Cl **00** *SC* **0** *P* **12** *L* **47** # 1

Laubach, Mark Ciena

Comment Type **E** *Comment Status* **X**

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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155** *P* **39** *L* **1** # 2

Laubach, Mark Ciena

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5** *P* **46** *L* **28** # 3

Laubach, Mark Ciena

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.31** *P* **104** *L* **14** # 4

Laubach, Mark Ciena

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

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 beyong WG ballot.

Proposed Response *Response Status* **O**

Cl **1** *SC* **1.3** *P* **21** *L* **8** # 5

Marris, Arthur Cadence Design Systems

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

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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **22** # 6

Marris, Arthur Cadence Design Systems

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **17** # 7

Marris, Arthur — Cadence Design Systems

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

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),"

Proposed Response *Response Status* **O**

Cl **00** *SC* **0** *P* **20** *L* **6** # 8

Grow, Robert — RMG Consulting

Comment Type **E** *Comment Status* **X**

Oops! How did 2022 get inserted here.

SuggestedRemedy

Delete "2022"

Proposed Response *Response Status* **O**

Cl **1** *SC* **1.5** *P* **21** *L* **28** # 9

Ran, Adee — Cisco

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

"AM" typically stands for "Amplitude Modulation" in engineering. It sees unreasonable to redefine it globally in 802.3 just for one clauses 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.

Proposed Response *Response Status* **O**

Cl **1** *SC* **1.5** *P* **21** *L* **29** # 10

Ran, Adee — Cisco

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.151.1** *P* **25** *L* **37** # 11

Ran, Adee — Cisco

Comment Type **E** *Comment Status* **X**

"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".

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.151.1** *P* **25** *L* **49** # 12

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"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.

Proposed Response *Response Status* **O**

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

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

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

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

Paragraph break before the period.

SuggestedRemedy

Delete it.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.227** *P* **30** *L* **17** # 15

Ran, Adee Cisco

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

"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

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.228** *P* **30** *L* **23** # 16

Ran, Adee Cisco

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

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

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.228** *P* **30** *L* **25** # 17

Ran, Adee Cisco

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

155.2.6.1 is an incorrect cross reference.

SuggestedRemedy

Change to 155.5.2.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.229** *P* **30** *L* **32** # 18

Ran, Adee Cisco

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

155.2.6.1 is an incorrect cross reference.

SuggestedRemedy

Change to 155.5.3.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.230** *P* **30** *L* **41** # 19

Ran, Adee Cisco

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

155.2.6.1 is an incorrect cross reference.

SuggestedRemedy

Change to 155.5.4.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.61.1** *P* **31** *L* **5** # 20

Ran, Adee Cisco

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

155.2.5.1 is an incorrect cross reference.

SuggestedRemedy

Change to 155.4.2.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.61.4** *P* **31** *L* **22** # 21

Ran, Adee Cisco

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

155.2.5.2 is an incorrect cross reference.

SuggestedRemedy

Change to 155.2.6.5.

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.1.3** *P* **33** *L* **12** # 22

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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".

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.3** *P* **34** *L* **1** # 23

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.4** *P* **34** *L* **24** # 24

Ran, Adee Cisco

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

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.

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.4.4** *P* **34** *L* **35** # 25

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.4.4** *P* **34** *L* **42** # 26

Ran, Adee Cisco

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

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.

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.4.5** *P* **35** *L* **5** # 27

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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

SuggestedRemedy

Change "is specified" to "are specified".

Proposed Response *Response Status* **O**

Cl **118** *SC* **118.1** *P* **38** *L* **2** # 28

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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

Proposed Response *Response Status* **O**

Cl **118** *SC* **118.1** *P* **38** *L* **10** # 29

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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* **O**

Cl **155** *SC* **155.1** *P* **39** *L* **8** # 30

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1.1** *P* **40** *L* **46** # 31

Ran, Adee Cisco

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

"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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **5** # 32

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **7** # 33

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"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)".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **9** # 34

Ran, Adee Cisco

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

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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **18** # 35

Ran, Adee Cisco

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

"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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **21** # 36

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **22** # 37

Ran, Adee Cisco

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

"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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **25** # 38

Ran, Adee Cisco

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **35** # 39

Ran, Adee Cisco

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

"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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **43** # 40

Ran, Adee Cisco

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

"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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.3** *P* **43** *L* **46** # 41

Ran, Adee Cisco

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.3** *P* **43** *L* **49** # 42

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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

SuggestedRemedy

Change to "generate, manipulate, and interpret blocks"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4** *P* **44** *L* **1** # 43

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **44** *L* **29** # 44

Ran, Adee Cisco

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

"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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **44** *L* **33** # 45

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **44** *L* **38** # 46

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **44** *L* **51** # 47

Ran, Adee Cisco

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

"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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **45** *L* **8** # 48

Ran, Adee Cisco

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

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)".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **45** *L* **12** # 49

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **45** *L* **13** # 50

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **45** *L* **16** # 51

Ran, Adee Cisco

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

"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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **45** *L* **16** # 52

Ran, Adee Cisco

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

"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*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).

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **45** *L* **17** # 53

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **45** *L* **18** # 54

Ran, Adee Cisco

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

"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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.4** *P* **45** *L* **41** # 55

Ran, Adee Cisco

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

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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.2** *P* **46** *L* **45** # 56

Ran, Adee Cisco

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

"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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.2** *P* **46** *L* **50** # 57

Ran, Adee Cisco

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.3** *P* **47** *L* **10** # 58

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.3** *P* **47** *L* **13** # 59

Ran, Adee Cisco

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

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

SuggestedRemedy

Add an entry in 1.3 as necessary.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.3** *P* **47** *L* **19** # 60

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

C1-14 bits

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.6** *P* **47** *L* **44** # 61

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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

SuggestedRemedy

Format digits as upright, all instances.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.4** *P* **47** *L* **47** # 62

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.10** *P* **50** *L* **22** # 63

Ran, Adee Cisco

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

"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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.1** *P* **52** *L* **9** # 64

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

119 bit

SuggestedRemedy

119-bit

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.2** *P* **52** *L* **13** # 65

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"produces" does not grammatically match "shall perform"

SuggestedRemedy

Change to "produce"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.5** *P* **52** *L* **32** # 66

Ran, Adee Cisco

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

"FEC_degraded_SER_ability_variable"
one underscore too many.

SuggestedRemedy

Change to "FEC_degraded_SER_ability variable"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.5** *P* **52** *L* **36** # 67

Ran, Adee Cisco

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

"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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.5** *P* **52** *L* **37** # 68

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"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)"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.7** *P* **53** *L* **1** # 69

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"detect and removal" in heading

SuggestedRemedy

Change to "detection and removal"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.7.2** *P* **53** *L* **41** # 70

Ran, Adee Cisco

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

"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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.7.2** *P* **53** *L* **42** # 71

Ran, Adee Cisco

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

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* **O**

Cl **155** *SC* **155.2.6.10** *P* **54** *L* **21** # 72

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.1** *P* **54** *L* **54** # 73

Ran, Adee Cisco

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

"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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.1.3** *P* **55** *L* **20** # 74

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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

SuggestedRemedy

Change per comment.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.2.2.2** *P* **57** *L* **51** # 75

Ran, Adee Cisco

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

"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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3** *P* **58** *L* **31** # 76

Ran, Adee Cisco

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

"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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3** *P* **58** *L* **34** # 77

Ran, Adee Cisco

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

"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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3** *P* **58** *L* **36** # 78

Ran, Adee Cisco

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

"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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.3** *P* **60** *L* **32** # 79

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.3** *P* **60** *L* **42** # 80

Ran, Adee Cisco

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

"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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.6** *P* **63** *L* **42** # 81

Ran, Adee Cisco

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.5.1** *P* **76** *L* **12** # 82

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.5.1** *P* **87** *L* **43** # 83

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.6** *P* **90** *L* **27** # 84

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.1** *P* **93** *L* **44** # 85

Ran, Adee Cisco

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

"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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.11** *P* **101** *L* **36** # 86

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

offsett

SuggestedRemedy

offset

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.11** *P* **101** *L* **36** # 87

Ran, Adee Cisco

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

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.11** *P* **101** *L* **37** # 88

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

"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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.29** *P* **104** *L* **1** # 89

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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

SuggestedRemedy

Fix it

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.10.1.2.4** *P* **106** *L* **21** # 90

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

beta

SuggestedRemedy

Change to the Greek letter

Proposed Response *Response Status* **O**

Cl **155A** *SC* **155A.1** *P* **114** *L* **9** # 91

Ran, Adee Cisco

Comment Type **E** *Comment Status* **X**

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".

Proposed Response *Response Status* **O**

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

Ran, Adee Cisco

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

"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.

Proposed Response *Response Status* **O**

Cl **156A** *SC* **156A.3** *P* **117** *L* **117** # 93

Ran, Adee Cisco

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

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.

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.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.227** *P* **30** *L* **16** # 94

Bruckman, Leon Huawei

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

Wrong reference

SuggestedRemedy

Replace "and 155.2.6.1" with "and 155.2.6.5"

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.228** *P* **30** *L* **22** # 95

Bruckman, Leon Huawei

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

This counter is for uncorrected errors

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.228** *P* **30** *L* **24** # 96

Bruckman, Leon Huawei

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

Wrong reference

SuggestedRemedy

Replace "and 155.2.6.1" with "and 155.2.6.5"

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.229** *P* **30** *L* **32** # 97

Bruckman, Leon Huawei

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

Total bits is fully defined in 153.2.5.3, clause 155 does not add anything.

SuggestedRemedy

Delete refernce to 155.2.6.1

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.230** *P* **30** *L* **40** # 98

Bruckman, Leon Huawei

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

Wrong reference

SuggestedRemedy

Replace "and 155.2.6.1" with "and 155.2.6.5"

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.61.1** *P* **31** *L* **4** # 99

Bruckman, Leon Huawei

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

Wrong reference

SuggestedRemedy

Replace: "155.2.5.1" with: "155.2.5.5.2"

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.61.4** *P* **31** *L* **21** # 100

Bruckman, Leon Huawei

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

Wrong reference

SuggestedRemedy

Replace: "155.2.5.2" with: "155.2.6.5"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.4** *P* **44** *L* **5** # 101

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.1** *P* **46** *L* **37** # 102

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

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

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.4** *P* **47** *L* **30** # 103

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

"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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.2** *P* **52** *L* **14** # 104

Bruckman, Leon Huawei

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

"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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.7** *P* **53** *L* **8** # 105

Bruckman, Leon Huawei

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

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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.7.1** *P* **53** *L* **22** # 106

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

"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 octest are numnbered 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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.1.3** *P* **55** *L* **5** # 107

Bruckman, Leon Huawei

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

"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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.2.2.1** *P* **57** *L* **43** # 108

Bruckman, Leon Huawei

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

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

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.7** *P* **65** *L* **3** # 109

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

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

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.8** *P* **65** *L* **9** # 110

Bruckman, Leon Huawei

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

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

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.8** *P* **65** *L* **14** # 111

Bruckman, Leon Huawei

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

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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.4.2** *P* **68** *L* **45** # 112

Bruckman, Leon Huawei

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

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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.4.2** *P* **68** *L* **48** # 113

Bruckman, Leon Huawei

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

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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.7.4.1** *P* **78** *L* **50** # 114

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

Make text consistent with clause

SuggestedRemedy

Replace: "Symbol mapping to physical signals" with: "Symbol mapping to analog signals"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.5.2** *P* **88** *L* **25** # 115

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

Strange text: "and delivered to the MDI"

SuggestedRemedy

Replace: "and delivered to the MDI" with: "and deliver them to the MDI"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.5.3** *P* **88** *L* **36** # 116

Bruckman, Leon Huawei

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

"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"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.2** *P* **98** *L* **41** # 117

Bruckman, Leon Huawei

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

"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

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.6** *P* **99** *L* **34** # 118

Bruckman, Leon Huawei

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

"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"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.13** *P* **101** *L* **48** # 119

Bruckman, Leon Huawei

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

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"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.14** *P* **102** *L* **3** # 120

Bruckman, Leon Huawei

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

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"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.15** *P* **102** *L* **6** # 121

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

Typeo"I-I-Q"

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.15** *P* **102** *L* **8** # 122

Bruckman, Leon Huawei

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

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"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.16** *P* **102** *L* **15** # 123

Bruckman, Leon Huawei

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

Spectral excursion is defined in ITU G.698.2 for DP-QPSK, but not for DP-16QAM. Spectral excusion is further mentioned in 156.9.17 without any reference

SuggestedRemedy

Change spectral excursion refernce to the 400ZR OIF IA section 13.4.2, and add the same refernce for spectral excursion in section 156.9.17

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.19** *P* **102** *L* **41** # 124

Bruckman, Leon Huawei

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

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."

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.20** *P* **102** *L* **51** # 125

Bruckman, Leon Huawei

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

Is "must" used ?

SuggestedRemedy

Replace "must" with "shall"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.21** *P* **103** *L* **7** # 127

Bruckman, Leon Huawei

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

Is "must" used ?

SuggestedRemedy

Replace "must" with "shall"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.22** *P* **103** *L* **12** # 128

Bruckman, Leon Huawei

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

Is "must" used ?

SuggestedRemedy

Replace "must" with "shall"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.23** *P* **103** *L* **18** # 129

Bruckman, Leon Huawei

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

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"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.26** *P* **103** *L* **38** # 130

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

Redundant text

SuggestedRemedy

Delete : "a while maintaining"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.27** *P* **103** *L* **48** # 131

Bruckman, Leon Huawei

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

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"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.32** *P* **104** *L* **21** # 132

Bruckman, Leon Huawei

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

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"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.10.1.2** *P* **105** *L* **50** # 133

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

Missing text

SuggestedRemedy

Replace: "in the following" with: "in the following sections"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.10.1.2.6** *P* **106** *L* **30** # 134

Bruckman, Leon Huawei

Comment Type **E** *Comment Status* **X**

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)."

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.10.1.2.7** *P* **107** *L* **26** # 135

Bruckman, Leon Huawei

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

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."

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.1.2** *P* **32** *L* **20** # 136

Dudek, Mike Marvell

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

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.11** *P* **50** *L* **30** # 137

Dudek, Mike Marvell

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

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

SuggestedRemedy

Change 10796 to 10976,

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.5** *P* **52** *L* **31** # 138

Dudek, Mike Marvell

Comment Type **E** *Comment Status* **X**

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".

Proposed Response *Response Status* **O**

Cl **156A** *SC* **156A.1** *P* **115** *L* **15** # 139

Dudek, Mike Marvell

Comment Type **E** *Comment Status* **X**

Typo.

SuggestedRemedy

Change "lack" to "black"

Proposed Response *Response Status* **O**

Cl **156A** *SC* **156A.3** *P* **117** *L* **25** # 140

Dudek, Mike Marvell

Comment Type **E** *Comment Status* **X**

The formating is cutting off part of T

SuggestedRemedy

fix it.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.2.1.3.1** *P* **86** *L* **14** # 141

Dudek, Mike Marvell

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

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.2.1.3.2** *P* **86** *L* **22** # 142

Dudek, Mike Marvell

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

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.1** *P* **94** *L* **15** # 143

Dudek, Mike Marvell

Comment Type **E** *Comment Status* **X**

Typo.

SuggestedRemedy

Change "internals" to "intervals" in footnote b

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.26** *P* **103** *L* **38** # 144

Dudek, Mike Marvell

Comment Type **E** *Comment Status* **X**

Typo.

SuggestedRemedy

Delete the duplicate "while maintaining a"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.27** *P* **103** *L* **48** # 145

Dudek, Mike Marvell

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

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.31** *P* **104** *L* **14** # 146

Dudek, Mike Marvell

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

There is a TBD in the draft.

SuggestedRemedy

Provide the definition for adjacent channel spectral isolation.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.32** *P* **104** *L* **21** # 147

Dudek, Mike Marvell

Comment Type **E** *Comment Status* **X**

Typo.

SuggestedRemedy

insert "in" between "specified" and "Table"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.11.2** *P* **107** *L* **52** # 148

Dudek, Mike Marvell

Comment Type **E** *Comment Status* **X**

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

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.13.4.3** *P* **112** *L* **6** # 149

Dudek, Mike Marvell

Comment Type **E** *Comment Status* **X**

The tables provide values not definitions.

SuggestedRemedy

Change to Per definitions in 156.9.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.13.4.4** *P* **112** *L* **22** # 150

Dudek, Mike Marvell

Comment Type **E** *Comment Status* **X**

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 requiements in Table ….."

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.7.1** *P* **100** *L* **50** # 151

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

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

•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* **O**

Cl **156** *SC* **156.9.1** *P* **97** *L* **37** # 152

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

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

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"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.2** *P* **98** *L* **42** # 153

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

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

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.6** *P* **90** *L* **13** # 154

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

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

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."

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.3** *P* **33** *L* **3** # 155

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

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

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.

Proposed Response *Response Status* **O**

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

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

Comment Type **E** *Comment Status* **X**

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 dnoted as MMD 9, which does not match Fig 118-2, which uses MMD 9 and MMD 8 respectively.

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1.1** *P* **40** *L* **41** # 157

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

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2** *P* **41** *L* **41** # 158

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

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

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* **X**

There is inconsistent usage of the terms 400GBASE-ZR PCS and PCS, as well as 400GBASE-ZR PMA and PMA thoughout 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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.6** *P* **89** *L* **38** # 160

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

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.3** *P* **33** *L* **33** # 161

Huber, Thomas — Nokia

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.4** *P* **34** *L* **24** # 162

Huber, Thomas — Nokia

Comment Type **E** *Comment Status* **X**

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)

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1** *P* **39** *L* **8** # 163

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1** *P* **39** *L* **9** # 164

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

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 contorl characters." to "The PCS uses a 64B/66B code to support transmission of data and control characters."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1** *P* **39** *L* **14** # 165

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **42** *L* **12** # 166

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

In Figure 155-3, the block labeled "Encode" should probably say "64B/66B Encode"

SuggestedRemedy

Add "64B/66B" to the label.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **42** *L* **15** # 167

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **6** # 168

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

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 subcluase 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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **9** # 169

Huber, Thomas Nokia

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

128×m 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 × 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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **18** # 170

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

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…"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **22** # 171

Huber, Thomas Nokia

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

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…"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **32** # 172

Huber, Thomas Nokia

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

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_UITDATA.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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **44** *L* **38** # 173

Huber, Thomas Nokia

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

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.)

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **45** *L* **8** # 174

Huber, Thomas Nokia

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

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 areat hat consists of 10,220 257-bit blocks.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **45** *L* **28** # 175

Huber, Thomas Nokia

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.4** *P* **45** *L* **42** # 176

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.4.1** *P* **46** *L* **1** # 177

Huber, Thomas Nokia

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

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).

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5** *P* **46** *L* **10** # 178

Huber, Thomas Nokia

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

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.1** *P* **46** *L* **38** # 179

Huber, Thomas Nokia

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

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 particulary 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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.3** *P* **47** *L* **12** # 180

Huber, Thomas Nokia

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.3** *P* **47** *L* **19** # 181

Huber, Thomas Nokia

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

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 subcluase 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 ∑CnD(t) nominally indicates the running remainder. The long-term average value of Cm(t) + ∑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. ∑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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.4** *P* **47** *L* **30** # 182

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

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..

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.6** *P* **47** *L* **37** # 183

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.6** *P* **47** *L* **40** # 184

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

The formula should use appropriate arithmetic symbols.

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.7** *P* **48** *L* **10** # 185

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

Missing an indefinite article

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.9** *P* **50** *L* **13** # 186

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

x should be a multiplication symbol

SuggestedRemedy

Use the multiplication symbol

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.11** *P* **50** *L* **30** # 187

Huber, Thomas Nokia

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

The number of 128-bit blocks is incorrect

SuggestedRemedy

Change 10796 to 10976.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.9.13** *P* **51** *L* **43** # 188

Huber, Thomas Nokia

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.7** *P* **53** *L* **12** # 189

Huber, Thomas Nokia

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.7** *P* **53** *L* **15** # 190

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

There is only one 1280-bit overhead field

SuggestedRemedy

Change "overhead fields" to "overhead field"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.7.1** *P* **53** *L* **19** # 191

Huber, Thomas Nokia

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

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.8** *P* **54** *L* **3** # 192

Huber, Thomas Nokia

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

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 ∑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 ∑CnD(t), and use them to recover the 1028-bit data blocks that were inserted into the frame by the GMP mapper.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.1.3** *P* **55** *L* **10** # 193

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

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; ..."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.1.3** *P* **56** *L* **10** # 194

Huber, Thomas Nokia

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

Sepraating 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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.2.2.1** *P* **57** *L* **43** # 195

Huber, Thomas Nokia

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

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

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.2.2.1** *P* **57** *L* **41** # 196

Huber, Thomas Nokia

Comment Type **E** *Comment Status* **X**

In all of the rx_codeword expressions, the multiplication symbol × should be used rather than *

SuggestedRemedy

Replace all instances of * with ×

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3** *P* **58** *L* **34** # 197

Huber, Thomas Nokia

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

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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3** *P* **58** *L* **36** # 198

Huber, Thomas Nokia

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

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 represneting the components of DP-16QAM symbols (namely, XI, XQ, Yi, and YQ). All of the components operate a thte same nominal signaling rate.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.1** *P* **58** *L* **45** # 199

Huber, Thomas Nokia

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

The second paragraph seems out of place since this subclause is discussing the transmit function.

SuggestedRemedy

Delete the paragraph.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.1** *P* **59** *L* **10** # 200

Huber, Thomas Nokia

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

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)

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.2** *P* **59** *L* **42** # 201

Huber, Thomas Nokia

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

This sentence (which appears to be copied firectly 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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.3** *P* **60** *L* **39** # 202

Huber, Thomas Nokia

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

The description of the frame and mutliframe 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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.2** *P* **83** *L* **1** # 203

Huber, Thomas Nokia

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

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.6** *P* **89** *L* **32** # 204

Huber, Thomas Nokia

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

Much of the material in clause 156.6 desribing the black link concepts is replicating what is already in 154.6. The part that is different begins in the pararaph folowing 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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.7** *P* **49** *L* **5** # 205

Slavick, Jeff Broadcom

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

Figure 155-7 appears to be incorrect in it's 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)

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **25** # 206

Slavick, Jeff Broadcom

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

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). "

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **35** # 207

Slavick, Jeff Broadcom

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

Where is the "non-normal" mode description?

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.2** *P* **44** *L* **22** # 208

Slavick, Jeff Broadcom

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

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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5** *P* **46** *L* **28** # 209

Slavick, Jeff Broadcom

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.7** *P* **48** *L* **12** # 210

Slavick, Jeff Broadcom

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

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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.8** *P* **50** *L* **3** # 211

Slavick, Jeff Broadcom

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

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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.10** *P* **50** *L* **19** # 212

Slavick, Jeff Broadcom

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

The convolutional interleaver operates on the scrarmbled 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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.11** *P* **50** *L* **30** # 213

Slavick, Jeff Broadcom

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

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.10** *P* **50** *L* **18** # 214

Slavick, Jeff Broadcom

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

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.9** *P* **50** *L* **14** # 215

Slavick, Jeff Broadcom

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

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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.11** *P* **50** *L* **30** # 216

Slavick, Jeff Broadcom

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.2** *P* **52** *L* **14** # 217

Slavick, Jeff Broadcom

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

Figure 155-8 is the Transmit bit order diagram.

SuggestedRemedy

Delete everything after the word bits

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.4** *P* **52** *L* **23** # 218

Slavick, Jeff Broadcom

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

The 10 976 x 119bits have been called blocks up to this point.

SuggestedRemedy

Change rows to blocks

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.4.2** *P* **70** *L* **12** # 219

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.2.3.1** *P* **58** *L* **15** # 220

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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:"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.4.2** *P* **68** *L* **48** # 221

Brown, Matt Huawei

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

EEE is not supported for 400GBASE-ZR.

SuggestedRemedy

Delete: ", and when the MDIO has put the PCS sublayer into low-power mode."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.4.2** *P* **70** *L* **12** # 222

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.5** *P* **75** *L* **21** # 223

Brown, Matt Huawei

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.7.4.1** *P* **78** *L* **14** # 224

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.1.1** *P* **81** *L* **42** # 225

Brown, Matt Huawei

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

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.6** *P* **89** *L* **41** # 226

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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."

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.6** *P* **90** *L* **43** # 227

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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"

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.26** *P* **103** *L* **38** # 228

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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"

Proposed Response *Response Status* **O**

Cl **156A** *SC* **156A.1** *P* **115** *L* **15** # 229

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.6** *P* **74** *L* **18** # 230

Brown, Matt Huawei

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

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"

Proposed Response *Response Status* **O**

Cl **FM** *SC* **FM** *P* **10** *L* **16** # 231

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

"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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1.1** *P* **40** *L* **47** # 232

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1.1** *P* **40** *L* **47** # 233

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1.1** *P* **41** *L* **14** # 234

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.1** *P* **41** *L* **34** # 235

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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)."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **42** *L* **23** # 236

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

Use style consistent in both transmit and receive direction.

SuggestedRemedy

Change "OH & AM insertion" to "OH/AM insertion".

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **7** # 237

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **13** # 238

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **45** *L* **17** # 239

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.3** *P* **45** *L* **23** # 240

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.2** *P* **46** *L* **42** # 241

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

What is a "400GBASE-ZR link"?

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.7** *P* **53** *L* **12** # 242

Brown, Matt Huawei

Comment Type **E** *Comment Status* **X**

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."

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **21** # 243

Maniloff, Eric Ciena

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.5.2** *P* **46** *L* **46** # 244

Maniloff, Eric Ciena

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

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.7.2** *P* **53** *L* **38** # 245

Maniloff, Eric Ciena

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

For link degrace 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"

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.6.7.2** *P* **53** *L* **46** # 246

Maniloff, Eric Ciena

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

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" toindicate STAT<7> is OR'd with the degrade detected by CFEC.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.5.4** *P* **88** *L* **40** # 247

Maniloff, Eric Ciena

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

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 ≤ -17dBm indicating FAIL.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.11** *P* **101** *L* **36** # 248

Maniloff, Eric Ciena

Comment Type **E** *Comment Status* **X**

us is used for microseconds, instead of µs or microseconds

SuggestedRemedy

change us to µs

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.14** *P* **102** *L* **4** # 249

Maniloff, Eric Ciena

Comment Type **E** *Comment Status* **X**

Period in middle of sentence

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.20** *P* **102** *L* **51** # 250

Maniloff, Eric Ciena

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

Transmit Power should be within the stated range when set to Highest or Lowest provisionable powers.

SuggestedRemedy

Change highest to lowest or highest

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.31** *P* **104** *L* **14** # 251

Maniloff, Eric Ciena

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

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.A.3** *P* **117** *L* **25** # 252

Maniloff, Eric Ciena

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

factor 2 should be outside (…)^6 term

SuggestedRemedy

Update equation

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.A.3** *P* **117** *L* **30** # 253

Maniloff, Eric — Ciena

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

T is transmission in linear units

SuggestedRemedy

Change definition of T to indicate linear units

Proposed Response *Response Status* **O**

Cl **00** *SC* **00** *P* **35** *L* **54** # 254

Law, David — Hewlett Packard Enterprise

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1** *P* **39** *L* **5** # 255

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.1** *P* **39** *L* **15** # 256

Law, David — Hewlett Packard Enterprise

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

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)'.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **9** # 257

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **17** # 258

Law, David — Hewlett Packard Enterprise

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.2** *P* **43** *L* **18** # 259

Law, David — Hewlett Packard Enterprise

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

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.'.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.11** *P* **50** *L* **33** # 260

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.12** *P* **51** *L* **33** # 261

Law, David — Hewlett Packard Enterprise

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

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].

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.1** *P* **58** *L* **49** # 262

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.2** *P* **59** *L* **46** # 263

Law, David — Hewlett Packard Enterprise

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.2** *P* **60** *L* **1** # 264

Law, David — Hewlett Packard Enterprise

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

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 ...'.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.2** *P* **60** *L* **27** # 265

Law, David — Hewlett Packard Enterprise

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

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'.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.3** *P* **60** *L* **32** # 266

Law, David — Hewlett Packard Enterprise

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

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 ...'.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.3** *P* **60** *L* **39** # 267

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

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>) ...'.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.3** *P* **60** *L* **41** # 268

Law, David — Hewlett Packard Enterprise

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

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 ...'.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.4** *P* **61** *L* **31** # 269

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.4** *P* **61** *L* **31** # 270

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

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.'.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.7** *P* **65** *L* **3** # 271

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

Typo

SuggestedRemedy

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

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.7** *P* **65** *L* **3** # 272

Law, David — Hewlett Packard Enterprise

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

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].

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.7** *P* **65** *L* **5** # 273

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

Typo.

SuggestedRemedy

Suggest that '... the PMD:IS_UNITDATA.request primitives.' should be changed to read '... the PMD:IS_UNITDATA.request primitive.'.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.3.3.1.8** *P* **65** *L* **9** # 274

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

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.'.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.4.2** *P* **68** *L* **36** # 275

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.7.3** *P* **78** *L* **10** # 276

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

Suggest that the 'Subclause' entry for PICS item DC should be 155.6.

SuggestedRemedy

See comment.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.13.3** *P* **110** *L* **16** # 277

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **X**

Suggest that the 'Subclause' entry for PICS item DC should be 156.3.

SuggestedRemedy

See comment.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155** *P* **39** *L* **1** # 278

Dawe, Piers — Nvidia

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155.2.5.1** *P* **44** *L* **16** # 279

Dawe, Piers Nvidia

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

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.

Proposed Response *Response Status* **O**

Cl **116** *SC* **116.1.3** *P* **33** *L* **12** # 280

Dawe, Piers Nvidia

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

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.

Proposed Response *Response Status* **O**

Cl **155** *SC* **155** *P* **39** *L* **1** # 281

Dawe, Piers Nvidia

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

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.6** *P* **91** *L* **8** # 282

Dawe, Piers Nvidia

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

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.8** *P* **96** *L* **33** # 283

Dawe, Piers Nvidia

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

"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,

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.8** *P* **96** *L* **33** # 284

Dawe, Piers Nvidia

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

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".

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9** *P* **97** *L* **12** # 285

Dawe, Piers Nvidia

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

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

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.6** *P* **99** *L* **34** # 286

Dawe, Piers Nvidia

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

"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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.9.6** *P* **99** *L* **37** # 287

Dawe, Piers Nvidia

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

"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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.10.1.2.1** *P* **106** *L* **5** # 288

Dawe, Piers Nvidia

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

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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.10.1.2.2** *P* **106** *L* **11** # 289

Dawe, Piers Nvidia

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

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".

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.10.1.2.4** *P* **106** *L* **21** # 290

Dawe, Piers Nvidia

Comment Type **E** *Comment Status* **X**

"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.

Proposed Response *Response Status* **O**

Cl **156** *SC* **156.10.1.2.7** *P* **106** *L* **38** # 291

Dawe, Piers Nvidia

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

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.

Proposed Response *Response Status* **O**