Cl **108** *SC* **108.5.3.6** *P* **57** *L* **39** # 1

Ran, Adee Intel

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

In the new figure 108.5 the source of bits into the "Codework marker alignment" block is now composed of two connected arrows. This is confusing. It should be a single serial bit stream.

SuggestedRemedy

1. Move the new unlabeled block to the bottom of the figure. Its output from the left should go into the vertical block (c0…c527) in parallel to the "PMA_UNITDATA.indication" vertical arrow.

2. Into the bottom of the new block there should be another arrow pointing upward from the label "(from PMA of 10GBASE-R)". This label should be preceded by "PMA_UNITDATA.indication" similar to the one on the left.

Proposed Response *Response Status* **O**

Cl **157** *SC* **157.1.4** *P* **64** *L* **40** # 2

Ran, Adee Intel

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

In Table 157-1, the "parameter" rows G, B, and R are not parameters. These are tokens of nomenclature that have no associated values. There are no such explanations in other clauses.

SuggestedRemedy

Delete rows G, B, R.

Proposed Response *Response Status* **O**

Cl **157** *SC* **157.1.4** *P* **66** *L* # 3

Ran, Adee Intel

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

Tables 157-3, 157-4 and 157-5 are inconsistent in the way clause labeled are placed. In the first two the clause numbers are horizontal, and in the third they are vertical.

Vertical labels as in Table 157-5 may be more convenient editorially (e.g. 109A, 109B in figure 157-4).

SuggestedRemedy

Align the label directions in all three tables with editorial license.

Proposed Response *Response Status* **O**

Cl **157** *SC* **157.2.3** *P* **67** *L* **51** # 4

Ran, Adee Intel

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

Extra space in "Multi- Gigabit". This occurs in other places.

SuggestedRemedy

Remove the space, apply globally.

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.5.1** *P* **72** *L* **29** # 5

Ran, Adee Intel

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

Spurious period in "diagram."

SuggestedRemedy

Remove the period

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.5.4** *P* **73** *L* **39** # 6

Ran, Adee Intel

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

"cross talk" should be "crosstalk"

SuggestedRemedy

delete the space

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.8.1** *P* **77** *L* **41** # 7

Ran, Adee Intel

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

The "test patterns" definitions in this subclause seem to be identical to those of 52.9.1. To help readers understand the requirements and re-use existing designs it would be better to refer to the existing subclause where possible.

SuggestedRemedy

Replace the content of this subclause with references to 52.9.1 and highlight any differences that may exist.

Proposed Response *Response Status* **O**

Cl **108** *SC* **108.2.1** *P* **47** *L* **8** # 8

Ran, Adee Intel

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

The FEC primitives d, e, and f are listed as require for the optional EEE capability, but these primitives are required only for the deep-sleep mode of EEE (see 74.5.2 and the 108.2 in the base standard for comparison). Deep-sleep is not defined for the PHYs in this amendment so these primitives are not required.

The behavior specified for these primitives is quite complicated but is irrelevant for optical PHYs which do not use deep sleep.

SuggestedRemedy

Delete these primitives and the associated text, including subclauses 108.2.1.4, 108.2.1.5, 108.2.1.6.

Proposed Response *Response Status* **O**

Cl **108** *SC* **108.1.3.1** *P* **44** *L* **1** # 9

Ran, Adee Intel

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

The new figures 108-1a and 108-b are (based on their captions) functional block diagrams of a full PHY. They belong in the overview clause, and are out of place and confusing in the RS-FEC subclause.

The new figures are cluttered (especially 108-1a which has unnecessary detail of the PCS) and inaccurate: the "FEC sublayer" is the one in this clause, labeled "RS-FEC sublayer"; and its sub-blocks are "Transmit function" and "Receive function", not "FEC encoder" and "FEC decoder"; The EEE primitives in figure 108-1a should be deleted as they only apply to deep sleep.

The RS-FEC sublayer positioning in the PHY between the PCS and the PMA is depicted in the existing figure 108-2, which is sufficient (and more accurately shows the structure of the FEC sublayer). The new content is not helpful - it is confusing the reader.

SuggestedRemedy

Preferably, delete subclause 108.1.3.1 altogether.

If it is not deleted:
1. remove the details of the PCS in figure 108-1a (make it similar to figure 108-1b).
2. Change "FEC encoder" and "FEC decoder" to "Transmit function" and "Receive function" respectively in both figures
3. in figure 108-1a, separate the "reverse gearbox" to a separate block from the "Receive function"; add a corresponding block in the receive direction.

Proposed Response *Response Status* **O**

Cl **108** *SC* **108.5.1.1** *P* **51** *L* # 10

Ran, Adee Intel

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

The reverse gearbox function is described here as if it applies only in the transmit direction. However, a similar function (forward gearbox?) is required in the receive direction, to convert the RS-FEC decoded bit stream to the XSBI format and send it to the PCS.

SuggestedRemedy

Add text to describe this gearbox function towards the service interface in the receive direction (towards the PCS).

Proposed Response *Response Status* **O**

Cl **108** *SC* **108.5.1.1** *P* **51** *L* # 11

Ran, Adee Intel

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

The XSBI interface described here is the interface between the RS-FEC sublayer and the 10GBASE-R PCS. However, there is a similar interface between the RS-FEC and the 10GBASE-R PMA - as shown in the updated figures 108-3 and 108-5 (bottom right in both figures).

The RS-FEC operation is currently specified with a serial bit stream interface. The conversion to the PMA service interface should be added, either here or in a separate subclause.

SuggestedRemedy

Add text in 108.5.1.1 or a separate subclause to describe the forward/reverse gearbox functionality towards the PMA service interface.

Proposed Response *Response Status* **O**

Cl **157** *SC* **157.4** *P* **68** *L* **51** # 12

Ran, Adee Intel

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

"The maximum delay constraints for 25GBASE-BRx PHY sublayers are specified in 105.5" - but 105.5 is not modified in this draft. Table 105-3 lists delays of all existing 25GBASE-R PMDs but the new PMDs are not added.

Similarly, the 50GBASE-BRx PMDs do not appear in Table 131-4.

SuggestedRemedy

Add the new PMDs to Table 105-3 and Table 131-4. Alternatively, since this is a new overview clause, create a table similar to table 105-3 here and include the all the relevant sublayers, including those of 10GBASE-BRx and 50GBASE-BRx.

Proposed Response *Response Status* **O**

Cl **157** *SC* **157.6** *P* **69** *L* **21** # 13

Ran, Adee Intel

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

This subclause includes an important normative requirement (ONU silent start) that is not listed in the PICS of any of the PHY clauses, nor is it mentioned in the clause text. It is really easy to miss since introduction clauses seldom contain feature specifications and normative requirements.

This feature can be mentioned here, but the normative statements should be moved to the PHY clauses.

SuggestedRemedy

Add an "ONU silent start" subclause to each of the PHY clauses and place the normative requirements there. Add corresponding PICS items.

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.1** *P* **70** *L* **34** # 14

Ran, Adee Intel

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

Footnote a of Table 158-1 seems redundant, and is at most informative. It is not required.

SuggestedRemedy

Delete footnote a

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.1.1** *P* **70** *L* **49** # 15

Ran, Adee Intel

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

The third paragraph in this subclause refers to "this requirement" which is stated in the second paragraph.

The second paragraph applies to the 10GBASE-BR20 PMD, as opposed to 10GBASE-BR10 and 10GBASE-BR40 PMDs in the first paragraph. But it is not clear that the third paragraph also applies only to 10GBASE-BR20 (other than the phrase "this requirement").

SuggestedRemedy

Merge the second and the third paragraphs (delete the paragraph break).

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.6** *P* **75** *L* **75** # 16

Ran, Adee Intel

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

Footnote a of table 158-5 is a normative requirement (RS-FEC correction cannot be bypassed) but it is stated as an option ("may not" is equivalent to "may").

This requirement is stated more clearly in footnote a of Table 158-1. It should not be repeated here, and definitely not as an option.

Also applies to Table 159-5 (page 102) and Table 160-5 (page 124).

SuggestedRemedy

Delete footnote a in all three tables. Alternatively, state it as a normative requirement (shall), preferably in the text instead of in a footnote.

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.7** *P* **77** *L* **33** # 17

Ran, Adee Intel

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

"The jitter specifications … shall meet the specifications defined in 158.8"

The specifications are what they are. What is it that needs to meet them?

SuggestedRemedy

Rephrase to clarify what the normative requirement is.

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.8.10.2** *P* **87** *L* **1** # 18

Ran, Adee Intel

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

For some reason, footnote c of table 158-13 is orphan.

SuggestedRemedy

Make it appear with the other footnotes.

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.8.10.3** *P* **87** *L* **18** # 19

Ran, Adee Intel

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

158.8.10.3 and 158.8.10.4 do not appear correctly in the bookmarks pane. In the table of contents they appear under 158.9.1 "General safety".

SuggestedRemedy

Fix it somehow.

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.8.10.1** *P* **85** *L* **47** # 20

Ran, Adee Intel

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

The reference transmitter is described using multiple instance of "should". Are these recommendations? I understand that this is something like a "golden transmitter" - is it okay to use a transmitter that does not meet these requirements?

The phrasing in 159.7.5.1 is more appropriate.

SuggestedRemedy

Rephrase the requirements to use "shall" or "is" instead of "should".

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.8.10.3** *P* **87** *L* **20** # 21

Ran, Adee Intel

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

The reference receiver is described using multiple instance of "should". Are these recommendations? I understand that this is something like an scope with optical input - is it okay to use a scope that does not meet these requirements?

The phrasing in 159.7.5.3 is more appropriate.

SuggestedRemedy

Rephrase the requirements to use "shall" or "is" instead of "should".

Proposed Response *Response Status* **O**

Cl **159** *SC* **159.5.2** *P* **100** *L* **32** # 22

Ran, Adee Intel

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

An optical signal is not a stream. "stream" applies to bits or symbols.

Applies twice in 159.5.2 and once in 159.5.3, and also in 160.5.2 and 160.5.3.

I am aware that there is a lot of old and bad precedence for this phrase, but it has recently been corrected, see e.g. 121.5.2, 122.5.2, 123.5.2, and 124.5.2, all of which use "optical signals".

SuggestedRemedy

Change "optical signal stream" to "optical signal".

Proposed Response *Response Status* **O**

Cl **160** *SC* **160.7.6** *P* **130** *L* **51** # 23

Ran, Adee Intel

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

"Shall be measured" - there is no normative requirement to measure anything.

SuggestedRemedy

Change to "is measured".

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.13.4.6** *P* **96** *L* **8** # 24

Ran, Adee Intel

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

PICS item M2 does not correspond to anything in the clause text.

Also in 159.12.4.6 and in 160.12.3.6.

SuggestedRemedy

Delete these items

Proposed Response *Response Status* **O**

Cl **157** *SC* **157.5** *P* **69** *L* **3** # 25

Ran, Adee Intel

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

This subclause states some rules about state diagrams and how they "must" be constructed, with rules that I can't even understand.

The users of this standard do not need to be instructed about constructing state diagrams, and this amendment does not contain any state diagrams anyway.

SuggestedRemedy

Delete this subclause.

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.5.4** *P* **73** *L* **38** # 26

Ran, Adee Intel

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

"As an unavoidable consequence of the requirements for the setting of the SIGNAL_DETECT parameter,
implementations must provide adequate margin..."

There is no unavoidable consequence here, and "must" is out of place. Implementations should provide adequate margin, but there is no definition of what is adequate, so this is not even a normative statement.

Also in 159.5.4 and in 160.5.4.

I am aware of the old bad precedence of this phrase, but it does not make it correct.

SuggestedRemedy

Delete the phrase "As an unavoidable consequence of the requirements for the setting of the SIGNAL_DETECT parameter" and change "must" to "shall".

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.8.9.1** *P* **80** *L* **16** # 27

Ran, Adee Intel

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

"Stressed receiver tolerance testing shall be performed" - there is no normative requirement to measure anything.

SuggestedRemedy

Change to "is performed".

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.8.9.1** *P* **80** *L* **19** # 28

Ran, Adee Intel

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

"Receivers must operate with BER less than" - this is a normative requirement, not an unavoidable situation.

SuggestedRemedy

Change "must" to "shall".

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.6.1** *P* **75** *L* **54** # 29

Ran, Adee Intel

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

"Even if the TDP < 1 dB, the OMA(min) must exceed this value." - this is a normative requirement, not an unavoidable situation.

Also applies in 159.6.1 and in 160.6.1.

SuggestedRemedy

Change to "The OMA(min) requirement holds even if the TDP < 1 dB". Change similarly in the other two places.

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.8.9.1.3** *P* **83** *L* **42** # 30

Ran, Adee Intel

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

This subclause describes "a suggested method for calibrating a stressed eye generator" but the text includes the word "must" three times. These are not unavoidable situations.

SuggestedRemedy

Change "must" to "should" 3 times.

Proposed Response *Response Status* **O**

Cl **108** *SC* **108.5.2.5** *P* **53** *L* **39** # 31

Ran, Adee Intel

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

in Figure 108-3, the direction of processing from Tx to Rx is downward.

In the original figure, the output of the "Serialization" block originally goes to the PMA_UNITDATA.request. This is the case for 25GBASE_R. I understand that for 10GBASE-R another processing is required to create an XSBI data unit.

In the new figure there are two outputs, one from the middle of the "Serialization" block (as in the original) and another one from the right - but these are both the same output. This may confuse the reader.

Also, the one from the right goes to a new block (unnamed) which I assume is the XSBI word. Unlike the original case of 25GBASE-R, this word does not have an arrow pointing downwards, and no primitive name. As it happens, the primitive for this one is also called PMA_UNITDATA.request, but it is a different one (51.2).

The arrows from the two tx_data-group labels are pointing upward.

This diagram is confusing.

SuggestedRemedy

1. There should be one arrow out of the bottom of "Serialization", routed to two places: the original path (serial PMA_UNITDATA.request), and the new block (which perhaps should be labeled "XSBI data unit").

2. From the bottom of the new block there should be another arrow pointing downward toward the label "(to PMA for 10GBASE-R)". This label should be preceded by "PMA_UNITDATA.request" similar to the one on the left.

Proposed Response *Response Status* **O**

Cl **108** *SC* **108.1.3.1** *P* **44** *L* **37** # 32

Dawe, Piers Nvidia

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

PMA_ENERGY.indication is a leftover from the Deep Sleep variant of EEE that the 10G RS-FEC doesn't use.

SuggestedRemedy

Delete

Proposed Response *Response Status* **O**

Cl **108** *SC* **108.6.3** *P* **59** *L* **32** # 33

Dawe, Piers Nvidia

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

108.6.3, RS-FEC Enable, says "The RS-FEC sublayer shall have capability to enable or disable the FEC function. An MDIO interface or an equivalent management interface shall be provided to access the variable FEC_Enable for the RS-FEC sublayer." The first sentence was correct for 802.3by, but is not correct for this project. I suspect that the second sentence needs revision too; we don't require registers we aren't allowed to use, do we? Compare 45.2.1.110.2.

SuggestedRemedy

For example, change "shall have capability to enable or disable the FEC function" to "may have the ability to disable the FEC function, for some PHY types". Change "An MDIO interface or an equivalent management interface shall..." to "For those PHY types, an MDIO interface or an equivalent management interface shall..."
In 108.7.3, major capability EF should be conditional on the PHY type, and the wording should be changed from "Has the capability to enable and disable the RS-FEC function" to "Has the ability to disable the RS-FEC function".
In 45.2.1.110.1, add a sentence like the one in 45.2.1.110.2: "Writes to bit 1.200.2 are ignored and reads return a one if the RS-FEC does not have the ability to disable the RS-FEC function."

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.6.2** *P* **76** *L* **35** # 34

Dawe, Piers Nvidia

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

Vertical eye closure penalty and stressed eye jitter are conditions of stressed receiver sensitivity test too.

SuggestedRemedy

Move the row "Conditions of stressed receiver sensitivity test" up two rows, indenting Vertical eye closure penalty and Stressed eye jitter, or delete "Conditions of stressed receiver sensitivity test".

Proposed Response *Response Status* **O**

Cl **160** *SC* **160.7.4** *P* **118** *L* **25** # 35

Dawe, Piers Nvidia

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

Obsolete wording "shall be performed"

SuggestedRemedy

Follow the style of e.g. 121.8.9, 159.7.10 and 160.7.11: change:
Stressed receiver tolerance testing shall be performed in accordance with the requirements of 158.8.9.1.1, 158.8.9.1.2, 158.8.9.1.3, and 158.8.9.1.4.
to:
Stressed receiver sensitivity shall be within the limits given in Table 158-7 if measured using the method defined in 158.8.9.1.1, 158.8.9.1.2, and 158.8.9.1.4, with the conformance test signal at TP3 as described in 158.8.9.1.3 and 158.8.9.1.5, using the test pattern specified for SRS in Table 158-14.

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.8.10.2** *P* **86** *L* **14** # 36

Dawe, Piers Nvidia

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

The minimum and maximum chromatic dispersion for the compliance channel are calculated based on maximum length. For each PMD, if minimum and maximum are the same side of zero, a link with a shorter fibre and maybe some extra patch panel loss is not properly protected. This is a long-standing bug that was noticed in another project just recently.

SuggestedRemedy

For each case, for whichever of max and min is nearer to zero, reduce the multiplier (e.g. 0.23) by a reasonable amount representing the possible shorter fibre that might be used. It would be simplest to reduce to zero if that isn't a burden. The tables may need rows for -D and -U. Applies to all three PMD clauses.

Proposed Response *Response Status* **O**

Cl **160** *SC* **160.6.1** *P* **125** *L* **30** # 37

Dawe, Piers Nvidia

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

Following up on D2.2 comment 14: PAM4 receivers need protection from signals with combinations of overshoot and low quality that are acceptable to the ideal reference receiver for TDECQ with its infinite resolution and perfect linearity, but real receivers designed to realistic cost and power objectives struggle with.
PAM4 receiver ICs are likely to have been designed and qualified to 200GBASE-DR4, 200GBASE-FR4, 200GBASE-LR4, 200GBASE-ER4, 50GBASE-FR, 50GBASE-LR and/or 50GBASE-ER, which all protect the receiver from bad over-emphasised signals with a limit on K = 10log10(Ceq). Recent 100 Gb/s/lane PAM4 receivers (100GBASE-DR, 100GBASE-FR1, and 100GBASE-LR1, 400GBASE-FR4 and 400GBASE-LR4-6) are protected by over/under-shoot and
transmitter power excursion limits.
In my previous comment I meant to recommend all three limits because each one can catch undesirable signals that the others miss, and that TDECQ misses too.
There are no separate measurements for these; they are by-products of waveform captures for TDECQ and TECQ.

SuggestedRemedy

Reinstate the limit on K = 10log10(Ceq) for all three PMDs.
Then at least there will be consistent protection across the 50Gb/s/lane family.
Add over/under-shoot limits as in the latest P802.3cu draft, for all three PMDs.
Add transmitter power excursion limits to the PMD(s) that need that protection (it depends on the receive max power).

Proposed Response *Response Status* **O**

Cl **158** *SC* **158.1** *P* **70** *L* **30** # 38

Dawe, Piers Nvidia

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

Now that Clause 108 has been revised to explicitly include 10G, is there a need for note a?

SuggestedRemedy

Delete note a

Proposed Response *Response Status* **O**