

IEEE P802.3cw D1.2 400 Gb/s over DWDM systems 3rd Task Force review comments

CI 155 SC 155.1.2 P 34 L 26 # 12

Huber, Tom Nokia  
 Comment Type T Comment Status D bucket

Text says the 400GMII extender sublayers are shown in the figure, but the figure does not include them.

*SuggestedRemedy*

Delete the second sentence of the first paragraph of 155.1.2, beginning with "The sublayers of a 400GMII Extended Sublayer."

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Referenced example is addressed in new 120A-6 which does show how extender sublayer is used with 400GBASE-ZR.

Change existing text "The sublayers of a 400GMII Extender Sublayer (400GXS) from Clause 118 are shown because the 00GBASE-ZR PHY is able to propagate FEC degrade signaling across the PCS and XS sublayers as described in 118.2." to "The sublayers of a 400GMII Extender Sublayer (400GXS) are shown in 120A-6. The 400GBASE-ZR PHY is able to propagate FEC degrade signaling across the PCS and XS sublayers as described in 118.2."

CI 155 SC 155.2.4.1 P 39 L 14 # 13

Huber, Tom Nokia  
 Comment Type T Comment Status A

The sentence about rate matching not being necessary could be more clear. Rate matching as described in 119.2.4.1 has two purposes: making room for alignment markers, and aligning the two clock domains. It is not needed in 400GBASE-ZR both because the AMs are not inserted into the stream of transcoded blocks (they are instead part of the 400GBASE-ZR frame) and because GMP handles the clock domain transition.

*SuggestedRemedy*

Modify the second sentence of the first paragraph to read: "The rate matching described in 119.2.4.1 is not required for the 400GBASE-ZR PCS because the transcoded block stream is mapped into a 400GBASE-ZR frame structure that includes space for alignment markers, and clock compensation between the two clock domains is provided by this mapping."

Response Response Status C

ACCEPT.

CI 155 SC 155.2.4.3 P 39 L 38 # 14

Huber, Tom Nokia  
 Comment Type E Comment Status D bucket

The right-hand curly brace, two horizontal lines, and word 'Frame' on the right hand side of the figure don't seem to add any clarity. The figure title is 400GBASE-ZR frame structure, and the text describes the structure clearly.

*SuggestedRemedy*

Delete the right-hand curly brace, horizontal lines and 'Frame', leaving only the frame itself in the figure.

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 155 SC 155.2.4.4.1 P 40 L 53 # 15

Huber, Tom Nokia  
 Comment Type T Comment Status A

The description of the alignment markers repeats some details from clause 119 that create ambiguity regarding the transmission order, and also doesn't mention that the 3-bit status described in clause 119 is not included.

*SuggestedRemedy*

Rewrite the clause as follows:

Alignment markers are used to provide frame delineation for the 400GBASE-ZR frame. They are inserted before FEC encoding and removed after FEC decoding (see Figure 155-2). The variable am\_mapped<1919:0> is constructed in a manner that yields the same result as the process described in 119.2.4.4.2. The 133-bit pad and 3-bit status fields are not added. The resulting 1920-bit value is inserted in the AM field of each 400GBASE-ZR frame.

Response Response Status C

ACCEPT IN PRINCIPLE.

Replace the first 2 paragraphs 155.2.4.4.1 with

"Alignment markers are used to provide frame delineation for the 400GBASE-ZR frame. They are inserted before FEC encoding and removed after FEC decoding (see Figure 155-2). The variable am\_mapped<1919:0> is constructed in a manner that yields the same result as the process described in 119.2.4.4.2. The 133-bit pad and 3-bit status fields are not added. The resulting 1920-bit value is inserted in the AM field of each 400GBASE-ZR frame."

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CI 155 SC 155.2.4.4.3 P 41 L 18 # 16

Huber, Tom Nokia  
 Comment Type T Comment Status A

The overhead in G.709.1 does not include the 'LDI' field described in 155.2.4.4.5; that is only in the 400ZR IA. As such the statement that the contents of the overhead are described in G.709.1 clauses 8.1 and 9.2 is not accurate.

*SuggestedRemedy*

Since G.709.1 and the 400ZR IA have different descriptive techniques, and neither one uses the same bit numbering convention of 802.3, it may be more expedient to create a figure in P802.3cw that shows the structure of the first set of 320 bits rather than to try and reference either document. Revise the text to say: The overhead is organized into four sets of 320 bits that are interleaved in groups of 10 bits to form the 1280 bit field. The contents of the first 320 bits are as shown in Figure 155-X and described below. The contents of the second through fourth sets of 320 bits are all zeros.

Response Response Status C

ACCEPT IN PRINCIPLE.

Insert a new figure 155-X based on Figure 155-8 to show the details of the status bytes.

Renumber bits to match IEEE convention.

Replace text in 155.2.4.4.3 with "The overhead is organized into four sets of 320 bits that are interleaved in groups of 10 bits to form the 1280 bit field. The contents of the first 320 bits are as shown in Figure 155-X and described in 155.2.4.4.4 through 155.2.4.4.6. The contents of the second through fourth sets of 320 bits are all zeros." with editorial license.

CI 155 SC 155.2.4.4.4 P 41 L 23 # 17

Huber, Tom Nokia  
 Comment Type E Comment Status A

155.2.4.4.4, 155.2.4.4.5, and 155.2.4.4.6 are all describing specific aspects of the 400GBASE-ZR overhead field. As such, it would probably be better if they were renumbered to be subclauses of 155.2.4.4.3.

*SuggestedRemedy*

Change the numbering to 155.2.4.4.3.1 through 155.2.4.4.3.3.

Response Response Status C

ACCEPT IN PRINCIPLE.

The 2021 IEEE SA Standards Style Manual states subclauses can have a maximum of 5 numbers separated by decimal points.

Change 155.2.4.4 "Alignment Marker (AM) and Overhead (OH) insertion" to "Alignment Marker (AM) and Pad insertion"

Change 155.2.4.4.3 400GBASE-ZR OH to 155.2.4.5 Overhead (OH) insertion.

CI 155 SC 155.2.4.4.5 P 41 L 41 # 18

Huber, Tom Nokia  
 Comment Type T Comment Status A

More detail about the LDI field is needed. While it is generally better to cross-reference, and the intent is clearly to match the behavior in the 400ZR IA, the IA treats these bits as part of the STAT byte rather than a separate field, and it also refers back to `tx_am_sf<2:0>` in its definition, so it would be better to describe how `LDI<2:0>` relates to `tx_am_sf<2:0>` directly. The text in the IA appears to align with the definitions of `tx_am_sf<2:0>` for PHY XS FEC Degradation signaling in 118.2.2 of 802.3 (the 'extra processing' in the IA seems to be described in this clause). The order of the bits in the Status byte is different than in `tx_am_sf<2:0>`.

*SuggestedRemedy*

Add the following text to paragraph 4:  
 The contents of `LDI<2:0>` are as follows:  
`LDI<2>` corresponds to `tx_am_sf<0>` in 118.2.2. `LDI<1>` corresponds to `tx_am_sf<2>` in 118.2.2. `LDI<0>` corresponds to `tx_am_sf<1>` in 118.2.2.

Response Response Status C

ACCEPT IN PRINCIPLE.

Add the sentence "The contents of `LDI<2:0>` are as follows:  
`LDI<2>` corresponds to `tx_am_sf<0>` in 118.2.2. `LDI<1>` corresponds to `tx_am_sf<2>` in 118.2.2. `LDI<0>` corresponds to `tx_am_sf<1>` in 118.2.2." to the end of paragraph four of 155.2.4.4.5.

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CI 155 SC 155.2.4.9 P 46 L 3 # 19

Huber, Tom Nokia  
 Comment Type E Comment Status A

The figure contains a mix of lighter and heavier horizontal lines. The heavier lines don't appear to mean anything.

*SuggestedRemedy*

Revise the figure to remove the heavy lines, or make clear what they mean if there is an intended meaning to them.

Response Response Status C

ACCEPT IN PRINCIPLE.

The figure is intended to show the ordering of 10976 codewords at the input to the CI, at the CI output / Hamming encoder input, and then the addition of 9 bits to each 119b codeword at the output of the Hamming encoder. Agree with the commenter that the lighter/heavier lines should be revised to a common width.

CI 155 SC 155.2.4.9 P 46 L 25 # 20

Huber, Tom Nokia  
 Comment Type T Comment Status D bucket

The last 6 rows in the first column are shaded, presumably because they are the 6 blocks of padding, but the shading is not maintained in the other columns.

*SuggestedRemedy*

Remove the shading of the pad blocks and relabel the left-most column to just show 10976 blocks of 119b, as the details of which blocks are pad blocks are not really important to this figure.

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 155 SC 155.2.4.10 P 46 L 38 # 21

Huber, Tom Nokia  
 Comment Type E Comment Status D bucket

No need for a hyphen in "It adds 9-bits of parity."

*SuggestedRemedy*

To maximize clarity, reword as "It adds 9 parity bits."

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 155 SC 155.2.5.6 P 48 L 50 # 22

Huber, Tom Nokia  
 Comment Type T Comment Status D bucket

The title of the clause is "CRC-32 check", but the text is mostly about error marking

*SuggestedRemedy*

Revise the title to be "CRC-32 check and error marking"

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 155 SC 155.2.5.7 P 49 L 6 # 23

Huber, Tom Nokia  
 Comment Type E Comment Status D bucket

There should be a hyphen in CRC32

*SuggestedRemedy*

Change to CRC-32

Proposed Response Response Status W

PROPOSED ACCEPT.

CI 155 SC 155.2.5.7.2 P 49 L 48 # 24

Huber, Tom Nokia  
 Comment Type T Comment Status D

Additional detail about the LDI field and how it relates to tx\_am\_sf<2:0> in clause 118 is needed.

*SuggestedRemedy*

Add a cross-reference to the description of the LDI bits in the Transmit clause (this is currently 155.2.4.4.5, but may be changed to 155.2.4.4.3.2 based on another comment)

Proposed Response Response Status W

PROPOSED ACCEPT.

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CI 155 SC 155.4 P 61 L 10 # 8

Lewis, David Lumentum

Comment Type T Comment Status A

Detailed functions and state diagrams for 400GBASE-ZR PCS and PMA are needed.

*SuggestedRemedy*

Contribution with proposed baseline text and figures will be made at a task force meeting. If the baseline is accepted, the editor's note can be removed. The task force could also decide that the detailed functions and state diagrams are not needed, in which case subclause 155.4 can be removed.

Response Response Status C

ACCEPT IN PRINCIPLE.

Implement slides 6 through 9 of lewis\_3cw\_01\_111521.pdf with editorial license.

CI 155 SC 155.5 P 61 L 17 # 9

Lewis, David Lumentum

Comment Type T Comment Status D

Management information for 400GBASE-ZR PCS and PMA is needed.

*SuggestedRemedy*

Contribution with proposed baseline text and figures will be made at a task force meeting. If the baseline is accepted, the editor's note can be removed. The task force could also decide that management details are not needed, in which case subclause 155.5 can be removed.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Contribution to be considered at a task force meeting.

CI 155 SC 155.6 P 61 L 23 # 10

Lewis, David Lumentum

Comment Type T Comment Status A

Loopback information is needed.

*SuggestedRemedy*

Contribution with proposed baseline text and figures will be made at a task force meeting. If the baseline is accepted, the editor's note can be removed. The task force could also decide that loopback details are not needed, in which case subclause 155.6 can be removed.

Response Response Status C

ACCEPT IN PRINCIPLE.

Delete 155.6 because loopback functionality is already defined in the 400GXS.

CI 155 SC 155.8 P 63 L 1 # 11

Lewis, David Lumentum

Comment Type T Comment Status D

PICS tables are needed.

*SuggestedRemedy*

Contribution with proposed tables will be made at a task force meeting.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Contribution to be considered at a task force meeting.

CI 156 SC 156.7.1 P 73 L 25 # 5

Jackson, Kenneth Sumitomo Electric

Comment Type E Comment Status A

Table 156-6, Laser frequency noise mask. Eliminate TBDs?

*SuggestedRemedy*

Make reference to 156.9.6 Laser frequency noise mask.

Response Response Status C

ACCEPT IN PRINCIPLE.

Remove TBD and replace with "See 156.9.6"

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CI 156 SC 156.7.2 P 74 L 23 # 27  
 Maniloff, Eric Ciena  
 Comment Type T Comment Status A  
 Receiver OSNR is only defined for average receive power = -12 dBm  
 SuggestedRemedy  
 Remove text "For average receive power < -12 dBm"  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 In table 156-7 change  
 "Receiver OSNR (min):  
 For average receive power < -12 dBm  
 For average receive power >= -12 dBm"  
 to  
 "Receiver OSNR (min):"

CI 156 SC 156.7.2 P 74 L 26 # 28  
 Maniloff, Eric Ciena  
 Comment Type T Comment Status A  
 Receiver OSNR tolerance is only defined for average receive power = -12 dBm  
 SuggestedRemedy  
 Remove text "For average receive power = -12 dBm" from receiver OSNR tolerance  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 In table 156-7 change  
 "Receiver OSNR tolerance  
 For average receive power >= -12 dBm"  
 to  
 "Receiver OSNR tolerance"

CI 156 SC 156.7.2 P 74 L 30 # 30  
 Issenhuth, Tom Huawei  
 Comment Type E Comment Status D bucket  
 Table 156-7 has a blank line at the end of the table  
 SuggestedRemedy  
 Remove the blank line  
 Proposed Response Response Status W  
 PROPOSED ACCEPT.

CI 156 SC 156.8 P 75 L 41 # 26  
 Maniloff, Eric Ciena  
 Comment Type T Comment Status A  
 Interferometric crosstalk is not required to be specified for point-to-point applications.  
 SuggestedRemedy  
 Remove Interferometric crosstalk from Table 156-8  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Keep Interferometric crosstalk at TP3 (max) in Table 156-8. Add a footnote stating "Only relevant with implementations of a DWDM black link with one or more OADMs present"  
 Update 156.9.24 to provide more context for the footnote.  
 With editorial license.

CI 156 SC 156.9.4 P 78 L 41 # 7  
 Jackson, Kenneth Sumitomo Electric  
 Comment Type T Comment Status A  
 Figure 156-4-Transmit spectral mask (max and min)  
 The text says, "...lower mask is set at -9 dB up to half the baud rate....", yet the Figure shows (30.8,-9). Isn't half the baud rate 29.9?  
 SuggestedRemedy  
 If my understanding is correct, the figure should be changed to reflect half the baud-rate.  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 The value of 30.8 in figure 156-4 is correct but the reference in D1.2 to half the baud rate is incorrect.  
 Change sentence before the figure  
 from  
 "The lower mask is set at -9 dB up to half the baud rate, and then follows the RRC with  $\beta$  of 0.05."  
 to  
 "The lower mask is set at -9 dB up to the -9dB point of an RRC with  $\beta$  of 0.05".

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CI 156 SC 156.9.6 P 79 L 51 # 6  
 Jackson, Kenneth Sumitomo Electric  
 Comment Type E Comment Status A  
 Labeling on plot (Figure 156-5-Frequency vs spectral power density) needs to reflect the table values.  
 SuggestedRemedy  
 change 1.0^6 to 10^6 (remove decimal) or 1.0e6  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Per the IEEE 802.3 Working Group editorial guidelines  
[https://www.ieee802.org/3/WG\\_tools/editorial/requirements/words.html](https://www.ieee802.org/3/WG_tools/editorial/requirements/words.html)  
 do not put trailing zeros after a decimal point. Change table 156.12 and figure 156-5 to reflect this guideline. Change labels in the figure to 1 x 10^6 as an example.

CI 156 SC 156.9.17 P 81 L 18 # 29  
 Maniloff, Eric Ciena  
 Comment Type E Comment Status A  
 Add table reference for Receiver OSNR tolerance  
 SuggestedRemedy  
 Change "Receiver OSNR tolerance" to "The Receiver OSNR tolerance is specified in Table 156-7. Receiver OSNR tolerance is defined."  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Change  
 "Receiver OSNR tolerance is defined in TBD"  
 to  
 "Receiver OSNR tolerance is specified in Table 156-7. Receiver OSNR tolerance is defined as TBD"

CI 156 SC 156.9.20 P 81 L 32 # 25  
 Maniloff, Eric Ciena  
 Comment Type T Comment Status A  
 Optical Path Power penalty is not required for the defined application.  
 SuggestedRemedy  
 Remove 156.9.20  
 Response Response Status C  
 ACCEPT IN PRINCIPLE.  
 Delete 156.9.20 and remove Optical path OSNR penalty (max), for OSNR at TP3 (12.5 GHz) from Table 156-8 and Optical path power penalty from Table 156-11.

CI 156 SC 156.10.1.1 P 83 L 6 # 1  
 Pittala, Fabio Huawei  
 Comment Type TR Comment Status A  
 The first box of Figure 156-7 consists of a coherent receiver and the second box consists of the frontend correction. Both boxes make a calibrated coherent receiver.  
 SuggestedRemedy  
 Rename the first box of Figure 156-7 as "Coherent Receiver" instead of "Calibrated Coherent Receiver"  
 Response Response Status C  
 ACCEPT.

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Cl 156 SC 156.10.1.2. P 84 L 8 # 2

Pittala, Fabio Huawei

Comment Type TR Comment Status A

Requirements on the clock recovery unit should be included.

SuggestedRemedy

Modify Figure 156-8 changing the second block as "Clock and Frequency Offset Recovery". Include at the beginning of subclause 156.10.1.2.2 the following text "A clock recovery with a corner frequency of TBD MHz and a slope of TBD dB/decade is applied on a fixed block length of TBD symbols."

Otherwise modify Figure 156-8 adding a block named "Clock Recovery" after the "Polarization Demux" block and add a new subclause (156.10.1.2.2) containing the following text "A clock recovery with a corner frequency of TBD MHz and a slope of TBD dB/decade is applied on a fixed block length of TBD symbols."

Response Response Status C

ACCEPT IN PRINCIPLE.

Change second block of figure 156-7 from "Frequency Offset Recovery" to "Clock and Frequency Offset Recovery". Change title of 156.10.1.2.2 from "Frequency Offset Recovery" to "Clock and Frequency Offset Recovery" and add a new sentence at the beginning of 156.10.1.2.2 "A clock recovery with a corner frequency of TBD MHz and a slope of TBD dB/decade is applied on a fixed block length of TBD symbols."

Cl 156 SC 156.10.1.2.1 P 84 L 1 # 3

Pittala, Fabio Huawei

Comment Type ER Comment Status A

There is a mismatch between the title of subclause 156.10.1.2.1 and the corresponding block in Figure 156-8.

SuggestedRemedy

Rename subclause 156.10.1.2.1 as "Polarization Demux"

Response Response Status C

ACCEPT.

Cl 156 SC 156.10.1.2.1 P 84 L 5 # 31

Issenhuth, Tom Huawei

Comment Type T Comment Status A

Number of block samples is TBD

SuggestedRemedy

Replace TBD with "1000"

Response Response Status C

ACCEPT.

Cl 156 SC 156.10.1.2.2 P 84 L 11 # 32

Issenhuth, Tom Huawei

Comment Type T Comment Status A

Number of symbols is TBD

SuggestedRemedy

Replace TBD with "1000"

Response Response Status C

ACCEPT.

Cl 156 SC 156.10.1.2.3 P 84 L 13 # 4

Pittala, Fabio Huawei

Comment Type TR Comment Status A

In Figure 156-8 there is a box "Carrier Phase Recovery" but no subclause is included to describe the functionality of this DSP block.

SuggestedRemedy

Add a new subclause 156.10.1.2.3 titled "Carrier Phase Recovery". Description text is TBD.

Response Response Status C

ACCEPT IN PRINCIPLE.

Add a new subclause 156.10.1.2.3 titled "Carrier Phase Recovery" with the text "The carrier phase is estimated and compensated on a fixed block length of 1000 symbols."

Cl 156 SC 156.10.1.2.4 P 84 L 19 # 33

Issenhuth, Tom Huawei

Comment Type T Comment Status A

Number of symbols is TBD

SuggestedRemedy

Replace TBD with "1000"

Response Response Status C

ACCEPT.

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**Cl 156**    **SC 156.13.4.4**                      **P 91**                      **L 25**                      # **34**

Issenhuth, Tom                                      Huawei

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

PICS table needs to be updated as "I-Q offset" was changed to "I-Q (max instantaneous)" and "I-Q (mean)"

**SuggestedRemedy**

Change "I-Q offset" to "I-Q (max instantaneous)" and add entry for "I-Q (mean)" for subclause 156.9.12

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

ACCEPT.

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**Cl 156A**    **SC 156A**                                      **P 95**                      **L 1**                      # **35**

Issenhuth, Tom                                      Huawei

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

Majority and possibly all of the annex no longer needed with the removal of the unamplified specification

**SuggestedRemedy**

Delete 156A.2 onward retaining 156A.1 which contains DWDM black link examples or remove the entire annex from the draft including references in clause 156.

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

ACCEPT IN PRINCIPLE.

Delete 156A.2 onward retaining 156A.1 which contains DWDM black link examples.