies the output of the PCS is just scrambled idle, no FEC encode or GMP mapping.

SuggestedRemedy

Change the paragraph to read "When the transmit function is in test-pattern mode it operates as if the 400GMII interface is a continuous stream of idle control blocks(see 155.2.5.13). "

Response Response Status C

ACCEPT IN PRINCIPLE.

In 155.2.1 change

"When the transmit function is in test-pattern mode, a test pattern is packed into the transmit data-units that are sent to the PMA via the PMA\_IS\_UNITDATA.request primitive. The transmitted test pattern shall be the scrambled idle pattern (see 155.2.5.13)."

to

"When the transmit function is in test-pattern mode, the PCS output is generated as specified in 155.2.5.13."

In 155.2.5.13

Change "The scrambled idle test pattern is the output of the PCS when the input to the PCS at the 400GMII is a control block with all idle characters."

to

"The scrambled idle test pattern is the output of the PCS when the input to the PCS at the 400GMII is composed only of idle control characters."

This resolution overtakes the resolution to comment #188.

With editorial license.

CI 155 SC 155.2.2 P 43 L 25 # 38

Ran, Adeo Cisco

Comment Type T Comment Status A

The text describing the behavior in test-pattern mode is significantly different from the description of normal mode. This leads to an impression that all the transmit functions are replaced by a "simple" test pattern, which is not true, as one can understand when reading 155.2.5.13.

To avoid misleading the reader the text should say something like "the PCS functionality is similar to that of normal mode, except that idle characters replace the 400GMII data (see 155.2.5.13).

SuggestedRemedy

Per comment.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #206.

CI 155 SC 155.2.2 P 43 L 32 # 172

Huber, Thomas Nokia

Comment Type T Comment Status A bucket

The PCS is receiving m-bit digitized DP-16QAM symbols from the PMA, and aligning to 128-bit SD-FEC codewords.

SuggestedRemedy

Change "...the PCS synchronization process accepts the stream of symbols via the PMA\_IS\_UNITDATA.indication primitive and forms a stream of 128-symbol SD-FEC codeword blocks"

to

"...the PCS synchronization process accepts a stream of m-bit digitized DP-16QAM symbols via the PMA\_IS\_UNITDATA.indication primitive and forms a stream of 128-bit SD-FEC codewords."

Response Response Status C

ACCEPT.

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.2.2 P 43 L 35 # 39

Ran, Adeo Cisco  
 Comment Type TR Comment Status A bucket

"When the receive function is in normal mode, the SD-FEC codeword blocks are provided to the Hamming (128,119) SD-FEC decoder. Next the PCS de-interleaves the corrected SD-FEC codewords using a convolutional de-interleaver"

Is there any other mode for the receive function?

Are "SD-FEC codeword blocks" different from "SD-FEC codewords"?

*SuggestedRemedy*

Change to "In the receive direction, the SD-FEC decoder generates error-corrected codewords from the incoming data stream on the PMA service interface, which are then are passed through a convolutional de-interleaver".

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "When the receive function is in normal mode, the SD-FEC codeword blocks are provided to the Hamming (128,119) SD-FEC decoder. Next the PCS de-interleaves the corrected SD-FEC codewords using a convolutional de-interleaver and passes the resulting 119-symbol codewords to the descrambler." to "In the receive direction, the SD-FEC decoder generates error-corrected codewords from the incoming data stream on the PMA service interface, which are then passed through a convolutional de-interleaver. The convolutional de-interleaver passes the resulting 119-symbol codewords to the descrambler."

CI 155 SC 155.2.2 P 43 L 35 # 207

Slavick, Jeff Broadcom  
 Comment Type TR Comment Status A

Where is the "non-normal" mode description?

*SuggestedRemedy*

Replace "When the receive function is in normal mode," with "The receive function operates as follows,"

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "When the receive function is in normal mode,"

to "The receive function operates as follows,"

With editorial license.

CI 155 SC 155.2.2 P 43 L 43 # 40

Ran, Adeo Cisco  
 Comment Type T Comment Status A bucket

"The reverse transcoder converts 257-bit blocks to 64B/66B"

64B/66B is the encoding scheme; the blocks are 66-bit blocks (as in the first sentence of 155.2.3).

The next sentence is indeed about the encoding scheme, so is fine.

*SuggestedRemedy*

Change "64/66B" to "66-bit"

Response Response Status C

ACCEPT.

CI 155 SC 155.2.3 P 43 L 46 # 41

Ran, Adeo Cisco  
 Comment Type ER Comment Status A bucket

Subclauses 155.2.3 through 155.2.6 describe functions within the PCS. They should be placed below 155.2.2 in the hierarchy.

Alternatively, 155.2.2 can be renamed "PCS overview", because that's what it is.

*SuggestedRemedy*

Preferably change the hierarchy per the comment.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change the name of 155.2.2 to: "PCS overview"

CI 155 SC 155.2.3 P 43 L 49 # 42

Ran, Adeo Cisco  
 Comment Type E Comment Status A bucket

"generate, manipulate and interpret blocks" is a single list.

*SuggestedRemedy*

Change to "generate, manipulate, and interpret blocks"

Response Response Status C

ACCEPT.

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.2.4 P 44 L 1 # 43

Ran, Adee

Cisco

Comment Type E Comment Status A bucket

The title of 155.2.4 is "64B/66B code" but the mapping to 66-bit blocks is already described in 155.2.3. The final sentence in 155.2.4 points to 119.2.3 which has already been mentioned in 119.2.3.

This subclause describes the additional 257-bit blocks and GMP, so its current title "64B/66B code" is inappropriate. The title of the previous subclause 155.2.3, "Use of blocks", fits better.

Also "codestream" is not defined.

*SuggestedRemedy*

Move the second sentence, "The 64B/66B codestream is then transcoded into a 256B/257B stream, mapped to a 400GBASE-ZR frame using GMP, and FEC bits added in this PCS before transmission", into 155.2.3, changing "codestream" to "block stream".

Delete the remainder of this subclause.

Response Response Status C

ACCEPT IN PRINCIPLE.

Implement proposed change with editorial license

CI 155 SC 155.2.4 P 44 L 5 # 101

Bruckman, Leon

Huawei

Comment Type E Comment Status A bucket

Reference to 119.2.3 is already provided in this context in the previous sub clause (155.2.3)

*SuggestedRemedy*

Delete: "Details of the 64B/66B code are provided in 119.2.3."

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #43.

CI 155 SC 155.2.5.1 P 44 L 16 # 279

Dawe, Piers

Nvidia

Comment Type T Comment Status R

This says "The rate matching described in 119.2.4.1 is not required for the 400GBASE-ZR PCS because the mapping of the transcoded block stream into the 400GBASE-ZR frame structure performs clock compensation between the two clock domains". It seems that the GMP method with 1028-bit GMP words produces significant "packet jitter" and the traditional Ethernet rate matching in 119.2.4.1 would be better.

If rate matching to the 20 ppm line clock is done here, the payload will not move in the 400GBASE-ZR frame. A receiver that processes GMP according to 155.2.6.8 will work correctly, although it has less to do.

However, some may prefer to avoid idle insertion/deletion at the expense of packet jitter.

*SuggestedRemedy*

Point out that rate matching can be done here, or in GMP, or both, with any relevant caveats.

Response Response Status C

REJECT.

Definition does not preclude an implementor from using idle compensation to "fix" the GMP payload.

CI 155 SC 155.2.5.2 P 44 L 22 # 208

Slavick, Jeff

Broadcom

Comment Type TR Comment Status A

Is there any difference from 119.2.4.2, doesn't appear so. Just state it's the same.

*SuggestedRemedy*

Make the text of 155.2.5.2 be "The 64B/66B to 256B transcoder is identical to that specified in 119.2.4.2."

Response Response Status C

ACCEPT IN PRINCIPLE.

The transcoder shall construct a 257-bit block from a group of four 66-bit blocks as specified in 119.2.4.2.

With editorial license.

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.2.5.3 P 44 L 29 # 44

Ran, Adees Cisco  
 Comment Type ER Comment Status A bucket

"ITU-T G.709 (06/2020)"  
 There is an "ITU-T Recommendation G.709" entry in the normative references (1.3), which is undated. Is there a reason to include the date here?

Also, please use the same name as in 1.3.

*SuggestedRemedy*

Change to "ITU-T Recommendation G.709", preferably without the date, unless there is a reason to lock a specific version.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change: "ITU-T G.709 (06/2020) Annex D" To: "ITU-T Recommendation G.709"

CI 155 SC 155.2.5.3 P 44 L 33 # 45

Ran, Adees Cisco  
 Comment Type E Comment Status A

In "10 220 257-bit blocks" the space digit grouping makes the number ambiguous. It could be read as 10 million and some, which is likely not the intent.

Also on P45 L10 (same numbers) and in several other places in the draft with different numbers.

In cases such as these, of numbers adjacent to other numbers, it is preferable to avoid ambiguity and not use a thousand separator at all. Consider that across the draft.

*SuggestedRemedy*

Change to "10220 257-bit blocks" in both cases.

Consider removing the space thousand separator in other places where it causes ambiguity.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change

"The 119-bit outputs of the convolutional interleaver shall be encoded by a systematic (128, 119) doubleextended Hamming code. The generic operation of the Hamming SD-FEC scheme is specified in ITU-T G.709.3 Annex D. It adds nine parity bits to each of the 10 976 119-bit blocks as output by the convolutional interleaving process and results in 10 796 128-bit SD-FEC codewords."

to

"Each 119-bit output of the convolutional interleaver shall be encoded by a systematic (128, 119) double-extended Hamming code, adding nine parity bits to produce a 128-bit SD-FEC codeword. The generic operation of the Hamming encoder is specified in ITU-T G.709.3 Annex D."

With editorial license.

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CI 155 SC 155.2.5.3 P 44 L 38 # 46

Ran, Adeel Cisco  
 Comment Type E Comment Status A bucket

The graphical objects in Figure 155-4 are not aligned to each other.

I'd suggest entering object sizes and positions manually rather than trying to align them by hand. The top row should be divided such that the sum of the widths is equal to widths of the other rows.

Also in Figure 155-5.

*SuggestedRemedy*

Per comment.

Response Response Status C

ACCEPT IN PRINCIPLE.

Update Figures 155-4 and 155-5 to improve alignment of the objects in the figures. With editorial license.

CI 155 SC 155.2.5.3 P 44 L 38 # 173

Huber, Thomas Nokia  
 Comment Type T Comment Status R

Need to be clear on how the columns are numbered - the material that follows the figure uses both 0-based and 1-based numbering.

*SuggestedRemedy*

Insert bit numbers at the top of the figure (below the braces that show the count of bits in the fields). Table 155-1 is assuming zero-based fields (first GMP word starting with bit 5140). In the numbered list of field descriptions, clarify the bit positions (e.g, if 0-based numbering is chosen, change "The first 1920 bits" to "Bits 0-1919", etc.)

Response Response Status C

REJECT.

Figure is showing the fields lengths, not the numbering

CI 155 SC 155.2.5.3 P 44 L 51 # 47

Ran, Adeel Cisco  
 Comment Type ER Comment Status A bucket

"The first 1920 bits of the frame contain alignment markers (AM)"

It is not a single alignment marker, so the abbreviation AM isn't appropriate. And these are not the per-lane alignment markers defined in 119.2.4.4.2 because there are no lanes in this PCS.

Using terminology from 400GBASE-R creates unnecessary confusion. It would be simpler to say that the first 1920 bits are identical to am\_mapped as defined in 119.2.4.4.2.

If the goal is to keep the name identical to other documents, then you could call it the AM field in the frame. This way AM becomes a notation rather than an abbreviation, and it can be removed from 1.5.

Also, the definitions of AM and PAD are repeated in 155.2.5.4.1 and 155.2.5.4.2, in different words. It would be easier for readers to have it only once.

*SuggestedRemedy*

Change list item 1 to:  
 "The first 1920 bits of the frame are the AM field, defined in 155.2.5.4.1".  
 Change list item 2 to  
 "The next 1920 bits of the frame are the pad field, defined in 155.2.5.4.2".

Response Response Status C

ACCEPT.

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CI 155 SC 155.2.5.3 P 45 L 8 # 174

Huber, Thomas

Nokia

Comment Type T Comment Status A bucket

Item 5 is written awkwardly. The intent is to define the payload area of the 400GBASE-ZR frame. The details of how it is filled are covered in the next paragraph and other subsequent text. "Bit 5141" implies that the first bit is numbered 1 rather than 0, which is not in line with what is in Table 155-1 below.

*SuggestedRemedy*

Replace the text of item 5) with: The remaining bits, from bit 5140 of the first row to end of the frame, are the payload area that consists of 10,220 257-bit blocks.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change:

"The 400GBASE-ZR PCS payload of the serialized stream of 257-bit blocks is mapped into the payload area of 400GBASE-ZR frames from bit 5141 to the end of the frame. The payload size of each 400GBASE-ZR frame is 10 220 x 257 bits."

to:

"The remaining bits, from bit 5140 of the first row to the end of the frame, are the payload area that consists of 10 220 blocks of 257 bits."

CI 155 SC 155.2.5.3 P 45 L 8 # 48

Ran, Adee

Cisco

Comment Type ER Comment Status A bucket

Item 5 has "The 400GBASE-ZR PCS payload of the serialized stream of 257-bit blocks is mapped"

This is quite confusing. It would help readers if existing terminology is used in this sentence.

In the following paragraph, "the logically serialized 257-bits block encoded stream produced according to 155.2.5.2" seems to refer to tx\_xcoded<256:0>.

*SuggestedRemedy*

In item 5, change "The 400GBASE-ZR PCS payload of the serialized stream of 257-bit blocks" to "The stream of tx\_xcoded<256:0> blocks".

In the paragraph following the list, change "(the logically serialized 257-bits block encoded stream produced according to 155.2.5.2)" to "(from the stream of tx\_xcoded<256:0> blocks)".

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using response to comment #174

CI 155 SC 155.2.5.3 P 45 L 12 # 49

Ran, Adee

Cisco

Comment Type E Comment Status A bucket

"4 x 257"

x is used as a multiplication sign in several other places.

*SuggestedRemedy*

Change x to a proper multiplication sign when that is the intent, across the draft.

Response Response Status C

ACCEPT IN PRINCIPLE.

Implement suggested remedy with editorial license



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CI 155 SC 155.2.5.3 P 45 L 13 # 50

Ran, Adees Cisco  
 Comment Type E Comment Status A bucket

"is either filled with data bits ... or stuff bits"  
 The "either" clause should be exchangeable with the "or" clause.

SuggestedRemedy  
 Change "is either filled with" to "is filled with either"

Response Response Status C  
 ACCEPT.

CI 155 SC 155.2.5.3 P 45 L 16 # 51

Ran, Adees Cisco  
 Comment Type ER Comment Status A bucket

"The 257-bit encoded data is a logically serial stream"

"logically serial stream" does not make sense, and this rate (as a serial stream) is not feasible in the foreseeable future.

Which 257-bit encoded data is that? is it the transcoder output, the payload area of a four-frame multi-frame mentioned in the previous paragraph, or the full frame? I assume it's the transcoder output, because the alternatives have higher data rate.

SuggestedRemedy  
 Change "The 257-bit encoded data is a logically serial stream at a rate of" to "The nominal data rate required for the transcoder output is".

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Change: "The 257-bit encoded data is a logically serial stream at a rate of" to: "The nominal data rate required for the 64B/66B to 256B/257B transcoder output is"

CI 155 SC 155.2.5.3 P 45 L 16 # 52

Ran, Adees Cisco  
 Comment Type TR Comment Status A

"at a rate of 401.542892 Gb/s ± 100 ppm."

Even assuming the 257B/256B transcoder output (which has the lowest data rate), the nominal rate is  $400 \times 257 / 256 = 401.5625$  Gb/s, higher than the number given.

Also, where does the 100 ppm come from? nothing in the PCS requires this range, and neither of the 400GMII, 400GBASE-R PCS, and 400GBASE-R PMA has a frequency range specification. The 100 ppm is only specified for the 400GAUI-n which could be part of the Extender, but it's not part of the PHY and doesn't necessarily exist. The 400GMII is only "specified to support 400 Gb/s operation" in 117.1.3 - without a range.

SuggestedRemedy  
 Change "401.542892 Gb/s ± 100 ppm" to "401.5625 Gb/s. The actual rate results from the 400GMII data rate, which may be within ±100 ppm of the nominal rate if a 400GMII Extender is used".

("nominal" should be inserted by the previous comment).

Response Response Status C  
 ACCEPT IN PRINCIPLE.

The CRG reviewed  
[https://www.ieee802.org/3/cw/public/23\\_06/bruckman\\_3cw\\_01a\\_2306.pdf](https://www.ieee802.org/3/cw/public/23_06/bruckman_3cw_01a_2306.pdf).  
 Implement slide 8 of bruckman\_3cw\_01a\_2306.pdf with editorial license.

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Cl 155 SC 155.2.5.3 P 45 L 17 # 239

Brown, Matt Huawei  
 Comment Type E Comment Status A bucket

The sentence says "The clocks for the PCS and the 400GBASE-ZR frame are independent." Does this mean it is not permitted for the PCS clock and frame clock to be derived from the same source? A 20 ppm reference clock might be used for both.

*SuggestedRemedy*

Perhaps is should state:  
 "The clocks for the PCS and the 400GBASE-ZR frame may be independent."  
 or  
 "It is not necessary for the the clocks for the PCS and the 400GBASE-ZR frame to be dependent."

Response Response Status C

ACCEPT IN PRINCIPLE.

Change: "The clocks for the PCS and the 400GBASE-ZR frame are independent." to: "The clocks for the PCS and the 400GBASE-ZR frame may be independent."

Cl 155 SC 155.2.5.3 P 45 L 17 # 53

Ran, Adeo Cisco  
 Comment Type E Comment Status A bucket

"The clocks for the PCS and the 400GBASE-ZR frame are independent"

This sentence would better be placed as the first sentence in the paragraph, to clarify what's it all about.

*SuggestedRemedy*

Move the quoted sentence to the beginning of the paragraph.

Response Response Status C

ACCEPT.

Cl 155 SC 155.2.5.3 P 45 L 18 # 54

Ran, Adeo Cisco  
 Comment Type TR Comment Status A

"an average number of 1028-bit GMP words filled per multi-frame between ~10 214.7 and ~10 217.1"

The combination of tilde, space separator, and a single digit after the decimal is neither accurate nor clear, and the average has no importance - what is important is the range.

It would be sufficient (and correct) to state that the average number is between 10214 and 10218.

*SuggestedRemedy*

Change "This results in an average number of 1028-bit GMP words filled per multi-frame between ~10 214.7 and ~10 217.1" to "As a result, the number of 1028-bit GMP words per multi-frame is at least 10214 and at most 10218".

Response Response Status C

ACCEPT IN PRINCIPLE.

Change:

"This results in an average number of 1028-bit GMP words filled per multi-frame between ~10 214.7 and ~10 217.1."

to:

"This results in between approximately 10 214.7 and 10 217.1 GMP words of 1028 bits on average, per multi-frame."

Cl 155 SC 155.2.5.3 P 45 L 23 # 240

Brown, Matt Huawei  
 Comment Type E Comment Status A bucket

The meaning of the following sentence is not clear. "The values in Table 155–1 include all possible outcomes for the rates and tolerances of the 400GBASE-ZR application."

*SuggestedRemedy*

Perhaps "The values in Table 155–1 include all possible outcomes for any PCS and frame clock rate within the permissible ranges."

Response Response Status C

ACCEPT.

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Cl 155 SC 155.2.5.3 P 45 L 28 # 175

Huber, Thomas

Nokia

Comment Type TR Comment Status A

The 3rd column of the Table 155-1 is not helpful as written (and may also be incorrect). GMP stuffing is done across a four-frame multiframe, using a word size of 1028 bits, so (row, bit) by itself doesn't convey sufficient information about the location of the stuff words.

*SuggestedRemedy*

To be useful, the frame number (within the multiframe) would have to be included (e.g., word 1 begins at frame 0, row 0, bit 5140, using 0-based indexing for all 3 indexes). Since these values can all be computed from the word numbers in column 2, and GMP implementations are algorithmic in any case, it may be simpler to just delete the 3rd column.

Response Response Status C

ACCEPT IN PRINCIPLE.

Delete column 3 from table 155-1

Cl 155 SC 155.2.5.4 P 45 L 41 # 55

Ran, Adeo

Cisco

Comment Type TR Comment Status A

The title "Alignment marker (AM) and pad insertion" suggests that an alignment marker is inserted; but in practice it is not an alignment marker in the meaning of the 400GBASE-R PCS, but an alignment marker group (see the first paragraph of 119.2.4.4.2), or the vector am\_mapped<1919:0> as described in the text of 155.2.5.4.1.

*SuggestedRemedy*

Change the title of 155.2.5.4 to "AM and pad fields".

Change the title of 155.2.5.4.1 to "AM field".

Change the first paragraph of 155.2.5.4.1 to the following text:

"The AM field is used to provide frame delineation for the 400GBASE-ZR frame. It is inserted before FEC encoding and removed after FEC decoding (see Figure 155-3). The content of the AM field is am\_mapped<1919:0> as defined in 119.2.4.4.2".

Response Response Status C

ACCEPT.

Cl 155 SC 155.2.5.4 P 45 L 42 # 176

Huber, Thomas

Nokia

Comment Type E Comment Status A bucket

The introductory sentence implies that filling in the AM, pad, and OH fields somehow depends on the GMP mapping process. That is true for the GMP-related OH, but the rest of it has no dependence on the GMP process. Also, 155.2.5.4 doesn't address the OH fields.

*SuggestedRemedy*

Replace the existing text with this: This clause specifies the alignment markers and pad fields of the 400GBASE-ZR frame.

Response Response Status C

ACCEPT.

Cl 155 SC 155.2.5.4.1 P 46 L 1 # 177

Huber, Thomas

Nokia

Comment Type T Comment Status A bucket

The description of where the AM field is and how the variable am\_mapped<1919:0> is inserted is not clear.

*SuggestedRemedy*

Delete the first sentence of the paragraph ("The AM field is carried at the beginning of each frame in the first row."); the location of the field is clear from figure 155-4. Delete the last sentence of the paragraph ("The transmission order of am\_mapped is from am\_mapped<0> to am\_mapped<1919>.") At the end of the preceding paragraph (bottom of page 45), add a sentence to clarify the order of the bits of am\_mapped within the AM field of the frame (i.e., am\_mapped<0:1919> are mapped into bits 0-1919 of the AM field).

Response Response Status C

ACCEPT IN PRINCIPLE.

Change: "The resulting 1920-bit value is inserted in the AM field of each 400GBASE-ZR frame." to: "The resulting am\_mapped<0:1919> is mapped to bits 0 to 1919 of the AM field".Delete the first and last sentences of the last paragraph in 155.2.5.4.1

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CI 155 SC 155.2.5.5 P 46 L 10 # 178

Huber, Thomas Nokia  
 Comment Type TR Comment Status A bucket

The title and introductory sentence of the clause are misleading - the contents are really about the OH elements (except for 155.2.5.5.4, which deals with mapping into the field labelled OH in figure 155-4)

*SuggestedRemedy*

Change the title from "OH fields" to "400GBASE-ZR overhead"  
 Replace the introductory sentence with this text: The 400GBASE-ZR overhead is carried in a 40-octet frame structure that uses a 4-frame multiframe, as shown in Figure 155-5 and described in 155.2.5.5.1 through 155.2.5.5.3. The mapping of this structure into the OH field in Figure 155-4 is described in 155.2.5.5.4. The overhead is intended to be consistent with the description in subclause 8.8 of OIF-400ZR-02.0.  
 Replace the caption of Figure 155-5 with this: Contents of 400GBASE-ZR OH field

Response Response Status C

ACCEPT IN PRINCIPLE.

Change the title of 155.2.5.5 from "OH fields" to "400GBASE-ZR overhead" Change the text of 155.2.5.5 to "The 400GBASE-ZR overhead is carried in a 40-octet frame structure that uses a 4-frame multiframe, as shown in Figure 155-5 and described in 155.2.5.5.1 through 155.2.5.5.3. The mapping of this structure into the OH fields in Figure 155-4 is described in 155.2.5.5.4. The overhead is intended to be consistent with the description in subclause 8.8 of OIF-400ZR-02.0."Change the title of Figure 155-5 to "Contents of 400GBASE-ZR OH fields". With editorial license.

CI 155 SC 155.2.5.5 P 46 L 28 # 209

Slavick, Jeff Broadcom  
 Comment Type E Comment Status A bucket

There are a pair of dark lines in the middle of the blocks representing the different bits to field mapping.

*SuggestedRemedy*

Fix the strange looking dark lines.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #3.

CI 155 SC 155.2.5.5 P 46 L 28 # 3

Laubach, Mark Ciena  
 Comment Type E Comment Status A bucket

text is obscured by what seems to be change bars in the figure - cannot read all letters of technical text.

*SuggestedRemedy*

Since everything from clause 155 on is "new" material, why are change bars turned on at all? If they are turned on, they can't obscure technical text. Consider turning off change bars starting at CL 155.

Response Response Status C

ACCEPT IN PRINCIPLE.

The change bars are automatically added by FrameMaker when text is changed as it was from D2.0 to D2.1. The bars will be removed in D2.2.

CI 155 SC 155.2.5.5.1 P 46 L 37 # 102

Bruckman, Leon Huawei  
 Comment Type E Comment Status A bucket

"as defined by" replabce "by" with "in"

*SuggestedRemedy*

Replace: "as defined by" with: "as defined in"

Response Response Status C

ACCEPT.

CI 155 SC 155.2.5.5.1 P 46 L 38 # 179

Huber, Thomas Nokia  
 Comment Type TR Comment Status A bucket

The description of the MFAS as being in "each 40-octet frame within the 160-octet block" is not correct. The overhead frame is 40 octets; the 4-frame multiframe should not be described as a 160-octet block. The reference to G.709.1 clause 9.2.1 is not particularly helpful because the OIF 400ZR/400GBASE-ZR application uses the field differently than FlexO uses it.

*SuggestedRemedy*

Change the second sentence of the clause to say: "It is an auto-wrapping 8-bit counter that is incremented in each 400GBASE-ZR frame."

Response Response Status C

ACCEPT.

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Cl 155 SC 155.2.5.5.2 P 46 L 42 # 241  
 Brown, Matt Huawei  
 Comment Type E Comment Status A  
 What is a "400GBASE-ZR link"?

*SuggestedRemedy*  
 Define "400GBASE-ZR link" or use more appropriate term.

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Change: "400GBASE-ZR link"  
 to: "400GBASE-ZR PCS"

Cl 155 SC 155.2.5.5.2 P 46 L 45 # 56  
 Ran, Adeo Cisco  
 Comment Type ER Comment Status A bucket  
 "The RFP bit indicates a remote 400GBASE-ZR defect"

In the previous paragraph RPF is defined as "remote PHY fault". And it only indicates a fault if it is set to 1.

(RPF, not RFP; and fault, not defect)

*SuggestedRemedy*  
 Change to "The RPF bit is used to signal a remote 400GBASE-ZR fault".

Response Response Status C  
 ACCEPT.

Cl 155 SC 155.2.5.5.2 P 46 L 46 # 244  
 Maniloff, Eric Ciena  
 Comment Type T Comment Status A  
 The statement "The local degrade bit indicates the quality of the received signal and the remote degrade bit indicates the quality of the signal received by the remote interface." is unclear. Which received signal? How is the remote degrade bit indicating the quality of the signal at the remote interface set? The OH SF signals need to include rx\_am\_sf from the XS as well as degrade information from the XS. This section needs clarification.

*SuggestedRemedy*  
 Clarify the encoding of the remote and local degrade bits. A figure here showing the sources would help

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Change:  
 "The local degrade bit indicates the quality of the received signal and the remote degrade bit indicates the quality of the signal received by the remote interface."

to:  
 "The local degrade bit indicates the quality of the signal received by the local 400GBASE-ZR PCS and the remote degrade bit indicates the quality of the signal received by the remote 400GBASE-ZR PCS. The propagation of FEC degrade signaling across PCS and XS sublayers is described in 116.6."

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Cl 155 SC 155.2.5.5.2 P 46 L 50 # 57

Ran, Adeo Cisco  
 Comment Type TR Comment Status A

The degrade bits seem to be defined for an 400GMII Extender (referring to 118.2.2) assuming it exists on both sides of the link. But the Extender is not part of the PHY and may or may not exist on either end.

The two paragraphs following this one (P47 L1-8) indicate that the content these bits is conditional on whether an Extender exists.

But this paragraph says these bits "correspond" to tx\_am\_sf bits, which are only defined for PHY XS sublayers.

Note that 118.2.2 defines tx\_am\_sf<2> and tx\_am\_sf<1> using variables from the BASE-R PCS (e.g., rx\_rm\_degraded), which do not exist in the ZR PCS, so the correspondence to these bits is unclear. Defining STAT<6> and STAT<7> using tx\_am\_sf is a broken circular reference.

SuggestedRemedy

Please rewrite this paragraph to clarify the definition of these bits, and especially what happens when there is no PHY XS.

Also, in the following paragraphs, define the bits STAT<6> and STAT<7> without referring to rx\_am\_sf.

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Delete:

"The local degrade bit corresponds to tx\_am\_sf<1> in 118.2.2. The remote degrade bit corresponds to tx\_am\_sf<2> in 118.2.2."

Cl 155 SC 155.2.5.5.3 P 47 L 10 # 58

Ran, Adeo Cisco  
 Comment Type E Comment Status A bucket

Hyphen in title as a separator.  
 Also in the body of this subclause, as a separator between bit labels, several times.

SuggestedRemedy

Change the hyphens to en dashes.

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Implement with editorial license

Cl 155 SC 155.2.5.5.3 P 47 L 12 # 180

Huber, Thomas Nokia  
 Comment Type TR Comment Status A bucket

The description of the JC information as "spread across the second, third, and fourth frames of the 160-octet block" is not correct. The overhead frame is 40 octets.

SuggestedRemedy

Replace the sentence with: The justification control information is carried in octets 4 and 5 of the second, third, and fourth frames of the multiframe, as shown in Figure 155-5.

Response Response Status C  
 ACCEPT.

Cl 155 SC 155.2.5.5.3 P 47 L 13 # 59

Ran, Adeo Cisco  
 Comment Type ER Comment Status R bucket

"OIF-400ZR-02.0" - seems like a normative reference.

SuggestedRemedy

Add an entry in 1.3 as necessary.

Response Response Status C  
 REJECT.

OIF-400ZR-02.0, Implementation Agreement 400ZR is already a normative reference in 1.3.

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CI 155 SC 155.2.5.5.3 P 47 L 19 # 181

Huber, Thomas

Nokia

Comment Type TR Comment Status A

There is no context for this paragraph - the GMP parameters have not been discussed previously. There is no mention of the CRC8 and CRC4 that protect the information in JC1/2 and JC4/5, respectively. The description either needs to be made complete, or a reference needs to be made to subclause 8.9 of the OIF 400ZR IA and Annex D of ITU-T G.709. (note that text in the OIF IA is not quite complete - it includes the CRC computations related to JC3 and JC6, but does not cover the II and DI bits in JC2)

SuggestedRemedy

Rewrite the last two paragraphs as follows:

A description of the operation of GMP is in Annex D of ITU-T G.709. There are two parameters that are encoded into the overhead: Cm(t) indicates the number of 1028-bit GMP data words that will be transmitted during the next multiframe, while  $\sum CnD(t)$  nominally indicates the running remainder. The long-term average value of Cm(t) +  $\sum CnD(t)$  represents the incoming serial stream rate as the number of information octets arriving at the GMP encoder per multiframe.

Cm(t) is encoded in bits C1 through C14 of JC1 and JC2, with the MSB in C1.  $\sum CnD(t)$  is encoded in bits D1 through D7 of JC4 and JC5.

Refer to subclause 8.9 of OIF-400ZR-02.0 and Annex D of ITU-T G.709 for additional information on the encoding of JC1-JC6.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change the last two paragraphs of 155.2.5.5.3 to:

"There are two parameters that are encoded into the overhead: Cm(t) indicates the number of 1028-bit GMP data words that will be transmitted during the next multiframe, while  $\sum CnD(t)$  nominally indicates the running remainder. The long-term average value of Cm(t) +  $\sum CnD(t)$  represents the incoming serial stream rate as the number of information octets arriving at the GMP encoder per multiframe. Cm(t) is encoded in bits C1 through C14 of JC1 and JC2, with the MSB in C1.  $\sum CnD(t)$  is encoded in bits D1 through D7 of JC4 and JC5 with the MSB in D1. Refer to subclause 8.9 of OIF-400ZR-02.0 and Annex D of ITU-T Recommendation G.709 for additional information on the encoding of JC1-JC6."

With editorial license

CI 155 SC 155.2.5.5.3 P 47 L 19 # 60

Ran, Adeel

Cisco

Comment Type E Comment Status A bucket

C1-14 bits

SuggestedRemedy

Change to C1-C14 or C<14:1>

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "C1-14 bits" to: "C1-C14"

CI 155 SC 155.2.5.5.4 P 47 L 30 # 103

Bruckman, Leon

Huawei

Comment Type E Comment Status A bucket

"The 400GBASE-ZR frame contains 1280-bit OH fields. This field is logically composed of" inconsistent singular/plural

SuggestedRemedy

Replace: "The 400GBASE-ZR frame contains 1280-bit OH fields. This field is logically composed of" with: "The 400GBASE-ZR frame contains 1280-bit OH fields. These fields are logically composed of"

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #182.

CI 155 SC 155.2.5.5.4 P 47 L 30 # 182

Huber, Thomas

Nokia

Comment Type E Comment Status A bucket

The first two sentences can be combined and made clearer

SuggestedRemedy

Rewrite as: The 128-bit OH field in the 400GBASE-ZR frame is logically composed of four 320-bit structures..

Response Response Status C

ACCEPT IN PRINCIPLE.

Implement suggested changes in slide 6 of [https://www.ieee802.org/3/cw/public/23\\_06/huber\\_3cw\\_01\\_2306.pdf](https://www.ieee802.org/3/cw/public/23_06/huber_3cw_01_2306.pdf) with editorial license.

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Cl 155 SC 155.2.5.5.4 P 47 L 47 # 62

Ran, Adeo

Cisco

Comment Type E Comment Status A

"The four 320-bit structures are 10-bit interleaved to form the 1280-bit OH fields as shown in OIF-400ZR-02.0, Figure 14"

A figure is an illustration of a specification. Readers of this draft (and future standard) should have the same clarity as in the other document.

Similarly in other figure references (final paragraph of 155.2.5.6).

SuggestedRemedy

Please provide a figure here - recreate the figure from the other document if necessary.

Response Response Status C

ACCEPT IN PRINCIPLE.

Add new figure similar to OIF-400ZR-02.0 figure 14. Delete final paragraph in 155.2.5.6. With editorial license.

Cl 155 SC 155.2.5.6 P 47 L 37 # 183

Huber, Thomas

Nokia

Comment Type E Comment Status A bucket

SC-FEC blocks are not 'calculated' (the parity bits are calculated, the rest are not). 'Constructed' would be a better choice.

SuggestedRemedy

Change "provides the input data for the calculation of SC-FEC input blocks" to "provides the input data for the construction of SC-FEC input blocks".

Response Response Status C

ACCEPT.

Cl 155 SC 155.2.5.6 P 47 L 40 # 184

Huber, Thomas

Nokia

Comment Type E Comment Status A bucket

The formula should use appropriate arithmetic symbols.

SuggestedRemedy

Change the x to a multiplication symbol and the / to a division symbol.

Response Response Status C

ACCEPT.

Cl 155 SC 155.2.5.6 P 47 L 44 # 61

Ran, Adeo

Cisco

Comment Type E Comment Status A bucket

Digits should not be italicized. There are many instances in this draft.

SuggestedRemedy

Format digits as upright, all instances.

Response Response Status C

ACCEPT IN PRINCIPLE.

Implement with editorial license

Cl 155 SC 155.2.5.7 P 48 L 10 # 185

Huber, Thomas

Nokia

Comment Type E Comment Status A bucket

Missing an indefinite article

SuggestedRemedy

Change "... MBAS requires additional 34 bits of padding." to "... MBAS requires an additional 34 bits of padding."

Response Response Status C

ACCEPT IN PRINCIPLE.

Change: "In order to conform to this block size, the SC-FEC block of 244 664 input bits plus 38 bits of CRC32 and MBAS requires additional 34 bits of padding." To: "In order to conform to this block size, the SC-FEC block of 244 664 input bits plus 38 bits of CRC32 and MBAS requires 34 bits of additional padding."

Cl 155 SC 155.2.5.7 P 48 L 12 # 210

Slavick, Jeff

Broadcom

Comment Type TR Comment Status A bucket

The 34-bit pad appears to be filler to make the length of the information frame the proper size. The SC-FEC is then using this to generate the parity data. So it seems this should be specified as to what value the 34bit field is so the other end knows as well.

SuggestedRemedy

change "34-bit pad" to "34-bit pad of all zeroes"

Response Response Status C

ACCEPT.



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CI 155 SC 155.2.5.7 P 49 L 5 # 205

Slavick, Jeff Broadcom

Comment Type TR Comment Status A bucket

Figure 155-7 appears to be incorrect in its representation of how the information, parity and pad bits are done. Each of the 5 parity blocks plus CRC + MBAS utilize 23.8 rows of the 690 column bits.  $23.8 * 5 = 119$  which means the start of each parity should begin on rows 24, 48, 72 and 96 as shown but completely fill to the end of the 119th row. The 6 x 119b pad is actually 6 more columns of data and is just filler and shouldn't be part of this diagram.

SuggestedRemedy

In figure 155-7 remove the 6x119 bit pad text and arrow, make the Bj+3 black outline box go around the light gray boxes, remove the left light gray box from Bj+3 and make the CRC & MBAS of Bj+4 point to the gray box that remains (which the 6x119bit pad use to point at)

Response Response Status C

ACCEPT.

CI 155 SC 155.2.5.8 P 50 L 3 # 211

Slavick, Jeff Broadcom

Comment Type TR Comment Status R

The 10 970 bits (columns) of information is being expanded to 10 976 to match the SD-FEC.

SuggestedRemedy

Replace 155.2.5.8 with "A 6b pad is added to each row of the SC FEC frame to expand it to 119 rows x 10 976 bits in order to match the block size of the 119B/128B SD-FEC encoder."

Response Response Status C

REJECT.

The 119x6 bit pad is added at the end of each 5xSC-FEC block and not of each row. Text is correct.

CI 155 SC 155.2.5.9 P 50 L 13 # 186

Huber, Thomas Nokia

Comment Type E Comment Status A bucket

x should be a multiplication symbol

SuggestedRemedy

Use the multiplication symbol

Response Response Status C

ACCEPT.

CI 155 SC 155.2.5.9 P 50 L 14 # 215

Slavick, Jeff Broadcom

Comment Type TR Comment Status A

We should be explicit on the order of the bits that are scrambled in the SC-FEC frame plus Pad.

SuggestedRemedy

Insert the following as the second sentence of the last paragraph "The order of transmitted bits is bit 0 from row 1 to row 119, then bit 1 row 1 to row 119 and so on."

Response Response Status C

ACCEPT IN PRINCIPLE.

In 155.2.5.9

Change

"shall advance for each transmitted bit."

to

"shall advance for each bit processed by the scrambler."

CI 155 SC 155.2.5.10 P 50 L 18 # 214

Slavick, Jeff Broadcom

Comment Type TR Comment Status A bucket

In section 155.2.5.8 it says the organization is 119 rows of 10 970 bits, but this section is now stating it's 10 976 rows of 119 bits.

SuggestedRemedy

Change rows to columns

Response Response Status C

ACCEPT IN PRINCIPLE.

There are no 10 976 rows of 119 bits, but 10976 blocks of 119 bits. See response to comment #212

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.2.5.10 P 50 L 19 # 212

Slavick, Jeff Broadcom

Comment Type TR Comment Status A bucket

The convolutional interleaver operates on the scrambled stream. No need to back reference two and three operations.

SuggestedRemedy

Replace the first sentence of 10.2.5.10 to be "The scrambled output from the frame synchronous scrambler is processed by the convolutional interleaver and is organized into 10 976 blocks of 119 bits where the first 119 bits from the scrambler is the first block, the following 199bits the second block and so forth."

Response Response Status C

ACCEPT IN PRINCIPLE.

Change: "The scrambled output from the SC-FEC encoder plus padding is organized as 10 976 rows of 119 bits, as shown on the left hand side of Figure 155-8." to: "The scrambled output from the frame synchronous scrambler is processed by the convolutional interleaver and is organized into 10 976 x 119-bit blocks where the first 119 bits from the scrambler is the first block, the following 199 bits the second block and so forth."

CI 155 SC 155.2.5.10 P 50 L 22 # 63

Ran, Adeo Cisco

Comment Type ER Comment Status A bucket

"The effect of the convolutional interleaver shall be to distribute consecutive units of 119 bits from the SC-FEC encoded frame in order to improve resilience of the system to bursts of errors"

This is a very vague description of a normative requirement. There is already a "shall" in the second sentence ("shall be functionally equivalent").

SuggestedRemedy

Either change "shall be" to "is" or delete this sentence.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change: "shall be" to "is"

CI 155 SC 155.2.5.11 P 50 L 30 # 137

Dudek, Mike Marvell

Comment Type T Comment Status A bucket

Adding 9 parity bits to the block won't change the number of blocks.

SuggestedRemedy

Change 10796 to 10976,

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #187

CI 155 SC 155.2.5.11 P 50 L 30 # 187

Huber, Thomas Nokia

Comment Type T Comment Status A bucket

The number of 128-bit blocks is incorrect

SuggestedRemedy

Change 10796 to 10976.

Response Response Status C

ACCEPT.

CI 155 SC 155.2.5.11 P 50 L 30 # 216

Slavick, Jeff Broadcom

Comment Type TR Comment Status A bucket

Looks like you're adding 9b of parity to each 119bit block to make it 128b blocks. So the number of input blocks to output blocks should be the same.

SuggestedRemedy

Remove the 10 976 and 10 796 from the last sentence of the first paragraph.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #187

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CI 155 SC 155.2.5.11 P 50 L 30 # 213  
 Slavick, Jeff Broadcom  
 Comment Type TR Comment Status A bucket  
 Is the SD-FEC codeword is not 10.8 billion bits, but the number of codewords created and the size it not readily distinguishable  
 SuggestedRemedy  
 Add the wide "x" between the 796 and 128-bit at the end of the first paragraph. Also between the 796 and the 119-bit  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #45.

CI 155 SC 155.2.5.11 P 50 L 33 # 260  
 Law, David Hewlett Packard Enterprise  
 Comment Type E Comment Status A bucket  
 Suggest that '... the tx\_codeword parameter of the PMA\_IS\_UNITDATA.request.' be changed to read '... the tx\_codeword parameter of the PMA\_IS\_UNITDATA.request primitive.'  
 SuggestedRemedy  
 See comment.  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.2.5.12 P 51 L 33 # 261  
 Law, David Hewlett Packard Enterprise  
 Comment Type T Comment Status A  
 Subclause 155.2.5.11 'Hamming SD-FEC encoder' says ' The 128-bit SD-FEC codewords are sent to the 400GBASE-ZR PMA sublayer using the tx\_codeword parameter of the PMA\_IS\_UNITDATA.request.'. Suggest that Figure 155-8 and subclause 155.3.3.1.1 should be updated to reflect this.  
 SuggestedRemedy  
 [1] The arrow at the bottom of Figure 155-8 should be annotated with 'PMA\_IS\_UNITDATA.request'.  
 [2] c0, c118, c119 and c127 above 'SD-FEC codeword' should be changed to read tx\_codeword[0], tx\_codeword[118], tx\_codeword[119] and tx\_codeword[127] respectively.  
 [3] The text 'Each SD-FEC codeword from the SD-FEC encoder c = [c0, c1,...,c127], is mapped ...' in subclause 155.3.3.1.1 should be changed to read 'Each SD-FEC codeword passed across the PMA service interface from the SD-FEC encoder in the tx\_codeword[127:0] parameter of the 'PMA\_IS\_UNITDATA.request primitive is mapped ...'.  
 [4] Change all the other instances of c[subscript] in subclause 155.3.3.1.1 to read tx\_codeword[subscript].

Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 [1] Annotate the arrow at the bottom of the figure 155-8 with 'PMA\_IS\_UNITDATA.request'.  
 [2] Change the text in 155.3.3.1.1 "Each SD-FEC codeword from the SD-FEC encoder c = [c0, c1,...,c127], is mapped" to  
 "Each SD-FEC codeword [c0, c1,...,c127] passed across the PMA service interface from the SD-FEC encoder in the tx\_codeword parameter of the 'PMA\_IS\_UNITDATA.request primitive, is mapped".  
 [3] in 155.2.5.11 Change:  
 "The 128-bit SD-FEC codewords are sent to the 400GBASE-ZR PMA sublayer using the tx\_codeword parameter of the PMA\_IS\_UNITDATA.request."  
 To  
 "The 128-bit [c0, c1,...,c127] SD-FEC codewords are passed to the 400GBASE-ZR PMA sublayer using the tx\_codeword parameter of the PMA\_IS\_UNITDATA.request primitive."  
 With editorial license.

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CI 155 SC 155.2.6.1 P 52 L 9 # 64  
 Ran, Adee Cisco  
 Comment Type E Comment Status A bucket  
 119 bit  
 SuggestedRemedy  
 119-bit  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change: "119 bit messages" to "119-bit blocks"

CI 155 SC 155.2.6.2 P 52 L 13 # 65  
 Ran, Adee Cisco  
 Comment Type E Comment Status A bucket  
 "produces" does not grammatically match "shall perform"  
 SuggestedRemedy  
 Change to "produce"  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.2.6.2 P 52 L 14 # 104  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket  
 "as depicted in the left hand side of Figure 155-8". Figure 155-8 does not depict this. This text is a left over of D2.0 that pointed to a figure that was removed during comment resolution  
 SuggestedRemedy  
 Delete "as depicted in the left hand side of Figure 155-8"  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.2.6.2 P 52 L 14 # 217  
 Slavick, Jeff Broadcom  
 Comment Type TR Comment Status A bucket  
 Figure 155-8 is the Transmit bit order diagram.  
 SuggestedRemedy  
 Delete everything after the word bits  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change: "sequences of 10 976 x 119 bits as depicted in the left hand side of Figure 155-8." to "sequences of 10 976 x 119-bit blocks."

CI 155 SC 155.2.6.4 P 52 L 23 # 218  
 Slavick, Jeff Broadcom  
 Comment Type TR Comment Status A bucket  
 The 10 976 x 119bits have been called blocks up to this point.  
 SuggestedRemedy  
 Change rows to blocks  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.2.6.5 P 52 L 31 # 138  
 Dudek, Mike Marvell  
 Comment Type E Comment Status A bucket  
 The sentence is somewhat confusing due to "signal" being both a noun and verb.  
 SuggestedRemedy  
 Insert "report" between "to" and "signal" or use similar wording to 45.2.4.21.1 and change it to "signal the presence of a degraded received signal".  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change: "signal degradation of the received signal." to "signal the presence of a degraded received signal."

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CI 155 SC 155.2.6.5 P 52 L 32 # 66  
 Ran, Adees Cisco  
 Comment Type ER Comment Status A bucket  
 "FEC\_degraded\_SER\_ability\_variable"  
 one underscore too many.  
 SuggestedRemedy  
 Change to "FEC\_degraded\_SER\_ability variable"  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.2.6.5 P 52 L 36 # 67  
 Ran, Adees Cisco  
 Comment Type ER Comment Status A bucket  
 "The PCS counts the number of bits corrected by the SC-FEC decoder"  
 Then on L39-40: "the number of symbol errors detected is increased by 957 x 257"  
 The SC-FEC corrects bit errors, not symbol errors, and this paragraph discusses counting the number of bit errors (usually corrected, but when uncorrectable, all bits are marked as errors).  
 Then on L42: "if the number of symbol errors is less than..."  
 The text should be consistent - bit errors, not symbols; and not necessarily corrected.  
 SuggestedRemedy  
 Change "The PCS counts the number of bits corrected by the SC-FEC decoder" to "The PCS counts the number of bit errors detected by the SC-FEC decoder"  
 Change "the number of symbol errors detected is increased" to "the number of bit errors detected is increased".  
 Change "if the number of symbol errors" to "if the number of bit errors detected".  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.2.6.5 P 52 L 37 # 68  
 Ran, Adees Cisco  
 Comment Type E Comment Status A bucket  
 "in consecutive non-overlapping SC-FEC frames of FEC\_degraded\_SER\_interval (see 155.5)"  
 The wording "of FEC\_degraded\_SER\_interval" is unclear.  
 In clause 119 the corresponding wording is "in consecutive nonoverlapping blocks of FEC\_degraded\_SER\_interval codewords (see 119.3.1),"

SuggestedRemedy  
 Change to "in consecutive non-overlapping blocks of FEC\_degraded\_SER\_interval SC-FEC frames (see 155.5)"  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.2.6.7 P 53 L 1 # 69  
 Ran, Adees Cisco  
 Comment Type E Comment Status A bucket  
 "detect and removal" in heading  
 SuggestedRemedy  
 Change to "detection and removal"  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.2.6.7 P 53 L 8 # 105  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket  
 There is an entry in the PICS to test this function, but there is no "shall"  
 SuggestedRemedy  
 Replace: "the AM and OH fields need to be" with: "the AM and OH fields shall be"  
 Response Response Status C  
 ACCEPT.

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Cl 155 SC 155.2.6.7 P 53 L 12 # 242

Brown, Matt Huawei  
 Comment Type E Comment Status A bucket

The word "can" in this context is deprecated per style guide. It is not clear if this is stating what shall happen, what may happen, or what might happen.

*SuggestedRemedy*

Change "Once AM lock has been acquired, the OH fields MFAS, status and JC1-JC6 can be extracted for use by the GMP de-mapper and for error signaling."  
 To  
 "Once AM lock has been acquired, the OH fields MFAS, status and JC1-JC6 are extracted for use by the GMP de-mapper and for error signaling."  
 or  
 "Once AM lock has been acquired, the OH fields MFAS, status and JC1-JC6 may be extracted for use by the GMP de-mapper and for error signaling."

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #189

Cl 155 SC 155.2.6.7 P 53 L 12 # 189

Huber, Thomas Nokia  
 Comment Type TR Comment Status A bucket

The term 'OH field' is being overloaded in the text - sometimes it means the 1280-bit OH field in the frame, sometimes it is referring to specific overhead information elements within that field. I would be more clear to use "OH field" to refer to the 1280-bit field only.

*SuggestedRemedy*

Change:  
 Once AM lock has been acquired, the OH fields MFAS, status and JC1-JC6 can be extracted for use by the GMP de-mapper and for error signaling.  
 To:  
 Once AM lock has been acquired, the MFAS, status, and JC1-JC6 information can be extracted from the OH field for use by the GMP de-mapper and for error signaling.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change: "Once AM lock has been acquired, the OH fields MFAS, status and JC1-JC6 are extracted for use by the GMP de-mapper and for error signaling." To: "Once AM lock has been acquired, the MFAS, status, and JC1-JC6 information may be extracted from the OH fields for use by the GMP de-mapper and for error signaling."

Cl 155 SC 155.2.6.7 P 53 L 15 # 190

Huber, Thomas Nokia  
 Comment Type E Comment Status A bucket

There is only one 1280-bit overhead field

*SuggestedRemedy*

Change "overhead fields" to "overhead field"

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #182.

Cl 155 SC 155.2.6.7.1 P 53 L 19 # 191

Huber, Thomas Nokia  
 Comment Type T Comment Status A bucket

The description of MFAS alignment is more complex than it needs to be

*SuggestedRemedy*

Change the section heading from 'MFAS detection' to 'MFAS alignment'.  
 Change the text of the clause to read:  
 Alignment to the four-frame multiframe is achieved via the two LSBs of the MFAS. The multiframe is used to support recovery of other overhead information elements shown in Figure 155-5

Response Response Status C

ACCEPT IN PRINCIPLE.

MFAS is required only for the JC1-JC6 octets recovery, so it is useful to indicate this. Change the section heading to "MFAS alignment" Change: "Only the two LSBs of MFAS are required to determine the contents of the 5th and 6th octets of the 320-bit OH fields received after de-interleaving from the 1280 bit OH fields." To "Alignment to the four-frame multiframe is achieved via the two LSBs of the MFAS."

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Cl 155 SC 155.2.6.7.1 P 53 L 22 # 106

Bruckman, Leon Huawei  
 Comment Type E Comment Status A bucket

"to determine the contents of the 5th and 6th octets of the 320-bit OH fields" The text is correct, but in the figure these octets are numbered 4 and 5, so it may create some confusion

*SuggestedRemedy*

Replace: "to determine the contents of the 5th and 6th octets of the 320-bit OH fields" with: "to determine the contents of octets number 4 and 5 of the 320-bit OH fields"

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #191

Cl 155 SC 155.2.6.7.2 P 53 L 38 # 245

Maniloff, Eric Ciena  
 Comment Type T Comment Status A bucket

For link degrade monitoring, the CFEC not SC-FEC BER is used

*SuggestedRemedy*

Change "Pre-FEC bit error ratio monitors within the SC-FEC" to "Pre-FEC bit error ratio monitors within the CFEC"

Response Response Status C

ACCEPT.

Cl 155 SC 155.2.6.7.2 P 53 L 41 # 70

Ran, Adeo Cisco  
 Comment Type TR Comment Status A

"DSP framing loss" isn't defined anywhere. This is the only place where "DSP" is used.

*SuggestedRemedy*

Define it or replace with what it's intended to mean.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change: "In the case of a DSP framing loss or 400GBASE-ZR frame or multi-frame loss,"

to:

"When the SIGNAL\_OK parameter of the PMA\_IS\_SIGNAL.indication primitive is FAIL or amps\_lock is FALSE,"

Cl 155 SC 155.2.6.7.2 P 53 L 42 # 71

Ran, Adeo Cisco  
 Comment Type TR Comment Status D

The standard should be more explicit about what happens in a PHY connected to a 400GMII Extender when there is no input signal.

The text here suggests that the PCS sends local fault to the 400GMII; this means the PHY XS should be able to generate local fault signaling over the 400GAUI-n toward the DTE XS. Moreover, there is no IS\_SIGNAL.indication across the 400GMII. Apparently it means that the 400GAUI-n in an Extender should never be silent.

In existing optical modules that are connected with any AUI-C2M to a PCS (as part of the PHY, not an extender), it is common to squelch the module electrical output (aka disable the AUI's transmitter) when there is no optical input (PMD:IS\_SIGNAL.indication is not\_ok); that is indicated to by PCS via PMA:IS\_SIGNAL.indication on its adjacent PMA. That would not be compliant behavior when the AUI is within an XS.

Ignoring this detail may lead to "surprising" module implementations that squelch the module's output when there is no input, and may create interoperability issues with hosts that stick to the standard.

*SuggestedRemedy*

Assuming this is the intent, please add a NOTE emphasizing that the adjacent PHY 400GXS generates PHY\_XS:IS\_UNITDATA.indication and does not squelch the 400GAUI-n even when PMA\_IS\_SIGNAL.indication is FAIL.

Proposed Response Response Status Z

REJECT.

This comment was WITHDRAWN by the commenter.

Cl 155 SC 155.2.6.7.2 P 53 L 46 # 246

Maniloff, Eric Ciena  
 Comment Type T Comment Status A

In addition to passing STAT<7> to tx\_am\_sf\_1, degrade of the received CFEC is included

*SuggestedRemedy*

Update "and local degrade in STAT<7> is passed to tx\_am\_sf<1> in the transmit direction of the 400GXS sublayer" to indicate STAT<7> is OR'd with the degrade detected by CFEC.

Response Response Status C

ACCEPT IN PRINCIPLE.

Implement suggested changes in slides 7 and 9 of [https://www.ieee802.org/3/cw/public/23\\_06/bruckman\\_3cw\\_03\\_2306.pdf](https://www.ieee802.org/3/cw/public/23_06/bruckman_3cw_03_2306.pdf) with editorial license.

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CI 155 SC 155.2.6.8 P 54 L 3 # 192

Huber, Thomas Nokia  
 Comment Type TR Comment Status A bucket

There is no context for most of what is in this paragraph - CRCs used in the GMP parameters have not been mentioned before, there is no mention of Cm(t) and  $\sum CnD(t)$  that were mentioned in the tx clause. Since GMP is being used by reference to other documents, the less said about the details here, the better.

SuggestedRemedy

Revise the text of the subclause to read:  
 The GMP-demapped shall decode the JC1-JC6 octets according to the procedures described in ITU-T G.709 Annex D, recover the parameters Cm(t) and  $\sum CnD(t)$ , and use them to recover the 1028-bit data blocks that were inserted into the frame by the GMP mapper.

Response Response Status C

ACCEPT IN PRINCIPLE.

Replace 155.2.6.8 with

"The GMP demapper shall decode the JC1-JC6 octets according to the procedures described in ITU-T G.709 Annex D, recover the parameters Cm(t) and  $\sum CnD(t)$ , and use them to recover the 1028-bit data blocks that were inserted into the frame by the GMP mapper and the signal stream rate.

The JC1-JC2 field information is also protected by limits on how the JC1-JC2 fields can change in successive multi-frames (see Table 155-1) and the coding technique for indicating these changes, which combine with the CRC8 in JC3 and the CRC4 in JC6 to provide error correction capability for bit and burst errors impacting JC1-JC6."

CI 155 SC 155.2.6.10 P 54 L 21 # 72

Ran, Adeo Cisco  
 Comment Type E Comment Status A bucket

"shall decode blocks" should be "shall decode 66-bit blocks" to align with 155.2.6.9 and avoid ambiguity.

This applies to 3 instances of "blocks" in this subclause.

SuggestedRemedy

Change per comment.

Response Response Status C

ACCEPT.

CI 155 SC 155.2.9.13 P 51 L 43 # 188

Huber, Thomas Nokia  
 Comment Type T Comment Status A bucket

Presumably the intent here is that the test signal is the result of the MII being a constant stream of idle characters; as written, it implies a single Idle control block.

SuggestedRemedy

Replace:  
 The scrambled idle test pattern is the output of the PCS when the input to the PCS at the 400GMII is a control block with all idle characters.  
 with  
 The scrambled idle test pattern is generated by applying a signal consisting of a continuous stream of idle control characters at the 400GMII.

Response Response Status C

ACCEPT.

CI 155 SC 155.3.1 P 54 L 54 # 73

Ran, Adeo Cisco  
 Comment Type ER Comment Status A bucket

"the Physical Medium Attachment (PMA) sublayer for the 400 Gb/s Physical Layer implementation known as 400GBASE-ZR"

Too wordy. This is a single PHY, not a family of PHYs.

SuggestedRemedy

Change to "the Physical Medium Attachment (PMA) sublayer for the 400GBASE-ZR PHY".

Response Response Status C

ACCEPT.

CI 155 SC 155.3.1.3 P 55 L 5 # 107

Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket

"Sampling at the symbol rate of the incoming signals" this text (changed from D2.0) seems to contradict the text in 155.3.3.2.1.

SuggestedRemedy

Delete: "at the symbol rate"

Response Response Status C

ACCEPT.



IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.3.1.3 P 55 L 10 # 193

Huber, Thomas Nokia  
 Comment Type E Comment Status A bucket

There is an awkward comma separating a list of two items: "state of polarization, and polarization mode dispersion". Presumably the comma was inserted to avoid the phrase being incorrectly parsed as "state of (polarization and polarization mode dispersion)". Rather than an awkward comma, the 'both... and' construct can be used.

SuggestedRemedy

change "... including state of polarization, and polarization mode dispersion; ... " to "... including both state of polarization and polarization mode dispersion; ..."

Response Response Status C  
 ACCEPT.

CI 155 SC 155.3.1.3 P 55 L 20 # 74

Ran, Adeo Cisco  
 Comment Type E Comment Status A bucket

Item k starts with "Provide". To align with all other items, it should be "Providing".

SuggestedRemedy

Change per comment.

Response Response Status C  
 ACCEPT.

CI 155 SC 155.3.1.3 P 56 L 10 # 194

Huber, Thomas Nokia  
 Comment Type T Comment Status A bucket

Separating the Gray coding and polarization distribution processes in Figure 155-9 does not align well with the text that follows; the Gray coding is described in terms the 4 components of the DP16QAM symbols.

SuggestedRemedy

Combine the Gray coding, symbol interleaving, and polarization distribution into a single process in the figure.

Response Response Status C  
 ACCEPT.

CI 155 SC 155.3.2.2.1 P 57 L 41 # 196

Huber, Thomas Nokia  
 Comment Type E Comment Status A bucket

In all of the rx\_codeword expressions, the multiplication symbol × should be used rather than \*

SuggestedRemedy

Replace all instances of \* with ×

Response Response Status C  
 ACCEPT.

CI 155 SC 155.3.2.2.1 P 57 L 43 # 195

Huber, Thomas Nokia  
 Comment Type T Comment Status A bucket

The closing parenthesis for the second index is in the wrong place

SuggestedRemedy

Change  $(k^4+1^*m)$  to  $(k^4+1)^*m$

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Resolve using the response to comment #108.

CI 155 SC 155.3.2.2.1 P 57 L 43 # 108

Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket

Typo in equation:  $(k^4+1^*m)$

SuggestedRemedy

Replace: " $(k^4+1^*m)$ " with: " $(k^4+1)^*m$ "

Response Response Status C  
 ACCEPT.

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.3.2.2.2 P 57 L 51 # 75  
 Ran, Adeo Cisco  
 Comment Type T Comment Status A bucket  
 "for each 128-bit SD-FEC codeword"  
 But according to 155.3.2.2.1, the message has 128 x m bits. The 128 bits are generated in the SD-FEC decoder in the PCS.  
 SuggestedRemedy  
 Change to "for each SD-FEC codeword".  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.3.2.3.1 P 58 L 15 # 220  
 Brown, Matt Huawei  
 Comment Type E Comment Status A bucket  
 The word "can" in this context is deprecated per style guide.  
 SuggestedRemedy  
 Change "The SIGNAL\_OK parameter can take on one of two values of the form:"  
 To: "The SIGNAL\_OK parameter takes on one of two values of the form:"  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.3.3 P 58 L 31 # 76  
 Ran, Adeo Cisco  
 Comment Type ER Comment Status A bucket  
 "The input (transmit direction) or output (receive direction) between the PMA and PCS carries a 128-bit SD-FEC codeword at 1/128 the DP-16QAM symbol rate"  
 The transmit and receive directions do not carry the same number of bits on each transaction of the service interface.  
 The interface carries codewords, not a single codeword.  
 Also, syntax can be improved.

SuggestedRemedy  
 Change the quoted sentence to "The input (transmit direction) of the PMA carries 128-bit SD-FEC codewords at 1/128 the DP-16QAM symbol rate from the PCS. The output (receive direction) of the PMA carries 128 x m bits representing the SD-FEC decoder input 1/128 the DP-16QAM symbol rate to the PCS".  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 The rate is not 1/128 the symbol rate, but 1/16 the symbol rate (see response to comment #197.)Change to: "The input (transmit direction) of the PMA carries 128-bit SD-FEC codewords at 1/16 the DP-16QAM symbol rate from the PCS. The output (receive direction) of the PMA carries 128 x m bits representing the SD-FEC decoder input at 1/16 the DP-16QAM symbol rate to the PCS"

CI 155 SC 155.3.3 P 58 L 34 # 197  
 Huber, Thomas Nokia  
 Comment Type T Comment Status A bucket  
 The signal rate between PCS and PMA seems to be mixing symbols and bits. Each transfer between PCS and PMA has 128 bits, or 16 DP-16QAM symbols, so the rate between PCS and PMA would be 1/16 the DP-16QAM symbol rate. It would of course be 1/128 the DP-16QAM bit rate .  
 SuggestedRemedy  
 Either change to 1/16, or change "DP-16QAM symbol rate" to "DP-16QAM bit rate".  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.

Change 1/128 to 1/16. See response to comment #76

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CI 155 SC 155.3.3 P 58 L 34 # 77  
 Ran, Adee Cisco  
 Comment Type ER Comment Status A bucket  
 "Likewise" is inadequate; the interface between the PMA and the PMD is nothing like the interface with the PCS.  
 This should be a separate paragraph from the PCS interface.  
 SuggestedRemedy  
 Delete "Likewise" and add a paragraph break.  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.3.3 P 58 L 36 # 198  
 Huber, Thomas Nokia  
 Comment Type T Comment Status A bucket  
 The last sentence has a few issues. The use of "Likewise" to begin the sentence seems not quite right since the interface between PCS and PMA and the interface between PMA and PMD are quite different. The list of components should have 'and' rather than 'or'. It's not clear if the last clause about nominal signaling rate is intended to mean the 4 components all have the same nominal rate, or that collectively they support the same rate as the PCS-to-PMA interface supports.  
 SuggestedRemedy  
 Rewrite the sentence: The input (receive direction) or output (transmit direction) signals between the PMA and PMD carry analog signals representing the components of DP-16QAM symbols (namely, XI, XQ, YI, and YQ). All of the components operate at the same nominal signaling rate.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.

The rate at the PMA to PMD service interface is higher than the rate at the PCS to PMA service interface due to the addition of Pilot, FAW and reserved symbols to create the DSP frame. Change: "Likewise, the input (receive direction) or output (transmit direction) signals between the PMA and PMD carry analog signals representing the components of symbols, namely XI, XQ, YI, or YQ, and operate at the same nominal signaling rate." To: "The input (receive direction) or output (transmit direction) signals between the PMA and PMD carry analog signals representing the components of DP-16QAM symbols (namely, XI, XQ, YI, and YQ)."

CI 155 SC 155.3.3 P 58 L 36 # 78  
 Ran, Adee Cisco  
 Comment Type ER Comment Status A bucket  
 "and operate at the same nominal signaling rate"  
 Same as what? It's not the same as the PCS-PMA rate.  
 What is the rate?  
 SuggestedRemedy  
 Rephrase, preferably adding the nominal signaling rate explicitly.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #198

CI 155 SC 155.3.3.1.1 P 58 L 45 # 199  
 Huber, Thomas Nokia  
 Comment Type T Comment Status A bucket  
 The second paragraph seems out of place since this subclause is discussing the transmit function.  
 SuggestedRemedy  
 Delete the paragraph.  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.3.3.1.1 P 58 L 49 # 262  
 Law, David Hewlett Packard Enterprise  
 Comment Type E Comment Status A bucket  
 Suggest that the text 'Each SD-FEC codeword from the SD-FEC encoder ...' should be changed to read 'Each SD-FEC codeword passed across the PMA service interface from the SD-FEC encoder ...'.  
 SuggestedRemedy  
 See comment.  
 Response Response Status C  
 ACCEPT.

IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.3.3.1.1 P 59 L 10 # 200

Huber, Thomas

Nokia

Comment Type T Comment Status A bucket

Columns 1-3 of table 155-2 and columns 4-6 are the same, except for the headings of columns 1 and 4. It would be better to reduce to 3 columns and combine the headings appropriately.

*SuggestedRemedy*

Delete columns 4-6. Change the heading of columns 2 and 3 to I and Q, respectively.

Change the heading of column 1 to

X: (c8i,m c8i+1, c8i+2, c8i+3)

Y: (c8i+4, c8i+5, c8i+6, c8i+7)

Response Response Status C

ACCEPT IN PRINCIPLE.

Delete columns 4-6. Change the heading of columns 2 and 3 to I and Q, respectively.

Change the heading of column 1 to

X: (c8i, c8i+1, c8i+2, c8i+3)

Y: (c8i+4, c8i+5, c8i+6, c8i+7).

With editorial license.

CI 155 SC 155.3.3.1.2 P 59 L 42 # 201

Huber, Thomas

Nokia

Comment Type T Comment Status A bucket

This sentence (which appears to be copied directly from 400ZR) is out of place here - there is no context for what pilot symbols are. The first sentence of the second paragraph (which also appears to come from 400ZR) is not necessary to understand how the interleaving works (and is somewhat contradicted by later text that discusses how the output of the interleaving process is mapped into the transmission frame), and the two paragraphs can otherwise be combined.

*SuggestedRemedy*

Replace the first paragraph and first sentence of the second paragraph with:

The DP-16QAM symbols from 16 SD-FEC codewords are time-interleaved to decorrelate the noise between consecutively received symbols.

Response Response Status C

ACCEPT.

CI 155 SC 155.3.3.1.2 P 59 L 46 # 263

Law, David

Hewlett Packard Enterprise

Comment Type T Comment Status A bucket

It seems odd to say that 'Prior to ... frame construction, each frame consists of 10 976 x 16 DP-16QAM symbols.', if the frame hasn't been constructed it doesn't consist of anything. In addition, subclause 155.3.3.1.3 'Transmission multi-frame and frame' says 'Each multi-frame is made up of 49 frames, each with 3712 symbols.'. It, therefore, appears that the reference to 'each frame consists of 10 976 x 16 DP-16QAM symbols' is about 400GBASE-ZR frames used within PCS, rather than the multi-frame and frame used within the PMA.

Since the PMA service interface just passes a continuous stream of 128-bit SD-FEC codewords from the PCS to PMA, with no other information, the PMA has no knowledge of the 400GBASE-ZR frame used within PCS. As a result, I suggest that this sentence is deleted.

*SuggestedRemedy*

Delete the text 'Prior to polarization distribution and transmission frame construction, each frame consists of 10 976 16 DP-16QAM symbols' from the start of the second paragraph of subclause 155.3.3.1.2.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #201

CI 155 SC 155.3.3.1.2 P 60 L 1 # 264

Law, David

Hewlett Packard Enterprise

Comment Type T Comment Status A bucket

The last paragraph of subclause 155.3.3.1.2 'Symbol interleaving' says 'The output stream is mapped, with the transmission order of left to right, into the next available frame payload location (see 155.3.3.1.3)'. It isn't clear what 'left to right' is about, if it is to Figure 155-10 'Eight-way Hamming code interleaver' I'm not sure that is a complete description. Instead, for Figure 155-10, isn't it 'bottom to top from left to right'?

*SuggestedRemedy*

Suggest the text '... the transmission order of left to right, into the ...' is changed to read '... the transmission order of from bottom to top, left to right (see Figure 155-10), into the ...'.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change: "The output stream is mapped, with the transmission order of left to right, into the next available frame payload location (see 155.3.3.1.3)." To: "The output stream is mapped, with the transmission order bottom to top, left to right (see Figure 155-10), into the next available frame payload location (see 155.3.3.1.3)."

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Cl 155 SC 155.3.3.1.2 P 60 L 27 # 265

Law, David Hewlett Packard Enterprise

Comment Type T Comment Status A bucket

Subclause 155.2.5.11 'Hamming SD-FEC encoder' says '... results in 10 796 128-bit SD-FEC codewords.' and 'The 128-bit SD-FEC codewords are sent to the 400GBASE-ZR PMA sublayer ...'. Subclause 155.3.3.1.2 'Symbol interleaving' says 'The symbol interleaver performs an 8-way interleaving of groups of sixteen symbols mapped from SD-FEC codewords as illustrated in Figure 155-10.'. I, therefore, believe the reference to 'Hamming code' should be changed to 'SD-FEC codeword' in the title of Figure 155-10.

*SuggestedRemedy*

Suggest that the title of Figure 155-10 be changed from 'Eight-way Hamming code interleaver' to 'Eight-way SD-FEC codeword interleaver'.

Response Response Status C

ACCEPT IN PRINCIPLE.

The interleaving is of DP-16QAM symbols. Change the title of Figure 115-10 to: "Eight-way DP-16QAM symbol interleaver"

Cl 155 SC 155.3.3.1.3 P 60 L 32 # 79

Ran, Adeo Cisco

Comment Type E Comment Status A bucket

"For each polarization, the stream of SD-FEC interleaved symbols are assembled"

Singular/plural mismatch

*SuggestedRemedy*

Either change "the stream of" to "the" or change "are" to "is".

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "are" to "is"

Cl 155 SC 155.3.3.1.3 P 60 L 32 # 266

Law, David Hewlett Packard Enterprise

Comment Type T Comment Status A bucket

The first paragraph of subclause 155.3.3.1.3 'Transmission multi-frame and frame' says 'For each polarization, the stream of SD-FEC interleaved symbols are assembled into a frame format suitable for transmission over the 400GBASE-ZR medium and for reception and decoding by the 400GBASE-ZR PMA receive path.'. I don't believe it is a stream of 'SD-FEC interleaved symbols', instead I believe it is a stream of 'interleaved DP-16QAM symbols' (see 155.3.3.1.2 'Symbol interleaving' that says 'The DP-16QAM symbols shall be time interleaved ...').

*SuggestedRemedy*

Suggest that the text 'For each polarization, the stream of SD-FEC interleaved symbols are assembled into a frame format suitable for transmission ...' is changed to read 'The stream of interleaved DP-16QAM symbols is assembled into a frame format, one for each polarization, suitable for transmission ...'.

Response Response Status C

ACCEPT.

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CI 155 SC 155.3.3.1.3 P 60 L 39 # 202

Huber, Thomas

Nokia

Comment Type T Comment Status A bucket

The description of the frame and mutiframe structure would be more clear if the abbreviations for the different types of symbols were spelled out, and if the organization was modified such that the overall structure of the frame is described before the details of the first vs 2nd through 49th frames are described.

*SuggestedRemedy*

Replace the second, third, and fourth paragraphs with this text:  
Each frame is based on 116 sets of 32 symbols. The first symbol of each set is a pilot symbol [P0, P1, ..., P115]. Each frame begins with an 11-symbol training sequence (TS, ts<0:10>). ts<0> is this also P0.

The first frame includes a 22-symbol Frame Alignment Word (FAW, faw<0:21>), 76 reserved symbols (rsvd<0:75>), and 3488 payload symbols (m<0:3487>). The reserved symbols are randomized and are ignored by the receiver. The payload symbols occupy the last 16 symbols before P4 and all symbols between P4 and P115.

Frames 2 through 49 do not have the FAW or reserved symbols, and therefore carry 1586 payload symbols, occupying the last 21 symbols between P0 and P1, and all symbols between P1 and P115.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change the second, third and fourth paragraphs to (see also comments #267 and #268):"Each frame is based on 116 sets of 32 symbols. The first symbol of each set is a pilot symbol [P0, P1, ..., P115]. Each frame begins with an 11-symbol training sequence (TS, ts<0:10>). The first symbol of each TS has the same value as the corresponding pilot symbol for each polarization and is counted as a pilot symbol. The first frame includes a 22-symbol Frame Alignment Word (FAW, faw<0:21>), 76 reserved symbols (rsvd<0:75>), and 3488 payload symbols (m<0:3487>). The reserved symbols are randomized and are ignored by the receiver. The payload symbols occupy the last 16 symbols before P4 and all symbols between P4 and P115. Frames 2 through 49 do not have the FAW or reserved symbols, and therefore carry 1586 payload symbols, occupying the last 21 symbols between P0 and P1, and all symbols between P1 and P115."

CI 155 SC 155.3.3.1.3 P 60 L 39 # 267

Law, David

Hewlett Packard Enterprise

Comment Type E Comment Status A bucket

Since the second paragraph of subclause 155.3.3.1.3 includes the first use of TS, PS, and FAW, suggest that they should be expanded.

*SuggestedRemedy*

Suggest that the text '... an 11-symbol TS (ts<0:10>), 116 PS symbols [P0, ..., P115], a 22-symbol FAW (faw<0:21>) ...' should be changed to read '... an 11-symbol Training sequence (TS) (ts<0:10>), 116 Pilot sequence (PS) symbols [P0, ..., P115], a 22-symbol Frame alignment word (FAW) (faw<0:21>) ...'.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #202

CI 155 SC 155.3.3.1.3 P 60 L 41 # 268

Law, David

Hewlett Packard Enterprise

Comment Type T Comment Status A bucket

The second paragraph of subclause 155.3.3.1.3 says 'There are 16 symbols after P3 ...'. According to Figure 155-11 there are 31 symbols after P3, 15 reserved symbols (rsvd<61:75>) followed by 16 payload symbols (m<0:15>).

*SuggestedRemedy*

Suggest the text 'There are 16 symbols after P3 ...' should be changed to read 'There are 16 payload symbols, preceded by 15 reserved symbols, after P3 ...'. Similarly, suggest that the text 'There are 21 symbols after P0 and ...' on line 45 is changed to read 'There are 21 payload symbols, preceded by 10 Training symbols, after P0 and ...'.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #202

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Cl 155 SC 155.3.3.1.3 P 60 L 42 # 80

Ran, Adeo Cisco  
 Comment Type TR Comment Status A

"The reserved symbols are randomized"

Specifying randomization or randomness is problematic.

Whether any sequence is allowed, or some sequences are not allowed, should be stated explicitly.

If pseudo-randomness is required, a suitable pattern (such as PRBS<n>) could be recommended.

*SuggestedRemedy*

Assuming there is no restriction on the sequence, change "The reserved symbols are randomized and their content ignored by the receiver" to "The values of reserved symbols are not specified and they are ignored by the receiver".

Response Response Status C

ACCEPT IN PRINCIPLE.

113.3.2.2.18 states that you can randomize without stating the exact method to randomize.

Change: "The reserved symbols are randomized and are ignored by the receiver."

To: "While the reserved symbols are not specified and are ignored by the receiver, it is recommended that the reserved symbols be randomized by any scrambler that is 2<sup>13</sup> or longer."

With editorial license.

Align with resolution of comment #202.

Cl 155 SC 155.3.3.1.4 P 61 L 31 # 270

Law, David Hewlett Packard Enterprise  
 Comment Type E Comment Status A bucket

I don't think the term DC balance needs to be qualified by 'zero'.

*SuggestedRemedy*

Suggest the text '... and designed for zero DC balance.' should be '... and is designed for DC balance.'

Response Response Status C

ACCEPT.

Cl 155 SC 155.3.3.1.4 P 61 L 31 # 269

Law, David Hewlett Packard Enterprise  
 Comment Type E Comment Status A bucket

Suggest that the text '... the outer constellation symbol values ...' (page 61, line 31) is changed to read '... the outer four points of the 16QAM constellation symbol values ...' and the text 'The symbols values are set at the outer four points of the 16QAM constellation ...' (page 62, line 29) is changed to read 'It is made up of the outer four points of the 16QAM constellation symbol values and ...' to align similar text in these two locations.

*SuggestedRemedy*

See comment.

Response Response Status C

ACCEPT.

Cl 155 SC 155.3.3.1.6 P 63 L 42 # 81

Ran, Adeo Cisco

Comment Type T Comment Status A

Table 155-5 seems to be a text representation of Figure 155-12, and Table 155-6 is yet another representation of the same information.

The bit order of the seeds (shown in hexadecimal in Table 155-5) relative to p9 / p0 in the figure is not stated; from the figure, it seems that p9 is the msb and p0 is the lsb. But without stating it explicitly, the table is not helpful.

Table 155-6 isn't really human readable since only the signs are changing. The way it is formatted it's not machine readable either, so it seems not helpful.

*SuggestedRemedy*

Change "The generator polynomial and seed values are listed in Table 155-5" to "The generator polynomial and seed values are listed in Table 155-5 (with the least significant bit generated first)"

Consider deleting Table 155-5, since it's redundant.

Consider deleting Table 155-6, since it's also redundant and isn't helpful.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change: "The generator polynomial and seed values are listed in Table 155-5" to: "The generator polynomial and seed values are shown in Figure 155-12 and are listed in Table 155-5".

Editor believes that the tables provide useful information and deleting them will not improve the quality of the draft.

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CI 155 SC 155.3.3.1.7 P 65 L 3 # 272

Law, David Hewlett Packard Enterprise  
 Comment Type TR Comment Status A bucket

Subclause 155.3.3.1.7 '16QAM encode' says 'The two polarization symbol streams stream [sic] shall be converted to four analog signals ...'. I believe that the 'two polarization symbol streams' are produced by serialising the two multi-frames, one for each polarization, but this process isn't specified.

SuggestedRemedy

Suggest that:

[1] The text 'The two polarization symbol streams stream shall be converted to four analog signals ...' in subclause 155.3.3.1.7 should be changed to read 'Two polarization symbol streams, derived from their respective multi-frames, shall be converted to four analog signals ...'

[2] A new last paragraph should be added to the end of subclause 155.3.3.1.3 'Transmission multi-frame and frame' that reads 'Each multi-frame shall be serialised into a stream of 16QAM symbols for transmission. Relative to Figure 155-11, the frames shall be transmitted from top to bottom, and the symbols of each frame shall be transmitted from left to right. The assembly of symbols into multi-frames is continuous.'

[3] An arrow should be drawn to the right of Figure 155-11 annotated 'Frames transmitted top to bottom'.

[4] An arrow should be drawn at the bottom of Figure 155-11. It should start below P0 of frame 48, drop-down, and then turn 90 degrees to the right, ending below the righthand side of frame 48. The arrow should be annotated as 'Symbols transmitted left to right'.

See IEEE\_P802d3cw\_D2p1\_comments\_David\_Law\_figure\_155-1.jpg for illustration of [3] and [4].

Response Response Status C

ACCEPT IN PRINCIPLE.

Implement suggested remedy with editorial license

CI 155 SC 155.3.3.1.7 P 65 L 3 # 271

Law, David Hewlett Packard Enterprise  
 Comment Type E Comment Status A bucket

Typo

SuggestedRemedy

Change '... symbol streams stream shall ...' to read '... symbol streams shall ...'

Response Response Status C

ACCEPT.

CI 155 SC 155.3.3.1.7 P 65 L 3 # 109

Bruckman, Leon Huawei  
 Comment Type E Comment Status A bucket

"The two polarization symbol streams stream shall be converted" unnecessary word "stream"

SuggestedRemedy

Replace: "The two polarization symbol streams stream shall be converted" with: "The two polarization symbol streams shall be converted"

Response Response Status C

ACCEPT.

CI 155 SC 155.3.3.1.7 P 65 L 5 # 273

Law, David Hewlett Packard Enterprise  
 Comment Type E Comment Status A bucket

Typo.

SuggestedRemedy

Suggest that '... the PMD:IS\_UNITDATA.request primitives.' should be changed to read '... the PMD:IS\_UNITDATA.request primitive.'

Response Response Status C

ACCEPT.

CI 155 SC 155.3.3.1.8 P 65 L 9 # 110

Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket

There is an entry in the PICS to test this function, but there is no "shall"

SuggestedRemedy

Replace: "are passed" with: "shall be passed"

Response Response Status C

ACCEPT.



IEEE P802.3cw D2.1 400 Gb/s over DWDM systems 1st Working Group recirculation ballot comments

CI 155 SC 155.3.3.1.8 P 65 L 9 # 274  
 Law, David Hewlett Packard Enterprise  
 Comment Type E Comment Status A bucket  
 Suggest a shall is added to subclause 155.3.3.1.8.  
 SuggestedRemedy  
 Suggest that the text 'The four analog signals XI, XQ, YI, and YQ are passed to ... using any of the mappings in Table 155-7.' should be changed to read 'The four analog signals XI, XQ, YI, and YQ shall be passed to ... using one of the mappings in Table 155-7.'  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.3.3.1.8 P 65 L 14 # 111  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket  
 Table 155-7 title refers to physical lanes, while the clause talks about analog signals  
 SuggestedRemedy  
 Replace: "Allowed symbol mapping to physical lanes" with: "Allowed symbol mapping to analog signals"  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.4.2 P 68 L 36 # 275  
 Law, David Hewlett Packard Enterprise  
 Comment Type E Comment Status A bucket  
 Since for faws\_lock<x>, x = 0:1 (see page 69, line 12) suggest that:  
 [1] The two instances of '... true for all x ...' should be changed to read '... true for both x ...'.  
 [2] The one instance of '... for any x.' should be changed to read '... for either x.'  
 SuggestedRemedy  
 See comment.  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.4.2 P 68 L 45 # 112  
 Bruckman, Leon Huawei  
 Comment Type TR Comment Status A bucket  
 There is no low power mode  
 SuggestedRemedy  
 Replace: "during power on, and when the MDIO has put the PMA sublayer into low power mode." with: "and during power on."  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.4.2 P 68 L 48 # 113  
 Bruckman, Leon Huawei  
 Comment Type TR Comment Status A bucket  
 There is no low power mode  
 SuggestedRemedy  
 Replace: "during power on, and when the MDIO has put the PCS sublayer into low-power mode." with: "and during power on."  
 Response Response Status C  
 ACCEPT.

CI 155 SC 155.4.2 P 68 L 48 # 221  
 Brown, Matt Huawei  
 Comment Type TR Comment Status A bucket  
 EEE is not supported for 400GBASE-ZR.  
 SuggestedRemedy  
 Delete: ", and when the MDIO has put the PCS sublayer into low-power mode."  
 Response Response Status C  
 ACCEPT.

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CI 155 SC 155.4.2 P 70 L 12 # 219  
 Brown, Matt Huawei  
 Comment Type E Comment Status A bucket  
 The word "can" in this context is deprecated per style guide.  
**SuggestedRemedy**  
 Change "The JC1-JC2 field information is also protected by limits on how the JC1-JC2 fields can change"  
 To: "Change "The JC1-JC2 field information is also protected by limits on how the JC1-JC2 fields might change"  
**Response** Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #192. Editor assumed that commenter refers to text in page 54 line 8

CI 155 SC 155.4.2 P 70 L 12 # 222  
 Brown, Matt Huawei  
 Comment Type E Comment Status A bucket  
 The word "can" in this context is deprecated per style guide.  
**SuggestedRemedy**  
 Change "A Boolean variable that is set to true when the AMP\_SLIP requested by the alignment marker lock state diagram has been completed and the next candidate 1920-bit block position can be tested."  
 To: "A Boolean variable that is set to true when the AMP\_SLIP requested by the alignment marker lock state diagram has been completed and the next candidate 1920-bit block position is available to be tested."  
**Response** Response Status C  
 ACCEPT.

CI 155 SC 155.5 P 75 L 21 # 223  
 Brown, Matt Huawei  
 Comment Type T Comment Status A  
 For the following 400GBASE-ZR PCS variables the MDIO device number should be 3 not 1: amps\_locked, FEC\_corrected\_cw\_counter, FEC\_uncorrected\_cw\_counter, FEC\_total\_bits\_counter, FEC\_corrected\_bits\_counter. The addresses here were correct for the 100GBASE-ZR SC-FEC sublayer using device 1.  
**SuggestedRemedy**  
 Add a new set of equivalent registers to Clause 45 with device address "3" not 1.  
**Response** Response Status C  
 ACCEPT IN PRINCIPLE.  
 Implement suggested remedy in clause 45 with editorial license. Delete first row of Table 155-9 since there is no such variable (amps\_locked) and a new "3" variable is not required.

CI 155 SC 155.5.1 P 76 L 12 # 82  
 Ran, Adee Cisco  
 Comment Type E Comment Status A bucket  
 "The variable register is a 32-bit counter"  
 "register" is used in clause 45; within the PCS these are variables.  
 Similarly in 155.5.2.  
**SuggestedRemedy**  
 Change "The variable register" to "This variable", in both places.  
**Response** Response Status C  
 ACCEPT IN PRINCIPLE.  
 In 155.5.1 change: "The variable register is a 32-bit counter" to: "The FEC\_corrected\_cw\_counter ia a 32-bit counter" and in 155.5.2 change: "The variable register is a 32-bit counter" to: "The FEC\_uncorrected\_cw\_counter is a 32-bit counter" consistent with text in clause 153.2.5

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**Cl 155**    **SC 155.6**                      **P 74**            **L 18**            # **230**  
 Brown, Matt                                      Huawei  
**Comment Type**    **T**            **Comment Status**    **R**                                      *bucket*  
 1 pause\_quanta = 512 BT  
 2400000 BT is 4687.5 pause\_quanta  
 Delay constraints are normally specified in integer number of pause\_quanta.  
**SuggestedRemedy**  
 Change "2 400 000 BT" to "2 400 256 BT"  
 Change "6000 ns" to "6000.64 ns"  
**Response**                                      **Response Status**    **C**  
 REJECT.  
 The proposed values are already integrated in D2.1. Commenter may have mistakenly referred to D2.0. Referenced text is on page 76 line 36.

**Cl 155**    **SC 155.7.3**                      **P 78**            **L 10**            # **276**  
 Law, David                                      Hewlett Packard Enterprise  
**Comment Type**    **E**            **Comment Status**    **A**                                      *bucket*  
 Suggest that the 'Subclause' entry for PICS item DC should be 155.6.  
**SuggestedRemedy**  
 See comment.  
**Response**                                      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.  
 Implement suggested remedy. Also delete word "in" from the "Value/Comment" column text in the same row

**Cl 155**    **SC 155.7.4.1**                      **P 78**            **L 14**            # **224**  
 Brown, Matt                                      Huawei  
**Comment Type**    **E**            **Comment Status**    **A**                                      *bucket*  
 The word "can" in this context is deprecated per style guide.  
**SuggestedRemedy**  
 Reference to the subclause 155.2.6.7.2 is sufficient. Delete the text in the value/comment cell for FDD.  
**Response**                                      **Response Status**    **C**  
 ACCEPT.

**Cl 155**    **SC 155.7.4.1**                      **P 78**            **L 50**            # **114**  
 Bruckman, Leon                                      Huawei  
**Comment Type**    **E**            **Comment Status**    **A**                                      *bucket*  
 Make text consistent with clause  
**SuggestedRemedy**  
 Replace: "Symbol mapping to physical signals" with: "Symbol mapping to analog signals"  
**Response**                                      **Response Status**    **C**  
 ACCEPT.

**Cl 155A**    **SC 155A.1**                      **P 114**            **L 9**            # **91**  
 Ran, Adee                                      Cisco  
**Comment Type**    **E**            **Comment Status**    **A**  
 The annex title "400GBASE-ZR PCS/PMA sublayer partitioning examples" is inadequate - the diagram shows a partition of the physical layer between the 400GMII and the PHY using a 400GMII extender.  
 There is no partition of the 400GBASE-ZR PHY itself.  
**SuggestedRemedy**  
 Change the title to "Physical layer partitioning example with 400GBASE-ZR".  
 Change "an example 400GBASE-ZR PCS/PMA layering with a 400GMII Extender" to "an example partition of a Physical layer with 400GBASE-ZR PHY and a 400GMII Extender".  
**Response**                                      **Response Status**    **C**  
 ACCEPT IN PRINCIPLE.  
 Change the title of annex 155A to "400GBASE-ZR physical layer partitioning example".  
 In 155A-1 change "Figure 155A-1 depicts an example 400GBASE-ZR PCS/PMA layering with a 400GMII extender using one 400GAUI-4 interface" to "Figure 155A-1 depicts an example 400GBASE-ZR PHY with a 400GMII extender using one 400GAUI-4 interface".  
 Change the title of Figure 155A-1 to "Example 400GBASE-ZR PHY with a 400GMII extender using one 400GAUI-4 interface".  
 With editorial license.

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Cl 155A SC 155A.1 P 114 L 30 # 156

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

Comment Type E Comment Status A bucket

Figure 155A-1 is essentially the same figure as 118-2. However, in Fig 155A-1, the PMA(16:4) is denoted as MMD 10 and PMA (4:16) is denoted as MMD 9, which does not match Fig 118-2, which uses MMD 9 and MMD 8 respectively.

*SuggestedRemedy*

Change the noted MMDs in Fig 155A-1 to match the same MMDs in Fig 118-2.

Response Response Status C

ACCEPT IN PRINCIPLE.

In Figure 155A-1 change MMD10 to MMD9 and MMD9 to MMD 8 to align with Figure 118-2 in IEEE Std 802.3-2022.

Cl 156 SC 156.1.1 P 81 L 42 # 225

Brown, Matt Huawei

Comment Type T Comment Status A

The FLR target defined for this PMD in this draft is consistent with a PHY that includes up to two AUIs in the PHY at each end of the link. For the 400GBASE-ZR the AUIs if implemented are within a 400GMII extender and thus the FEC is segmented and the resulting FLR due to the AUIs will be significantly lower than 6.2E-11.

*SuggestedRemedy*

Change the FLR limit to 6.2E-11.

Response Response Status C

ACCEPT.

Cl 156 SC 156.2 P 83 L 1 # 203

Huber, Thomas Nokia

Comment Type T Comment Status A

It is not clear why figures 156-2 and 156-3 are here. Other PMD clauses do not include figures like these. Figure 156-1 already shows how the PMD relates to the other sublayers; figures 156-2 and 156-3 aren't relevant to the definition of the PMD.

*SuggestedRemedy*

Delete figures 156-2 and 156-3.

Response Response Status C

ACCEPT IN PRINCIPLE.

The service interface definition currently contained in clause 116 is specific to the 400GBASE-R family of PHYs and not applicable to a 400GBASE-ZR PHY. A service interface definition for the 400GBASE-ZR PHY is necessary and it was felt it was better for the reader to be located in the specific 400GBASE-ZR PMD clause. These figures are included as part of the service interface definition.

In 116.3 change "The service interfaces for the 400GBASE-ZR PHY are defined in 155.3.2 and 156.2.1."

to

"The service interfaces for the 400GBASE-ZR PHY are defined in 155.2.1, 155.3.2 and 156.2.1 and illustrated in Figure 156-2 and Figure 156-3."

Cl 156 SC 156.2.1.3.1 P 86 L 14 # 141

Dudek, Mike Marvell

Comment Type T Comment Status A signal ok

156.5.4 says that the global signal detect function should be set to a fixed OK value. This would negate what is said here particularly details like the note.

*SuggestedRemedy*

Rewrite as just "Always conveys the value OK (see 156.5.4)". The note if kept could just state "SIGNAL\_OK = OK indication does not imply that the link meets the FLR defined in 156.1.1.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve with response to comment #247.

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Cl 156 SC 156.2.1.3.2 P 86 L 22 # 142  
 Dudek, Mike Marvell  
 Comment Type T Comment Status A signal ok  
 As there is never a change in the value of the SIGNAL\_OK parameter the PMD\_IS\_SIGNAL indication primitive will never be generated.  
*SuggestedRemedy*  
 Rewrite as "The PMD\_IS\_SIGNAL indication primitive will never be generated because the value of the SIGNAL\_OK parameter is always set to OK."  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve with response to comment #247.

Cl 156 SC 156.5.1 P 87 L 43 # 83  
 Ran, Adeo Cisco  
 Comment Type E Comment Status R  
 The heading "PMD block diagram" does not match the title of Figure 156-4 "Block diagram for 400GBASE-ZR transmit/receive paths".  
 The figure is not a block diagram of the PMD; the PMD is one block in the figure.  
*SuggestedRemedy*  
 Change "PMD block diagram" to "Link diagram" in the heading and in the text.  
 Response Response Status C  
 REJECT.  
 The use of "PMD block diagram" aligns with multiple optical PMD subclauses in IEEE 802.3-2022.

Cl 156 SC 156.5.2 P 88 L 25 # 115  
 Bruckman, Leon Huawei  
 Comment Type E Comment Status A bucket  
 Strange text: "and delivered to the MDI"  
*SuggestedRemedy*  
 Replace: "and delivered to the MDI" with: "and deliver them to the MDI"  
 Response Response Status C  
 ACCEPT.

Cl 156 SC 156.5.3 P 88 L 36 # 116  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A  
 "amplitude values ranging from -3 to 3" what are the units ?  
*SuggestedRemedy*  
 Some options: Add the units, or remove the text: "with expected amplitude values ranging from -3 to 3", or remove the word "amplitude"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 In 156.5.2 change "The mapping of the FEC bits to the symbol amplitudes is listed in Table 155-2."  
 to  
 "The mapping of the FEC bits to the symbol values is listed in Table 155-2."  
 Change to title of Table 155-2 to "In-phase (I) and quadrature-phase (Q) symbol values"  
 In 156.5.3 change "The four analog streams carry the in-phase component (I) and quadrature-phase (Q) component of the X and Y polarizations with expected amplitude values ranging from -3 to 3."  
 to  
 "The four analog streams carry the in-phase component (I) and quadrature-phase (Q) component of the X and Y polarizations."

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CI 156 SC 156.5.4 P 88 L 40 # 247  
 Maniloff, Eric Ciena  
 Comment Type T Comment Status A Signal ok  
 For 400GBASE-ZR, an appropriate signal detect level can be defined. At a 29dB OSNR, for our highest allowable Rx Power, the accumulated noise would be -20dBm assuming a 100GHz Demux BW, for a 26dB OSNR the value accumulated noise would be -17 dBm.  
 SuggestedRemedy  
 Add a SIGNAL\_DETECT level to indicate OK and FAILED, with a value of  $\leq -17$ dBm indicating FAIL.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change signal\_detect value to indicate OK and FAILED, with a value of  $\leq -17$ dBm, see supporting presentation  
[https://www.ieee802.org/3/cw/public/23\\_06/maniloff\\_3cw\\_02a\\_2306.pdf](https://www.ieee802.org/3/cw/public/23_06/maniloff_3cw_02a_2306.pdf).  
 Insert new table "SIGNAL\_DETECT value definition" and supporting text.  
 With editorial license.

CI 156 SC 156.6 P 89 L 32 # 204  
 Huber, Thomas Nokia  
 Comment Type T Comment Status R  
 Much of the material in clause 156.6 describing the black link concepts is replicating what is already in 154.6. The part that is different begins in the paragraph following figure 156-5, and deals with the fact that 400GBASE-ZR has 64 channels with 75 GHz spacing (whereas 100GBASE-ZR has 48 channels with 100G spacing)  
 SuggestedRemedy  
 The concept of the black link is not any different for 400G than it is for 100G. Replace the replicated material with a cross-reference to clause 154.6 for general discussion of black link concepts and an indication that the channel plan is different for 400GBASE-ZR.  
 Response Response Status C  
 REJECT.  
 Further refinement of the DWDM black link continued during the course of this project differentiating from text related to 100GBASE-ZR in clause 154.  
 There is no consensus to make a change to the draft.

CI 156 SC 156.6 P 89 L 38 # 160  
 D'Ambrosia, John Futurewei, U.S. Subsidiary of Huawei  
 Comment Type E Comment Status A  
 The following sentence is incomplete - as the standard can distribute multiple channels over one or two fibers - depending upon the implementation.  
 In this application, DWDM technology is used to enable the transport of multiple DWDM channels over a single fiber.  
 SuggestedRemedy  
 Change sentence to -  
 In this application, DWDM technology is used to enable the transport of multiple DWDM channels over single mode fiber.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change sentence to -  
 "In this application, DWDM technology is used to enable the transport of multiple DWDM channels over single-mode fiber."

CI 156 SC 156.6 P 89 L 41 # 226  
 Brown, Matt Huawei  
 Comment Type E Comment Status A bucket  
 The word "can" in this context is deprecated per style guide. Also, it is not clear what is meant by "this PMD type" or "the link".  
 SuggestedRemedy  
 Change: "By using this methodology this PMD type can support a wide range of applications, as long as the link requirements specified in 156.8 are met."  
 To: "By using this methodology 400GBASE-ZR PMD supports a wide range of applications, as long as the black link requirements specified in 156.8 are met."  
 Response Response Status C  
 ACCEPT.

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Cl 156 SC 156.6 P 90 L 13 # 154

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

Comment Type TR Comment Status A

The language used to describe TP3 here is noted as "output (TP3\_i in Figure 156-4) of the DWDM black link" is different than earlier reference to TP3 in 156.5.1 - "output of the fiber optic cabling (TP3) at the MDI" which could cause some confusion.

*SuggestedRemedy*

Modify "output (TP3\_i in Figure 156-4) of the DWDM black link" to "output of the DWDM black link at the fiber optic cabling (TP3) at the MDI."

Response Response Status C

ACCEPT IN PRINCIPLE.

Add a new sentence at the end of 156.5.1 "There is an independent TP2 and TP3 associated with each DWDM channel."

In 156.6 change

"single-channel points at the input (TP2\_i in Figure 156-4) and output (TP3\_i in Figure 156-4) of the DWDM black link"

to

"single-channel points at the input (TP2 in Figure 156-4) and output (TP3 in Figure 156-4) of the DWDM black link"

Cl 156 SC 156.6 P 90 L 27 # 84

Ran, Adeo Cisco

Comment Type E Comment Status A

In Figure 156-5, several blocks include "Opt". Does it mean Optical? Optional? Something else?

Also in Figure 156A-1.

*SuggestedRemedy*

Either spell out the word, or delete "Opt" if it's not helpful.

Response Response Status C

ACCEPT IN PRINCIPLE.

In Figure 156-5, Figure 156A-1 and Figure 156A-2 change "Opt" to "Optical".

Cl 156 SC 156.6 P 90 L 43 # 227

Brown, Matt Huawei

Comment Type E Comment Status A bucket

The word "can" in this context is deprecated per style guide.

*SuggestedRemedy*

Change "The 400GBASE-ZR PMD is specified on the basis that it can be connected" To: "The 400GBASE-ZR PMD is specified on the basis that it may be connected"

Response Response Status C

ACCEPT.

Cl 156 SC 156.6 P 91 L 8 # 282

Dawe, Piers Nvidia

Comment Type ER Comment Status A bucket

The house style is to put the units in ordinary round brackets, as in the style manual, Annex B, section 4.3, and a huge number of tables in 802.3 such as Table 116-7 in this draft.

*SuggestedRemedy*

Change the square brackets to the usual round brackets. Also in Table 156-12.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change the "[ ]" brackets to "( )" brackets in Tables 156-4 and 156-12.

Cl 156 SC 156.7.1 P 93 L 44 # 85

Ran, Adeo Cisco

Comment Type T Comment Status R

"dB (12.5 GHz)" is not a unit.

The definition of OSNR in 156.9.16 should use standard units.

Also in other table entries specifying OSNR.

*SuggestedRemedy*

Change to dB, and clarify the definition in 156.9.16 if necessary.

Response Response Status C

REJECT.

"dB (12.5GHz)" is the correct unit for this parameter and aligns with the same parameter for 100GBASE-ZR in Table 154-7 of IEEE Std 802.3-2022.

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CI 156 SC 156.7.1 P 94 L 15 # 143  
 Dudek, Mike Marvell  
 Comment Type E Comment Status A bucket  
 Typo.  
 SuggestedRemedy  
 Change "internals" to "intervals" in footnote b  
 Response Response Status C  
 ACCEPT.

CI 156 SC 156.7.1 P 100 L 50 # 151  
 D'Ambrosia, John Futurewei, U.S. Subsidiary of Huawei  
 Comment Type TR Comment Status D EVM  
 •156.7.1 currently contains a limit of 12% for Error vector magnitude (max). The TF has had discussions about EVM for DP-16QAM for over 4 years. There is limited evidence that an EVM of 12% is an adequate limit to distinguish good from bad transmitters. No further information has been presented into the Task Force and no industry information is available at this time that alleviates this concern.  
 SuggestedRemedy  
 re-open the investigation to establish a suitable quality metric for a DP-16QAM transmitter, which is also important for future coherent applications, e.g. in P802.3dj. Commenter & co-authors will provide presentation with recommendation.  
 Proposed Response Response Status Z  
 REJECT.  
 This comment was WITHDRAWN by the commenter.

CI 156 SC 156.8 P 96 L 33 # 284  
 Dawe, Piers Nvidia  
 Comment Type TR Comment Status A Adjacent channel isolation  
 It is hard to grasp what this table is meant to say.  
 SuggestedRemedy  
 Provide a graph to illustrate it. Define the terms "frequency offset" and "isolation".  
 Response Response Status U  
 ACCEPT IN PRINCIPLE.

Resolve using the response to comment #251.  
 Straw poll #1:  
 Do you support the addition of a graph as part of the resolution to this comment to further define adjacent channel isolation.  
 Yes: 5  
 No: 6  
 No consensus to add the graph to the draft.

CI 156 SC 156.8 P 96 L 33 # 283  
 Dawe, Piers Nvidia  
 Comment Type TR Comment Status A Adjacent channel isolation  
 "Adjacent channel spectral isolation" is not defined (the reference in 156.9.31 is "TBD") and it is not specified what the two frequencies in "frequency offset" are.  
 SuggestedRemedy  
 Define "Adjacent channel spectral isolation", specifying what the two frequencies are. Use references as appropriate,  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #251.



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CI 156 SC 156.9 P 97 L 12 # 285  
 Dawe, Piers Nvidia  
 Comment Type TR Comment Status R  
 Multiple optical parameters are inadequately defined; some (or more) measurement methods are needed for some of them  
 SuggestedRemedy  
 Complete the definitions of the optical parameters, with measurement methods and references as necessary  
 Response Response Status U  
 REJECT.  
 Comment unclear and no suggested remedy provided.

CI 156 SC 156.9.1 P 97 L 37 # 152  
 D'Ambrosia, John Futurewei, U.S. Subsidiary of Huawei  
 Comment Type ER Comment Status A bucket  
 Parameters Optical center frequency, side-mode suppression, average channel output power, transmit output power stability, and transmit output power absolute accuracy are all noted as using pattern "valid 400GBASE-R signal, 5". It is believed the user has a choice to use either pattern, which would be better noted with an or between the two noted patterns. The current denotation doesnt imply a choice between patterns.  
 SuggestedRemedy  
 In Table 156-11, change all instances of "valid 400GBASE-R signal, 5" to "5 or valid 400GBASE-R signal"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 In Table 156-11 change "valid 400GBASE-ZR signal, 5" to "5 or valid 400GBASE-ZR signal"

CI 156 SC 156.9.2 P 98 L 41 # 117  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket  
 "The transmitter is modulated using the test pattern defined in Table 156-10". Table 156-10 defines only test pattern 5, but in Table 156-11 these two parameters can be tested using either test pattern 5 or a valid 400GBASE-ZR signal.  
 SuggestedRemedy  
 Change the reference to Table 156-11  
 Response Response Status C  
 ACCEPT.

CI 156 SC 156.9.2 P 98 L 42 # 153  
 D'Ambrosia, John Futurewei, U.S. Subsidiary of Huawei  
 Comment Type TR Comment Status A bucket  
 Current text is pointing to Table 156-10, which is the summary of test patterns. The test patterns for 156.9.2 are denoted in Table 156-11.  
 SuggestedRemedy  
 Change Table reference from 156-10 to 156-11.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #117.

CI 156 SC 156.9.6 P 99 L 34 # 286  
 Dawe, Piers Nvidia  
 Comment Type TR Comment Status R  
 "Frequency noise" is extremely arcane, and not defined here. Phase noise is much more commonplace (but ambiguous, so that would need definition too). Also, it is not clear how the "frequency noise" is to be measured if the transmitter is transmitting Pattern 5; there needs to be a method that can tell unwanted "frequency noise" from the intended modulation.  
 SuggestedRemedy  
 If there is a well-known metric that does the job, use that instead. Either way, define the parameter with the relevant text, equation(s) and/or references, and write down how it may be measured.  
 Response Response Status U  
 REJECT.  
 No suitable definitions were found and a contribution to recommend a definition would be welcome.  
 No consensus to make a change at this time.

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Cl 156 SC 156.9.6 P 99 L 34 # 118  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A  
 "The laser frequency noise mask is the laser frequency noise" seems odd, is it a mask or is it the laser noise ?  
 SuggestedRemedy  
 Replace: "The laser frequency noise mask is the laser frequency noise and is formed by interpolating" with: "The laser frequency noise mask is formed by interpolating"  
 Response Response Status C  
 ACCEPT.

Cl 156 SC 156.9.6 P 99 L 37 # 287  
 Dawe, Piers Nvidia  
 Comment Type TR Comment Status A  
 "the frequency of interest" is not defined. This might be the laser center frequency, the offset from channel nominal, the offset from the peak, the lowest number in the table, a different number for the measurement at each frequency, or something else.  
 SuggestedRemedy  
 Write down clearly what is meant.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change "the frequency of interest" to "the frequency being measured".

Cl 156 SC 156.9.11 P 101 L 36 # 87  
 Ran, Adeo Cisco  
 Comment Type T Comment Status R  
 The equation of here is the same as that of the I-Q offset (mean) in 159.9.12.  
 Should it be instantaneous instead of mean?  
 SuggestedRemedy  
 Correct as necessary.  
 Response Response Status C  
 REJECT.  
 The formulas are the same, one is instantaneous and is specified over 1us while the other is the mean value.

Cl 156 SC 156.9.11 P 101 L 36 # 248  
 Maniloff, Eric Ciena  
 Comment Type E Comment Status A bucket  
 us is used for microseconds, instead of  $\mu$ s or microseconds  
 SuggestedRemedy  
 change us to  $\mu$ s  
 Response Response Status C  
 ACCEPT.

Cl 156 SC 156.9.11 P 101 L 36 # 86  
 Ran, Adeo Cisco  
 Comment Type E Comment Status A bucket  
 offsett  
 SuggestedRemedy  
 offset  
 Response Response Status C  
 ACCEPT.

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CI 156 SC 156.9.11 P 101 L 37 # 88

Ran, Adee Cisco  
 Comment Type E Comment Status A bucket

"The instantaneous I-Q offset per polarization is the maximum value per polarization and shall be within the limits given in Table 156-6"

Please separate parameter definition from normative statement.

Similarly in 156.9.12.

*SuggestedRemedy*

Change to  
 "The maximum instantaneous I-Q offset per polarization shall be within the limits given in Table 156-6", in a separate paragraph.

Apply similarly in 156.9.12.

Response Response Status C  
 ACCEPT IN PRINCIPLE.

Change 156.9.11 to "The maximum instantaneous I-Q offset per polarization shall be within the limits given in Table 156-6. The instantaneous I-Q offset per polarization is the maximum value per polarization and is calculated as  $I-Q \text{ offset} = 10\log_{10}[(I_{\text{mean}2} + Q_{\text{mean}2})/P_{\text{signal}}]$  with a measurement interval of 1 us." Change 156.9.12 to "The maximum mean I-Q offset per polarization shall be within the limits given in Table 156-6. The mean I-Q offset per polarization is the mean value per polarization and is calculated as  $I-Q \text{ offset} = 10\log_{10}[(I_{\text{mean}2} + Q_{\text{mean}2})/P_{\text{signal}}]$ ."

CI 156 SC 156.9.13 P 101 L 48 # 119

Bruckman, Leon Huawei  
 Comment Type TR Comment Status A bucket

Text is not consistent with other subclauses in this section

*SuggestedRemedy*

At the end of the paragraph add: "and shall be within the limits given in Table 156-6"

Response Response Status C  
 ACCEPT.

CI 156 SC 156.9.14 P 102 L 3 # 120

Bruckman, Leon Huawei  
 Comment Type TR Comment Status A bucket

Text is not consistent with other subclauses in this section

*SuggestedRemedy*

At the end of the paragraph add: "and shall be within the limits given in Table 156-6"

Response Response Status C  
 ACCEPT IN PRINCIPLE.

At the end of the first sentence add "and shall be within the limits given in Table 156-6"

CI 156 SC 156.9.14 P 102 L 4 # 249

Maniloff, Eric Ciena  
 Comment Type E Comment Status A bucket

Period in middle of sentence

*SuggestedRemedy*

change "signal. Measured" to "signal, measured"

Response Response Status C  
 ACCEPT.

CI 156 SC 156.9.15 P 102 L 6 # 121

Bruckman, Leon Huawei  
 Comment Type E Comment Status A bucket

Typeo "I-I-Q"

*SuggestedRemedy*

Replace "I-I-Q" with "I-Q"

Response Response Status C  
 ACCEPT.

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CI 156 SC 156.9.15 P 102 L 8 # 122  
 Bruckman, Leon Huawei  
 Comment Type TR Comment Status A bucket  
 Text is not consistent with other subclauses in this section  
 SuggestedRemedy  
 At the end of the paragraph add: "and shall be within the limits given in Table 156-6"  
 Response Response Status C  
 ACCEPT.

CI 156 SC 156.9.16 P 102 L 15 # 123  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A  
 Spectral excursion is defined in ITU G.698.2 for DP-QPSK, but not for DP-16QAM.  
 Spectral excursion is further mentioned in 156.9.17 without any reference  
 SuggestedRemedy  
 Change spectral excursion reference to the 400ZR OIF IA section 13.4.2, and add the same reference for spectral excursion in section 156.9.17  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.

In 156.9.16 change "as defined in ITU-T G.698.2."  
 to  
 "as defined in OIF-400ZR-02.0, Implementation Agreement 400ZR section 13.4.2"  
 In 156.9.17 in the last sentence change "the maximum spectral excursion"  
 to  
 "the maximum spectral excursion as defined in OIF-400ZR-02.0, Implementation Agreement 400ZR section 13.4.2."

CI 156 SC 156.9.19 P 102 L 41 # 124  
 Bruckman, Leon Huawei  
 Comment Type TR Comment Status A bucket  
 Reference to the value is missing  
 SuggestedRemedy  
 At the beginning of the section add: "The Transmit output power stability shall be within the limits given in Table 156-6."  
 Response Response Status C  
 ACCEPT.

CI 156 SC 156.9.20 P 102 L 51 # 250  
 Maniloff, Eric Ciena  
 Comment Type T Comment Status A bucket  
 Transmit Power should be within the stated range when set to Highest or Lowest provisionable powers.  
 SuggestedRemedy  
 Change highest to lowest or highest  
 Response Response Status C  
 ACCEPT.

CI 156 SC 156.9.20 P 102 L 51 # 125  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket  
 Is "must" used ?  
 SuggestedRemedy  
 Replace "must" with "shall"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.

At the end of the first paragraph add "and shall be within the limits given in Table 156-6". In the second paragraph change "the average transmit output power must be within the range defined by the min and max values of average channel output power as specified in Table 156-6." to "the average transmit output power shall be within the limits given in Table 156-6". With editorial license.

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CI 156 SC 156.9.21 P 103 L 7 # 127  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket  
 Is "must" used ?  
 SuggestedRemedy  
 Replace "must" with "shall"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 At the end of the first paragraph add "and shall be within the limits given in Table 156-6". In the second paragraph change "the average transmit output power must be within the range defined by the min and max values of average channel output power as specified in Table 156-6." to "the average transmit output power shall be within the limits given in Table 156-6"

CI 156 SC 156.9.22 P 103 L 12 # 128  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket  
 Is "must" used ?  
 SuggestedRemedy  
 Replace "must" with "shall"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change "This field specifies the minimum average channel power that must be met for the highest setting of the adjustable range of transmit output power." to "This field specifies the minimum average channel power for the highest setting of the adjustable range of transmit output power and shall be within the limits given Table 156-6"

CI 156 SC 156.9.23 P 103 L 18 # 129  
 Bruckman, Leon Huawei  
 Comment Type TR Comment Status A bucket  
 Text is not consistent with other subclauses in this section  
 SuggestedRemedy  
 At the end of the paragraph add: "and shall be within the limits given in Table 156-6"  
 Response Response Status C  
 ACCEPT.

CI 156 SC 156.9.26 P 103 L 38 # 228  
 Brown, Matt Huawei  
 Comment Type E Comment Status A bucket  
 The word "can" in this context is deprecated per style guide.  
 SuggestedRemedy  
 Change: "Receiver OSNR tolerance is defined as minimum OSNR that the receiver can tolerate while"  
 To: "Receiver OSNR tolerance is defined as minimum OSNR that the receiver tolerates while"  
 Response Response Status C  
 ACCEPT.

CI 156 SC 156.9.26 P 103 L 38 # 144  
 Dudek, Mike Marvell  
 Comment Type E Comment Status A bucket  
 Typo.  
 SuggestedRemedy  
 Delete the duplicate "while maintaining a"  
 Response Response Status C  
 ACCEPT.

CI 156 SC 156.9.26 P 103 L 38 # 130  
 Bruckman, Leon Huawei  
 Comment Type E Comment Status A bucket  
 Redundant text  
 SuggestedRemedy  
 Delete : "a while maintaining"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Resolve using the response to comment #144

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Cl 156 SC 156.9.27 P 103 L 48 # 145

Dudek, Mike

Marvell

Comment Type TR Comment Status A

The maximum ripple is specified as 2.5dB in table 156-8 but it is stated as being between 3dB points so with that definitions it must be at least 3dB.

SuggestedRemedy

Clarify the definition. Maybe it should be measured over a narrower wavelength range or maybe relative to a specific mask.

Response Response Status U

ACCEPT IN PRINCIPLE.

In 156.9.27 change "The ripple is the maximum peak-to-peak insertion loss variation between 3 dB points in the channel passband."

to

"The ripple is the maximum peak-to-peak insertion loss variation measured between the +/- 3 dB frequency points as defined by the maximum spectral excursion mask."

Cl 156 SC 156.9.27 P 103 L 48 # 131

Bruckman, Leon

Huawei

Comment Type TR Comment Status A bucket

Text is not consistent with other subclauses in this section

SuggestedRemedy

At the end of the paragraph add: "and shall be within the limits given in Table 156-8"

Response Response Status C

ACCEPT.

Cl 156 SC 156.9.29 P 104 L 1 # 89

Ran, Adeo

Cisco

Comment Type E Comment Status A bucket

Left margin in this page is larger than in other pages.

SuggestedRemedy

Fix it

Response Response Status C

ACCEPT.

Cl 156 SC 156.9.31 P 104 L 14 # 146

Dudek, Mike

Marvell

Comment Type TR Comment Status A Adjacent channel isolation

There is a TBD in the draft.

SuggestedRemedy

Provide the definition for adjacent channel spectral isolation.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #251.

Cl 156 SC 156.9.31 P 104 L 14 # 4

Laubach, Mark

Ciena

Comment Type T Comment Status A Adjacent channel isolation

Why is there a TBD here? If it is truly needed, why is there no editor note explaining when it will be resolved?

SuggestedRemedy

Get the TBD resolved before going into SA ballot preferably. Leaving it, especially unexplained, is just comment bait. If it does persist, have a clear editor note. I have seen this done once for an EtherType assignment waiting on the RAC. Please try to avoid this TBD persisting beyond WG ballot.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #251.

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CI 156 SC 156.9.31 P 104 L 14 # 251  
 Maniloff, Eric Ciena  
 Comment Type T Comment Status A Adjacent channel isolation  
 Adjacent Channel Spectral Isolation needs additional definition.  
 SuggestedRemedy  
 TBD in this subclause needs to be replaced with a definition. The commenter will bring in a contribution with a proposed definition.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change 156.9.31 to  
 "The limits for the adjacent channel spectral isolation are specified in Table 156-9. The frequencies in Table 156-9 refer to the offset from the center frequency for channel i, fi. The isolation in Table 156-9 specifies the power received at TP3i at the specified frequency for light transmitted into an adjacent channel, at TP2i±1, divided by the power received at TP3i for light at the same optical power at the center frequency fi transmitted into TP2i."

CI 156 SC 156.9.32 P 104 L 21 # 147  
 Dudek, Mike Marvell  
 Comment Type E Comment Status A bucket  
 Typo.  
 SuggestedRemedy  
 insert "in" between "specified" and "Table"  
 Response Response Status C  
 ACCEPT.

CI 156 SC 156.9.32 P 104 L 21 # 132  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status A bucket  
 A "shall" seems to be missing  
 SuggestedRemedy  
 Replace: "the maximum allowable interferometric crosstalk is specified Table 156-8" with: "the maximum allowable interferometric crosstalk shall be as specified in Table 156-8"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change "the maximum allowable interferometric crosstalk is specified Table 156-8" to "the interferometric crosstalk shall be within the limits given in Table 156-8"

CI 156 SC 156.10.1.2 P 105 L 50 # 133  
 Bruckman, Leon Huawei  
 Comment Type E Comment Status A bucket  
 Missing text  
 SuggestedRemedy  
 Replace: "in the following" with: "in the following sections"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Replace "described in the following" with "described in 156.10.1.2.1 through 156.10.1.2.7"

CI 156 SC 156.10.1.2.1 P 106 L 5 # 288  
 Dawe, Piers Nvidia  
 Comment Type TR Comment Status A EVM  
 This says 1000 samples, 156.10.1.2.3 and 156.10.1.2.5 say 1000 symbols, 156.10.1.1 says "The ... sampling rate of the digitizers should be ... at least 1.15 times the symbol rate." So the block that the polarization demux uses can be arbitrarily short. The polarization rotation speed of an 80 km link is 50 krad/s max (1.2 million UI per radian), the channel here is a 2 to 5 m patch cord and the transmitter should not make significant polarization rotation (if it did, it would need a spec to limit it), so it seems that a block longer than 1000 UI would be appropriate.

SuggestedRemedy  
 Define the block size in symbols not samples, but as the duration of symbols is given in UI in 802.3, use "UI" throughout.  
 Choose an appropriate number of UI for the polarization demux. Unless there is a good reason not to, it should be a power of 2. Probably 2048 would be a better choice for slightly less numerical noise.  
 Change the block sizes in 156.10.1.2.3 and 156.10.1.2.5 to powers of 2. There is no advantage in making the polarization demux the same as those because the blocks must be concatenated for the clock recovery step in between (see another comment). So if 1000 is about right for them, change them to 1024.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 In 156.10.1.2.1 change "1000 samples" to "1000 unit intervals".  
 In 156.10.1.2.3 and 156.10.1.2.5 change "1000 symbols" to "1000 unit intervals".

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CI 156 SC 156.10.1.2.2 P 106 L 11 # 289

Dawe, Piers Nvidia  
 Comment Type TR Comment Status A EVM

1000 symbols at ~60 GBd is 17 ns which defeats the 3 MHz clock recovery (1/333 MHz) and would allow a transmitter with very poor jitter to pass. If there's a clock recovery function it should apply on a continuous basis to the measurement, not in blocks.

SuggestedRemedy

Change "applied on a fixed block length of 1000 symbols" to "is applied to the concatenation of the blocks from the polarization demux".

Response Response Status C

ACCEPT.

CI 156 SC 156.10.1.2.4 P 106 L 21 # 290

Dawe, Piers Nvidia  
 Comment Type E Comment Status A bucket

"RRC filter with a beta = 0.2"

SuggestedRemedy

Say that beta is the roll-off factor, use the Greek letter for beta (which I won't use here, the comment tools might not like it), and refer to Eq 156-1.

Response Response Status C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #90.

CI 156 SC 156.10.1.2.4 P 106 L 21 # 90

Ran, Adeo Cisco  
 Comment Type E Comment Status A bucket

beta

SuggestedRemedy

Change to the Greek letter

Response Response Status C

ACCEPT.

CI 156 SC 156.10.1.2.6 P 106 L 30 # 134

Bruckman, Leon Huawei  
 Comment Type E Comment Status A bucket

Text is not clear

SuggestedRemedy

Replace: "The coefficients of the equalizer are searched that minimize the EVMmax value using the signal with additive white Gaussian noise considering the receiver OSNR(min)." with: "The coefficients of the equalizer that minimize the EVMmax value are searched using the signal with additive white Gaussian noise considering the receiver OSNR(min)."

Response Response Status C

ACCEPT.

CI 156 SC 156.10.1.2.7 P 106 L 38 # 291

Dawe, Piers Nvidia  
 Comment Type TR Comment Status A EVM

Items in equations must be defined, typically as a "where" section after each equation. See style guide.

SuggestedRemedy

Define k, K, I\_ref and Q\_ref. Similarly for the other equations.

Response Response Status C

ACCEPT IN PRINCIPLE.

The CRG reviewed supporting presentation  
[https://www.ieee802.org/3/cw/public/23\\_06/sluyiski\\_3cw\\_01\\_2306.pdf](https://www.ieee802.org/3/cw/public/23_06/sluyiski_3cw_01_2306.pdf)

In 156.9.10 implement slide 3 of sluyiski\_3cw\_01\_2306.pdf

Replace the text in 156.10.1.2.7 with reference to relevant section in the OIF-400ZR-02.0, Implementation Agreement 400ZR.

With editorial license.



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Cl 156 SC 156.10.1.2.7 P 107 L 26 # 135  
 Bruckman, Leon Huawei  
 Comment Type T Comment Status R bucket  
 A "shall" seems to be missing at the end of the section  
 SuggestedRemedy  
 At the end of the section add: "EVMmax shall be within the limit given in Table 156-6."  
 Response Response Status C  
 REJECT.  
 The shall statement is previously stated in 156.9.10 with "The EVMmax shall be within the limits given in Table 156-6 if measured using the methods specified in 156.10.1.1 and 156.10.1.2".

Cl 156 SC 156.11.2 P 107 L 52 # 148  
 Dudek, Mike Marvell  
 Comment Type E Comment Status A bucket  
 There is a footnote 7 mark the footnote is on a different page.  
 SuggestedRemedy  
 move the footnote or paragraph so that they are on the same page  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Ensure the footfoot marker and associated footnote are on the same page. With editorial license.

Cl 156 SC 156.13.3 P 110 L 16 # 277  
 Law, David Hewlett Packard Enterprise  
 Comment Type E Comment Status A bucket  
 Suggest that the 'Subclause' entry for PICS item DC should be 156.3.  
 SuggestedRemedy  
 See comment.  
 Response Response Status C  
 ACCEPT.

Cl 156 SC 156.13.4.3 P 112 L 6 # 149  
 Dudek, Mike Marvell  
 Comment Type E Comment Status A bucket  
 The tables provide values not definitions.  
 SuggestedRemedy  
 Change to Per definitions in 156.9.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 In the Value/Comment row of Table 156.13.4.3 change to "Per definitions in 156.9".

Cl 156 SC 156.13.4.4 P 112 L 22 # 150  
 Dudek, Mike Marvell  
 Comment Type E Comment Status A bucket  
 The tables provide values not definitions.  
 SuggestedRemedy  
 Leave the Values/comments blank as is done for 140.12.4.6 in the base standard or change to "meets requirements in Table ....."  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 In Value/Comment column of Table 156.13.4.4, change OM2 to "Per IEC 61280-1-3 under modulated conditions", change OM3 to "Per IEC 61280-1-1" and OM4-OM13 leave blank.

Cl 156 SC 156.A.3 P 117 L 25 # 252  
 Maniloff, Eric Ciena  
 Comment Type T Comment Status D bucket  
 factor 2 should be outside (...)^6 term  
 SuggestedRemedy  
 Update equation  
 Proposed Response Response Status Z  
 REJECT.  
 This comment was WITHDRAWN by the commenter.  
 Change "exp[-loge(2)x(2(f-f0)/B)^6]" to "exp[-loge(2)x2((f-f0)/B)^6]".

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Cl 156 SC 156.A.3 P 117 L 30 # 253  
 Maniloff, Eric Ciena  
 Comment Type T Comment Status A bucket  
 T is transmission in linear units  
 SuggestedRemedy  
 Change definition of T to indicate linear units  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change "transmission loge" to "transmission in linear units"

Cl 156A SC 156A.3 P 117 L 25 # 140  
 Dudek, Mike Marvell  
 Comment Type E Comment Status A bucket  
 The formatting is cutting off part of T  
 SuggestedRemedy  
 fix it.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Correct the equation formatting so T(f) is fully visible.

Cl 156A SC 156A.1 P 115 L 15 # 139  
 Dudek, Mike Marvell  
 Comment Type E Comment Status A bucket  
 Typo.  
 SuggestedRemedy  
 Change "lack" to "black"  
 Response Response Status C  
 ACCEPT.

Cl 156A SC 156A.3 P 117 L 117 # 93  
 Ran, Adee Cisco  
 Comment Type T Comment Status A  
 The text in this paragraph is unclear. Where was this filter used? Why "was used", "will perfectly match", "is useful"? What are "passband" and "spectral isolation"?  
 There is no mention of the parameters f0 and B in the text or tables, nor any reference of "transmission log\_e" (what is it?). "bandwidth" appears in Table 156-1, but with two different values. So it is unclear how should this equation be used.

Cl 156A SC 156A.1 P 115 L 15 # 229  
 Brown, Matt Huawei  
 Comment Type E Comment Status A bucket  
 The word "can" in this context is deprecated per style guide.  
 SuggestedRemedy  
 Change "The purpose of this annex to provide examples of optical component specifications that can meet the DWDM lack link requirements."  
 To: "The purpose of this annex to provide examples of optical component specifications that meet the DWDM lack link requirements."  
 Response Response Status C  
 ACCEPT.

Also, putting a log in the exponent is obfuscating - a factor of 1/2 outside the exponent would be more readable.  
 Also, the equation is truncated on the left.  
 SuggestedRemedy  
 If this subclause is important for the Annex's informative purpose, rewrite it with clear language and equations. Otherwise, consider deleting it.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change "Although no filter will perfectly match" to "Although no filter perfectly matches"  
 The editors feel this section clearly defines the passband of the mux and demux used in the spectral analysis.  
 See response to comment #253.  
 Comment was directed at line 17 not line 117.

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Cl 156A SC 156A.3 P 117 L 117 # 92

Ran, Adeo Cisco

Comment Type T Comment Status R

"3rd-order super-Gaussian" is not a well-known term and does not occur anywhere in 802.3. This expression has been deleted from 156.11.1.2.4.

*SuggestedRemedy*

Rephrase to avoid using unfamiliar terms.

Response Response Status C

REJECT.

As stated in 156A.1 "The purpose of this annex to provide examples of optical component specifications that can meet the DWDM link requirements." The form of the 3rd-order super-Gaussian filter is defined in 156A.3.

Comment was directed at line 17 not line 117.