Cl **0** *SC* **0** *P* *L* # i-11

Anslow, Peter — Ciena

Comment Type **E** *Comment Status* **A**

The IEEE 802.3 chair has announced the assumed order of amendments to be:
IEEE Std 802.3cn-20xx - Amendment 4
IEEE Std 802.3cg-20xx - Amendment 5
IEEE Std 802.3cq-20xx - Amendment 6
IEEE Std 802.3cm-20xx - Amendment 7

SuggestedRemedy

Change the draft to be Amendment 7 and include any changes due to P802.3cn, P802.3cg, and P802.3cq that are now assumed to be ahead of this draft.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Adopt the suggested remedy and insert appropriate editor's notes.

Cl **0** *SC* **0** *P* *L* # i-15

Ran, Adee — Intel Corporation

Comment Type **G** *Comment Status* **R** *Bucket*

This amendment adds the new PHY type "400GBASE-SR4.2". The "4.2" notation for a bi-directional link is new, not intuitively understood, and is only explained in clause 150.

There are a few existing bi-directional PHYs in Ethernet, namely 100BASE-BX10 and 1000BASE-BX10. And subclause 1.2.3 specifically assigns "B" for bidirectional optics.

If this working group ever gets to define 400GBASE-SR4 (with 4 pairs of multimode fiber) or - who knows - 400GBASE-SR2 (with 2 pairs), it will become very confusing.

The PHY type notation "400GBASE-BR4" is available and would be less confusing.

SuggestedRemedy

Consider changing the numenclature from "400GBASE-SR4.2" to "400GBASE-BR4" across this amendment.

Response *Response Status* **C**

REJECT.
The “4.2” nomenclature is explained in 150.1. See the responses to comments #i-27 and #i-33.
The “B” nomenclature has been used for “conventional” bidirectional optics, i.e. using a single wavelength in each direction. However, Clause 150 specifies a PMD that combines both bidirectional and WDM optics. Hence, the nomenclature needs to provide more information, i.e. both the number of fiber pairs and the number of wavelengths. It is also desirable to maintain continuity with the shortwave “S” designation with which the user community is familiar.
The nomenclature is expected to be easily adapted to future PMDs. For example, a 400G PMD supporting four MMF pairs using 100G VCSELs could be designated “400GBASE-SR4.1”.

Cl **0** *SC* **0** *P* **0** *L* **0** # i-10

Turner, Michelle

Comment Type **G** *Comment Status* **A** *Bucket*

This draft meets all editorial requirements.

SuggestedRemedy

Response *Response Status* **C**

ACCEPT.

Cl **1** *SC* **1.4.110a** *P* **18** *L* **9** # i-14

Ran, Adee — Intel Corporation

Comment Type **E** *Comment Status* **R** *Bucket*

In "over eight lanes on multimode fiber", "on" seems to be a typo.

SuggestedRemedy

Change to "over eight lanes of multimode fiber".

Response *Response Status* **C**

REJECT.
Prior definitions for multimode PHYs over multiple fibers (100GBASE-SR10, 100GBASE-SR4, 100GBASE-SR2, 200GBASE-SR4, 400GBASE-SR16, 40GBASE-SR4) and also the new definition for 400GBASE-SR8 in 1.4.110b have used “over X lanes of multimode fiber” because the number of lanes in each direction equals the number of fibers in each direction. For 400GBASE-SR4.2 this is not the case as there are eight lanes in each direction, but only eight fibers in total. Consequently, the wording for this definition (here and in Table 116-2) has been changed to “over eight lanes on multimode fiber”.

Cl **9** *SC* **9.8** *P* **88** *L* **41** # i-12

Rannow, R K — Self

Comment Type **TR** *Comment Status* **R** *Bucket*

use of "i.e.," in this context appears ambiguous.

SuggestedRemedy

Remove "i.e.," to make a grammatically superior statement that is not potentially confusing.

Response *Response Status* **W**

REJECT.
Clause 9, Subclause 9.8 and Page 88 do not exist in the draft.

Cl **9** *SC* **9.8.2** *P* **89** *L* **38** # i-13

Rannow, R K — Self

Comment Type **GR** *Comment Status* **R** *Bucket*

Two instances of, "defined in that specification ..."

SuggestedRemedy

Perhaps a pointer/reference to "that specification".

Response *Response Status* **W**

REJECT.
Clause 9, Subclause 9.8.2, Page 89 and the text “defined in that specification” do not exist in the draft.

Cl **116** *SC* **116.1.4** *P* **25** *L* **12** # i-16

Ran, Adee — Intel Corporation

Comment Type **E** *Comment Status* **R** *Bucket*

Columns in this table and similar ones in the standard are ordered by clause/annex numbering. According to this order, the column for 400GBASE-SR4.2 clause 150 should be rightmost.

SuggestedRemedy

Change column order to make 150 400GBASE-SR4.2 appear on the right.

Response *Response Status* **C**

REJECT.
There is a well-established precedent for the row order in the left-hand column. Adopting the column order shown then ensures that the Ms under the optical PMD clauses form a clean diagonal. Ordering the columns by clause number generates a table that is much harder to read (particularly by the time that the P802.3cn, P802.3cu, and P802.3ct amendments have also modified this table).

Cl **138** *SC* **138.5.1** *P* **35** *L* **13** # i-17

Ran, Adee — Intel Corporation

Comment Type **E** *Comment Status* **A** *Bucket*

The original Figure 138-2 had signal-detect lines from the optical receivers vertically aligned, so that it was visually hinted that the signal from L0 is passes "underneath" optical receiver L1, and so on.

The updated figure has 7 lines at the top of the L7 optical receiver, but they are not aligned with the lines from optical receivers L0 and L1 above.

Also, many lines are not flushed with the boxes they are touching. This can be made cleaner (edit with high zoom factor).

Also applies to Figure 150-2.

SuggestedRemedy

Correct the alignment and make sure that lines are flush with boxes, in both figures.

Response *Response Status* **C**

ACCEPT.

Cl **138** *SC* **138.5.8** *P* **37** *L* **9** # i-18

Ran, Adee — Intel Corporation

Comment Type **E** *Comment Status* **A** *Bucket*

"Table 138-8" appears in smaller font than the text. Also in line 51 in this page.

SuggestedRemedy

Correct the font size.

Response *Response Status* **C**

ACCEPT.

Cl **138** *SC* **138.7.2** *P* **38** *L* **34** # i-1

Rolfe, Benjamin — Blind Creek Associates

Comment Type **T** *Comment Status* **R** *Bucket*

Note (a) states a normative requirement ("shall" is the clue). Notes to tables are informative:
Subclause 6.4.1 of the IEEE-SA Standards Board Operations Manual defines which parts of a standard are
normative and which parts of a standard are informative. A table note (a note to a table) is informative. A table footnote is normative. This distinction should be kept
in mind when determining whether information should go in a table note or a table footnote.

SuggestedRemedy

Move statement of requirements to a footnote or move requirement text to an appropriate sub-clause.

Response *Response Status* **C**

REJECT.
The draft is correct as it stands. In Table 138-9, all the notes are “table footnotes” since they are set outside of the boxed table (see p. 23 of the IEEE-SA Standards Style Manual). These table footnotes are therefore normative and the use of “shall” in footnote (a) is consistent with this.

Cl **138** *SC* **138.8.5** *P* **39** *L* **29** # i-19

Ran, Adee — Intel Corporation

Comment Type **T** *Comment Status* **R** *Bucket*

The additional text referring to the optical splitter and variable reflector does not seem to be related to "optical channel requirements in 121.8.5.2".

121.8.5.2 does not mention the splitter and the reflector, and it is excluded by the existing text anyway.

The additional text for 40GBASE-SR8 would better be listed in a separate exception.

SuggestedRemedy

Separate the new text into a separate exception.

Response *Response Status* **C**

REJECT.
The draft is correct as it stands.
“The optical channel requirements in 121.8.5.2 do not apply” indicates to the reader that the SMF specifications (Table 121-11 and related text) are not relevant to the TDECQ test for MMF PMDs, since the worst-case MMF channel is represented by an electrical low-pass filter. However, Table 121-11 specifies an optical return loss (for 200GBASE-DR4) for which the value of optical return loss tolerance (max) in Table 138-8 should be used instead.
Furthermore, 138.8.5 refers to “the methods specified in 121.8.5”, which describe the use of an optical splitter and variable reflector.

Cl **138** *SC* **138.8.5** *P* **39** *L* **38** # i-26

Dawe, Piers J G — Mellanox Technologies

Comment Type **TR** *Comment Status* **R**

The 0.1 dB allocation for both modal noise and mode partition noise should be increased by 0.2 dB. See kolesar_3cm_adhoc_01_042519, dawe_3cm_adhoc_01_101118, castro_3cm_01_1118, pepeljugoski_1_1104 and castro_3cm_01_0119 (which said 0.23 to 0.45 dB for MN). The total penalties should be kept below 4.6 dB, which is unreasonably high already. The adjustment for MN should be done in the same way as for 100GBASE-SR4 with a formula, so as not to penalise good transmitters.
With this remedy, a 400GBASE-SR8 module used in breakout mode as 200GBASE-SR4, 100GBASE-SR2 or 50GBASE-SR is interoperable with and compliant to those specs (but a SR/SR2/SR4 module is not necessarily interoperable with anything, worst case, because of this gap in their specs).
It is better to provide an adequate yet compatible spec for 400GBASE-SR8 than repeat a mistake made in 802.3cd.

SuggestedRemedy

Add an exception in 138.8.5 as follows:
For the calculation of TDECQ (but not SECQ) for 400GBASE-SR8, Equation (138-1) is used in place of Equation (121-11).
R=sqrt(sigmaG^2 + sigmaS^2 - M^2) (138-1)
where M = 0.0065Pave

Response *Response Status* **U**

REJECT.
This comment is similar to comments #39 against D1.0, #4 against D1.1, #1 against D1.2, #6 against D2.0 and #1 against D2.1, which were rejected.
Insufficient evidence has been provided to justify a change.
It is highly desirable to keep the per lane specifications for 400GBASE-SR8 identical to the other PMDs in Clause 138 (50GBASE-SR, 100GBASE-SR2, and 200GBASE-SR4).

Cl **138** *SC* **138.8.5.1** *P* **39** *L* **45** # i-29

Dawe, Piers J G — Mellanox Technologies

Comment Type **TR** *Comment Status* **R**

SMF TDECQ is defined with minimum and maximum dispersion so that the signal after any allowed dispersion is acceptable. MMF TDECQ is defined with maximum dispersion only. We thought that was the worst case but it isn't always.

As explained in D2.0 comment 9, equalizing a signal after an 11.2 GHz BT4 filter with a 5-tap FFE needs at least one precursor unless the signal is carefully pre-distorted. If it is, and a fourth post-cursor is also needed, the same transmitter seen after a fast channel, e.g. a short fibre, can be difficult to receive (outside the TDECQ spec limit and/or receive power too low) because the 5-tap FFE can't correct the fourth post-cursor and the (now -ve) first precursor at the same time.
The signal after the fast channel can have more distortion from laser dynamics and a little more modal noise.
These three effects can outweigh the better Ceq after the fast channel.

Possible remedies include:
(a) Ensure there is at least one precursor (tap 2 or 3 is the largest), or
(b) Add ~0.4 dB to TDECQ if tap 1 is the largest, or
(c) Define MMF TDECQ with fast and slow channels, in the same spirit as SMF with high and low dispersion, noting that if tap 2 or 3 is the largest it can be assumed that TDECQ(fast) < TDECQ(slow), so no need to determine it.

No extra cost: an implementer who doesn't like option c, if adopted, can comply by following a or b. If he doesn't like b he can follow a. In practice, it seems that TDECQ uses at least one precursor for reasonable MMF transmitters, so there is no extra cost to a competent / responsible transmitter implementer, but the receiver needs protection from inferior transmitters that could appear in the future.

With this remedy, a 400GBASE-SR8 module used in breakout mode as 200GBASE-SR4, 100GBASE-SR2 or 50GBASE-SR is interoperable with and compliant to those specs (but a SR/SR2/SR4 module is not necessarily interoperable with anything, worst case, because of this gap in their specs).
It is better to provide an adequate yet compatible spec for 400GBASE-SR8 than repeat a mistake made in 802.3cd.

SuggestedRemedy

To ensure that the 400GBASE-SR8 transmitter is good enough for the intended range of channel bandwidths, either:
(a) Change the fourth sentence in 138.8.5.1 from "Tap 1, tap 2, or tap 3, has the largest magnitude tap coefficient, which is constrained to be at least 0.8." to
"For 50GBASE-SR, 100GBASE-SR2, and 200GBASE-SR4, tap 1, tap 2, or tap 3, has the largest magnitude tap coefficient, which is constrained to be at least 0.8. For 400GBASE-SR8, tap 2, or tap 3 has the largest magnitude tap coefficient, which is constrained to be at least 0.8."; or
(b) In 138.8.5, add another exception: "For 400GBASE-SR8, if tap 1 has the largest magnitude tap coefficient, TDECQ is 1.1 x the value given by Eq. (121-12). The TDECQ

value with tap 2 having the largest magnitude tap coefficient may be used instead."; or
(c) Change the third exception in 138.8.5 to:
TDECQ is defined for two measurement conditions for 400GBASE-SR8, and for one measurement condition for 50GBASE-SR, 100GBASE-SR2, and 200GBASE-SR4. In the high bandwidth case, which applies to 400GBASE-SR8, the combination of the O/E converter and the oscilloscope used to measure the optical waveform is as in 121.8.5.1. In the low bandwidth case, it has a 3 dB bandwidth of 11.2 GHz with a fourth-order Bessel-Thomson response to at least 1.5 x 22.4 GHz. At frequencies above 1.5 x 22.4 GHz the response should not exceed -24 dB. Compensation may be made for any deviation from an ideal fourth-order Bessel-Thomson response. For 400GBASE-SR8, TDECQ is the higher of the results from the two bandwidth cases. If tap 2 or tap 3 has the largest magnitude tap coefficient in the low bandwidth case, it may be assumed that the result from the low bandwidth case is higher than the result from the high bandwidth case.

Response *Response Status* **U**

REJECT.
This comment is similar to comments #42 against D1.0, #7 against D1.1, #4 against D1.2, #9 against D2.0 and #4 against D2.1, which were rejected.
Insufficient evidence has been provided to justify a change.
Furthermore, it is highly desirable to keep the per lane specifications for 400GBASE-SR8 identical to the other PMDs in Clause 138 (50GBASE-SR, 100GBASE-SR2, and 200GBASE-SR4). Limiting to at most three post-cursors in the reference equalizer means that the transmitted signal, when propagated through the TDECQ reference response, cannot have a significant amount of fourth post-cursor response at the receiver without suffering higher TDECQ penalty.

Cl **138** *SC* **138.8.10** *P* **39** *L* **51** # i-20

Ran, Adee Intel Corporation

Comment Type **E** *Comment Status* **A** *Bucket*

Missing period at the end of the sentence

SuggestedRemedy

Add a period.

Response *Response Status* **C**

ACCEPT.

Cl **138** *SC* **138.10.3.1** *P* **41** *L* **19** # i-21

Ran, Adee Intel Corporation

Comment Type **E** *Comment Status* **R** *Bucket*

In the sentence "The interface contains sixteen active lanes within sixteen total positions", "within sixteen total positions" is redundant.

See for comparison 123.11.3.1.

SuggestedRemedy

Delete "within sixteen total positions".

Response *Response Status* **C**

REJECT.
The draft is correct as it stands. The sentence emphasizes that all positions are active in the single-row sixteen-fiber interface, unlike the two-row twelve-fiber interface.

Cl **138** *SC* **138.10.3.4** *P* **42** *L* **8** # i-22

Ran, Adee — Intel Corporation

Comment Type **E** *Comment Status* **A**

"Figure 138-8 shows an MPO female plug connector with flat interface, and an MDI"

... but this figure is in a subclause that is specific to 100GBASE-SR2 and 200GBASE-SR4. Although the figure itself is generic, it is referenced in 138.10.3.3 within the text.

Also, this sentence is placed in the middle of a long discussion about the two lane assignment options A and B, but it is unrelated to this discussion.

This is not a good editorial structure.

The proposed changed is minimal. More pervasive ones are

1. move figure 138-8 and the text referring to it into 138.10.3.1 which discusses all multi-lane interfaces.
2. Create a new figure similar to 138-8 for the 8-lane connection, with perhaps different dimensions.

SuggestedRemedy

Change "Figure 138-8 shows an MPO female plug connector with flat interface, and an MDI"

to

"The MPO female plug connector and MDI are structurally similar to those depicted in figure 138-8".

And move this sentence to the end of the 138.10.3.4.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change "Figure 138-8 shows an MPO female plug connector with flat interface, and an MDI"

to

"The MPO female plug connector and MDI are structurally similar to those depicted in Figure 138-8, but with two rows of fibers", with this sentence at the end of the second paragraph

and

"The MPO female plug connector and MDI are structurally similar to those depicted in Figure 138-8, but with sixteen fibers and an offset keyway as well as a different pin diameter and location", with this sentence at the end of the third paragraph

Cl **138** *SC* **138.11.3** *P* **46** *L* **15** # i-23

Ran, Adee — Intel Corporation

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

Figure 138-7a has two options. An implementation can conform with one of the options, but not both.

The MDI connection is an important major option that should be defined in the PICS, but currently there is only one item, SR8, for both options.

Item OC6 refers to Figure 138-7a without stating which option.

SuggestedRemedy

Change

Add two new items SR8A and SR8B after SR8A

*SR8A | 400GBASE-SR8 MDI option A | 138.10.3.4 | Device has MDI with dual-row twelve-fiber interface | SR8:O.1 | Yes [ ] No [ ]
*SR8B | 400GBASE-SR8 MDI option B | 138.10.3.4 | Device has MDI with single-row sixteen-fiber interface | SR8:O.1 | Yes [ ] No [ ]

Separate OC6 to two items, referring to option A and option B. Status should be "SR8A:M" and "SR8B:M" respectively.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the suggested remedy, with the exception that “Add two new items SR8A and SR8B after SR8A” should have “SR8” at the end not “SR8A”.

Cl **138** *SC* **138.11.4.2** *P* **46** *L* **1** # i-25

Healey, Adam — Broadcom Inc.

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

In the base document, the subclause number for "Characteristics of the fiber optical cabling and MDI" is 138.11.4.6 (as stated in the editing instruction) and not 138.11.4.2.

Also implement Maintenance Request #1332 <http://www.ieee802.org/3/maint/requests/maint_1332.pdf> which points out that PICS items originally numbered OC9 and OC10 (OC11 and OC12 in this draft) have contents that do not reflect the requirements of the subclause that they reference.

SuggestedRemedy

Change the subclause number from 138.11.4.2 to 138.11.4.6.

In 138.11.4.6, Item OC11 (formerly OC9), Value/Comment field change:
"Per IEC 61754-7-1 interface 7-1-1"
to:
"Per IEC 61754-7-1 interface 7-1-3 or interface 7-1-10"

In 138.11.4.6, Item OC12 (formerly OC10), Value/Comment field change:
"Per IEC 61754-7-1 interface 7-1-1"
to:
"Per IEC 61754-7-1 interface 7-1-4"

Response *Response Status* **C**

ACCEPT.

Cl **150** *SC* **150.1** *P* **47** *L* **12** # i-27

Dawe, Piers J G — Mellanox Technologies

Comment Type **E** *Comment Status* **A** *Bucket*

The 4.2 nomenclature tells us the number of fibres divided by 2 (they aren't really pairs in this PMD type, by the way) and the number of wavelengths per fibre. It doesn't tell us that it's bidirectional; had we chosen the co-directional option I think we would still have called it 400GBASE-SR4.2. No need to introduce a controversial assertion that would interfere with a future project.

SuggestedRemedy

Delete "propagating in opposite directions". If wished, add a separate sentence "The two wavelengths propagate in opposite directions on each fiber."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #i-33.

[Editor's note added after comment resolution completed.
The response to comment i-33 is ACCEPT with a Suggested Remedy of:
Break the sentence into two as follows.
"The 4.2 nomenclature is used to indicate that transmission is over four fiber pairs (eight individual fibers) with the use of two wavelengths. For 400GBASE-SR4.2 these wavelengths propagate in opposite directions on each individual fiber."

Here the general description is conveyed in the first sentence. The second sentence describes how these wavelengths propagate in this particular PMD.]

Cl **150** *SC* **150.1** *P* **47** *L* **12** # i-33

Kolesar, Paul — CommScope, Inc.

Comment Type **TR** *Comment Status* **A** *Bucket*

The following existing sentence needs clarification to avoid overly constraining the meaning of the SR4.2 suffix as being tied to counter propagation.
"The 4.2 nomenclature is used to indicate that transmission is over four fiber pairs (eight individual fibers) with the use of two wavelengths propagating in opposite directions on each individual fiber."
The use of two wavelengths would be encoded in the suffix as ".2" independent of the propagation direction, be it co-propagating or counter-propagating (i.e. bidirectional). But here is is implied to be only applicable to wavelengths propagating in opposite directions. Changing the description will avoid setting an unintended precedent.

SuggestedRemedy

Break the sentence into two as follows.
"The 4.2 nomenclature is used to indicate that transmission is over four fiber pairs (eight individual fibers) with the use of two wavelengths. For 400GBASE-SR4.2 these wavelengths propagate in opposite directions on each individual fiber."

Here the general description is conveyed in the first sentence. The second sentence describes how these wavelengths propagate in this particular PMD.

Response *Response Status* **C**

ACCEPT.

Cl **150** *SC* **150.7** *P* **54** *L* # i-24

Ran, Adee — Intel Corporation

Comment Type **T** *Comment Status* **R** *Bucket*

It seems that most of the specifications in 150.7 are copied over from the 200GBASE-SR4 equivalents, with changes possibly only in the wavelength-dependent parameters.

Same goes for 150.8 with seems to be practically a copy of 136.8 (unless I'm missing something).

These subclauses are long and are the most important part of clause 150, and it is difficult to see what exactly is different from previous specifications.

It would be preferable to provide reference to existing specifications for anything that is unchanged. This would make the clause easier to read (and review).

SuggestedRemedy

Go over 150.7 and 150.8 and their subclauses, and replace as much as possible with references to clause 138. Wherever there are changes, add exceptions.

Response *Response Status* **C**

REJECT.
The draft is correct as it stands. When creating a new clause, how much of the text is copied and how much is referenced is an editorial choice that each project makes. The more that is local, the easier it is for someone looking at just this PMD type to read the specification. The more that is referenced, the easier it is for someone who is already familiar with the referenced clause to see what is different. At this point in time, the draft has progressed through detailed technical reviews in Task Force and Working Group ballot using the first approach. Accepting the proposed change carries a high risk of causing a cascade of other changes that would need to be identified when implementing exceptions to the referenced clause.

Cl **150** *SC* **150.7.1** *P* **55** *L* **39** # i-9

Rolfe, Benjamin — Blind Creek Associates

Comment Type **G** *Comment Status* **R**

(1) What is the Encircled flux requirement when not measured as specified?
Guessing you really don't mean "if" but rather meant that the measurement is to be made per the referenced specification, in which case delete "if"

SuggestedRemedy

Delete "if"

Response *Response Status* **C**

REJECT.
The draft is correct as it stands. There is no ambiguity since only one measurement method is specified. Furthermore, the text is consistent with the in-force standard IEEE Std 802.3-2018 (see Table 95-6) and the in-force amendment IEEE Std 802.3cd-2018 (see Table 138-8). There is no requirement to make a measurement. The product must be compliant to the specification whether it is tested or not.

Cl **150** *SC* **150.7.2** *P* **56** *L* **8** # i-35

Kolesar, Paul — CommScope, Inc.

Comment Type **TR** *Comment Status* **A** *Bucket*

Both TxRx pair types are associated with the incorrect receive wavelength. The receive wavelength for TxRx pair type TR is lambda 2 (900 - 918 nm), not lambda 1 (844 - 863nm). The receive wavelength for TxRx pair type RT is lambda 1, not lambda 2.

SuggestedRemedy

Change TR to RT and change RT to TR at lines 8 and 9 respectively.

Response *Response Status* **C**

ACCEPT.

Cl **150** *SC* **150.7.2** *P* **56** *L* **27** # i-2

Rolfe, Benjamin — Blind Creek Associates

Comment Type **G** *Comment Status* **R** *Bucket*

Per Subclause 6.4.1 of the IEEE-SA Standards Board Operations Manual notes to tables are informative. Thus statement of mandatory requirement ("shall") is not appropriate in a note to a table

SuggestedRemedy

Move requirement statement to text following the table or include in the table properly

Response *Response Status* **C**

REJECT.
The draft is correct as it stands. In Table 150-8, all the notes are “table footnotes” since they are set outside of the boxed table (see p. 23 of the IEEE-SA Standards Style Manual). These table footnotes are therefore normative and the use of “shall” in footnote (a) is consistent with this.

Cl **150** *SC* **150.8.2** *P* **58** *L* **38** # i-3

Rolfe, Benjamin — Blind Creek Associates

Comment Type **T** *Comment Status* **R**

"if measured per IEC 61280-1-3" is incomplete, as you don't state what the limits are if measured some other way.
I *think* you mean "as measured per IEC 61280-1-3" which makes sense.

SuggestedRemedy

change "if" to "as"

Response *Response Status* **C**

REJECT.
The draft is correct as it stands. There is no ambiguity since only one measurement method is specified. Furthermore, the text is consistent with the in-force standard IEEE Std 802.3-2018 (see 95.8.2) and the in-force amendment IEEE Std 802.3cd-2018 (see 138.8.2). There is no requirement to make a measurement. The product must be compliant to the specification whether it is tested or not.

Cl **150** *SC* **150.8.3** *P* **58** *L* **44** # i-4

Rolfe, Benjamin — Blind Creek Associates

Comment Type **G** *Comment Status* **R**

"if measured" again

SuggestedRemedy

Either change to "as measured" or specify what the limits would be if NOT measured according to the
methods given in IEC 61280-1-1

Response *Response Status* **C**

REJECT.
The draft is correct as it stands. There is no ambiguity since only one measurement method is specified. Furthermore, the text is consistent with the in-force standard IEEE Std 802.3-2018 (see 95.8.3) and the in-force amendment IEEE Std 802.3cd-2018 (see 138.8.3). There is no requirement to make a measurement. The product must be compliant to the specification whether it is tested or not.

Cl **150** *SC* **150.8.4** *P* **58** *L* **50** # i-5

Rolfe, Benjamin — Blind Creek Associates

Comment Type **G** *Comment Status* **R**

"if measured" again

SuggestedRemedy

delete "if"

Response *Response Status* **C**

REJECT.
The draft is correct as it stands. There is no ambiguity since only one measurement method is specified. Furthermore, the text is consistent with the in-force standard IEEE Std 802.3-2018 (see 95.8.4) and the in-force amendment IEEE Std 802.3cd-2018 (see 138.8.4). There is no requirement to make a measurement. The product must be compliant to the specification whether it is tested or not.

Cl **150** *SC* **150.8.5** *P* **59** *L* **8** # i-6

Rolfe, Benjamin — Blind Creek Associates

Comment Type **T** *Comment Status* **R**

"if measured" is wrong. "as measured", would not be wrong. Just "measured" would not be wrong. Possibly "when measured' even.

I'd suggest pick one of the not wrong options and use consistently throughout.

SuggestedRemedy

"as measured" works

Response *Response Status* **C**

REJECT.
The draft is correct as it stands. There is no ambiguity since only one measurement method is specified. Furthermore, the text is consistent with the in-force standard IEEE Std 802.3-2018 (see 95.8.5) and the in-force amendment IEEE Std 802.3cd-2018 (see 138.8.5). There is no requirement to make a measurement. The product must be compliant to the specification whether it is tested or not.

Cl **150** *SC* **150.8.5** *P* **59** *L* **16** # i-31

Dawe, Piers J G — Mellanox Technologies

Comment Type **E** *Comment Status* **A** *Bucket*

This is very hard to understand: "with a fourth-order Bessel-Thomson response to at least 1.5 x 17.92 GHz and at frequencies above 1.5 x 17.92 GHz the response should not exceed -24 dB".

SuggestedRemedy

Break it up as in P802.3cn/D3.1 definition of transition time: Change to: "with a fourth-order Bessel-Thomson response to at least 1.5 x 17.92 GHz. At frequencies above 1.5 x 17.92 GHz the response should not exceed -24 dB".
Similarly in 150.8.10.

Response *Response Status* **C**

ACCEPT.

Cl **150** *SC* **150.8.5.1** *P* **59** *L* **28** # i-30

Dawe, Piers J G — Mellanox Technologies

Comment Type **TR** *Comment Status* **R**

SMF TDECQ is defined with minimum and maximum dispersion so that the signal after any allowed dispersion is acceptable. MMF TDECQ is defined with maximum dispersion only. We thought that was the worst case but it isn't always.

As explained in D2.0 comment 14, equalizing a signal after an 8.96 GHz BT4 filter with a 5-tap FFE needs at least one precursor unless the signal is carefully pre-distorted. If it is, and a fourth post-cursor is needed, the same transmitter seen after a fast channel, e.g. a short fibre, can be difficult to receive (outside the TDECQ spec limit and/or receive power too low) because the 5-tap FFE can't correct the fourth post-cursor and the (now -ve) first precursor at the same time.
The signal after the fast channel can have more distortion from laser dynamics and a little more modal noise.
These three effects can outweigh the better Ceq after the fast channel.

Possible remedies include:
(a) Ensure there is at least one precursor (tap 2 or 3 is the largest), or
(b) Add ~0.4 dB to TDECQ if tap 1 is the largest, or
(c) Define MMF TDECQ with fast and slow channels, in the same spirit as SMF with high and low dispersion, noting that if tap 2 or 3 is the largest it can be assumed that TDECQ(fast) < TDECQ(slow), so no need to determine it.

No extra cost: an implementer who doesn't like option c, if adopted, can comply by following a or b. If he doesn't like b he can follow a. In practice, it seems that TDECQ uses at least one precursor for reasonable MMF transmitters, so there is no extra cost to a competent / responsible transmitter implementer, but the receiver needs protection from inferior transmitters that could appear in the future.

SuggestedRemedy

To ensure that the transmitter is good enough for the intended range of channel bandwidths, either:
(a) Change "Tap 1, tap 2, or tap 3, has" to "Tap 2 or tap 3 has"; or
(b) In 150.8.5, add another exception: "If tap 1 has the largest magnitude tap coefficient, TDECQ is 1.1 x the value given by Eq. (121-12). The TDECQ value with tap 2 having the largest magnitude tap coefficient may be used instead."; or
(c) Change the paragraph at line 15 to:
TDECQ is defined for two measurement conditions. In the high bandwidth case, the combination of the O/E converter and the oscilloscope used to measure the optical waveform is as in 121.8.5.1. In the low bandwidth case, it has a 3 dB bandwidth of 8.96 GHz with a fourth-order Bessel-Thomson response to at least 1.5 x 17.92 GHz. At frequencies above 1.5 x 17.92 GHz the response should not exceed -24 dB. Compensation may be made for any deviation from an ideal fourth-order Bessel-Thomson response. TDECQ is the higher of the results from the two bandwidth cases. If tap 2 or tap 3 has the largest magnitude tap coefficient in the low bandwidth case, it may be assumed that the result from the low bandwidth case is higher than the result from the high bandwidth case.

Response *Response Status* **U**

REJECT.
This comment is similar to comments #48 against D1.0, #14 against D1.1, #9 against D1.2, #14 against D2.0 and #5 against D2.1, which were rejected.
Limiting to at most three post-cursors in the reference equalizer means that the transmitted signal, when propagated through the TDECQ reference response, cannot have a significant amount of fourth post-cursor response at the receiver without suffering higher TDECQ penalty.
Insufficient evidence has been provided to justify a change.
Straw poll:
Do you support:
A) Make no change to the specification
B) Define TDECQ as the highest value obtained with 8.96 GHz and 13.28125 GHz filters
A: 6
B: 4

Cl **150** *SC* **150.8.6** *P* **59** *L* **47** # i-7

Rolfe, Benjamin — Blind Creek Associates

Comment Type **T** *Comment Status* **R**

"if measured" again (still wrong).

SuggestedRemedy

"when measured"

Response *Response Status* **C**

REJECT.
The draft is correct as it stands. There is no ambiguity since only one measurement method is specified. Furthermore, the text is consistent with the in-force standard IEEE Std 802.3-2018 (see 95.8.6) and the in-force amendment IEEE Std 802.3cd-2018 (see 138.8.6). There is no requirement to make a measurement. The product must be compliant to the specification whether it is tested or not.

Cl **150** *SC* **150.8.7** *P* **60** *L* # i-32

Dawe, Piers J G — Mellanox Technologies

Comment Type **E** *Comment Status* **A** *Bucket*

Readers struggle to understand "as measured through an O/E converter and oscilloscope with a combined 3 dB bandwidth of approximately 13.28125 GHz with a fourth-order Bessel-Thomson response to at least 1.5 x 26.5625 GHz and at frequencies above 1.5 x 26.5625 GHz the response should not exceed -24 dB". 5-line sentence is too long.
Similar issue in three other places.

SuggestedRemedy

Break it up as in P802.3cn/D3.1 definition of transition time: Change to: "as measured through an O/E converter and oscilloscope with response defined as follows. The combined response of the O/E converter and oscilloscope has a 3 dB bandwidth of approximately 13.28125 GHz with a fourth-order Bessel-Thomson response to at least 1.5 x 26.5625 GHz. At
frequencies above 1.5 x 26.5625 GHz the response should not exceed -24 dB."

Response *Response Status* **C**

ACCEPT.

Cl **150** *SC* **150.8.10** *P* **61** *L* **33** # i-8

Rolfe, Benjamin — Blind Creek Associates

Comment Type **T** *Comment Status* **R**

another "if measured"

SuggestedRemedy

"when measured"

Response *Response Status* **C**

REJECT.
The draft is correct as it stands. There is no ambiguity since only one measurement method is specified. Furthermore, the text is consistent with the in-force standard IEEE Std 802.3-2018 (see 95.8.8) and the in-force amendment IEEE Std 802.3cd-2018 (see 138.8.10). There is no requirement to make a measurement. The product must be compliant to the specification whether it is tested or not.

Cl **150** *SC* **150.10** *P* **63** *L* **38** # i-28

Dawe, Piers J G — Mellanox Technologies

Comment Type **E** *Comment Status* **A** *Bucket*

Someone who is interested in the cabling rather than the transceiver technology may not be familiar with "TxRx pairs", which aren't used in any other clause.

SuggestedRemedy

After the first mention of TxRx pairs in this subclause, insert "(see 150.6)".

Response *Response Status* **C**

ACCEPT.

Cl **150** *SC* **150.10.2.1** *P* **65** *L* **11** # i-34

Kolesar, Paul — CommScope, Inc.

Comment Type **TR** *Comment Status* **A** *Bucket*

Footnote e is incorrectly applied to the 2470 MHz.km entry for OM5. The footnote applies only to entries that are characterized (i.e. informative in nature), not those that are specified. 2470 MHz.km is a specification of OM5, not a characterization.

SuggestedRemedy

Delete footnote e on 2470.

Response *Response Status* **C**

ACCEPT.