Cl **030** *SC* **30.5.1.1.2** *P* **43** *L* **16** # 2

Anslow, Pete Ciena

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

Comment #20 against D2.0 changed all instances of "2-lane" to "two-lane" and all instances of "4-lane" to "four-lane" in new text.
This is ok for new clauses and new text in existing clauses where it is appropriate.
However, there are two places in the draft where this makes the newly inserted text inconsistent with the surrounding existing text.
In 30.5.1.1.2, the existing list has:
100GBASE-CR10 "over 10 lane shielded copper"
100GBASE-SR4 "over 4 lane multimode fiber"
100GBASE-SR10 "over 10 lane multimode fiber"
etc.
Likewise in 80.1.3, the existing exceptions use "10 lane", "4 lane" etc.

SuggestedRemedy

In 30.5.1.1.2 and 80.1.3 change "two-lane" to "2 lane" and "four-lane" to "4 lane" throughout to be consistent with the surrounding text.

Proposed Response *Response Status* **O**

Cl **030** *SC* **30.5.1.1.15** *P* **44** *L* **36** # 3

Anslow, Pete Ciena

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

The base text (as amended by IEEE Std 802.3bs-201x) has "… Clause 108, and Clause 119 ..." but there is no "and" shown in the P802.3cd draft.

SuggestedRemedy

Change "… Clause 108, Clause 119 …" to "… Clause 108, and Clause 119 …" where "and " is in strikethrough font.

Proposed Response *Response Status* **O**

Cl **031B** *SC* **31B.4.3** *P* **328** *L* **40** # 9

Anslow, Pete Ciena

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

The addition of requirements for 50 Gb/s Ethernet to 31B.3.7 means that changes to the PICS in 31B.4.3 and 31B.4.6 should be made.

SuggestedRemedy

Insert new rows into the tables in 31B.4.3 and 31B.4.6 for "operating speeds of 50 Gb/s" using the changes made here by IEEE Std 802.3by-2016 as an example.

Proposed Response *Response Status* **O**

Cl **045** *SC* **45.2.1** *P* **47** *L* **25** # 1

Anslow, Pete Ciena

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

The choice of registers 284 through 289 for the FEC degraded SER registers prevents them from being used for extension of the RS-FEC PCS alignment status registers (280 to 283) if more lanes are ever needed. Given the space available elsewhere, this doesn't seem like a good choice.

SuggestedRemedy

Change the allocation to:
1.650, 1.651 RS-FEC degraded SER activate threshold 45.2.1.116o
1.652, 1.653 RS-FEC degraded SER deactivate threshold 45.2.1.116p
1.654, 1.655 RS-FEC degraded SER interval 45.2.1.116q
Update all references to these registers throughout the draft accordingly.

Proposed Response *Response Status* **O**

Cl **045** *SC* **45.2.1.101.1** *P* **57** *L* **29** # 58

Slavick, Jeff Broadcom Limited

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

45.2.1.101.1 and 45.2.1.102.8 have references only to Clause 91 but they're also present in Cl 134 RS-FEC decoder.

SuggestedRemedy

Bring in and remove the "(see 91.5.3.3)" from 45.2.1.101.1 and 45.2.1.102.8

Proposed Response *Response Status* **O**

Cl **045** *SC* **45.2.1.102.6c** *P* **59** *L* **41** # 54

Slavick, Jeff — Broadcom Limited

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

The FEC_degraded_SER_ability variable is an indicator of the ability to detect a degraded signal. So using the word "signal" is a little misleading since we don't signal to the other end the degraded condition like in 802.3bs

SuggestedRemedy

Change "signal" to "indicate" in Table 45-79, 45.2.1.101.aa, Table 45-80, 45.2.102.6c, 91.5.3.3.1, 91.6.2b, 91.6.5a, 91.6.5b, 134.5.3.3.2, 134.6.2, 134.6.8, 134.6.9
Change "signalling" to "detection" in the 2nd and 3rd sentences of 45.2.1.101.aa, 91.6.2b, 134.6.2

Proposed Response *Response Status* **O**

Cl **045** *SC* **45.2.1.102.6c** *P* **59** *L* **42** # 4

Anslow, Pete — Ciena

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

Missing "." at the end of the last sentence.

SuggestedRemedy

Add the missing "."

Proposed Response *Response Status* **O**

Cl **045** *SC* **45.2.1.102.7** *P* **58** *L* **23** # 59

Slavick, Jeff — Broadcom Limited

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

RS-FEC high SER has references to Cl91 but Cl134 has the same text for setting this indicator.

SuggestedRemedy

Bring in 45.2.1.102.7 and change "(see 91.5.3.3)" to "(see 91.5.3.3 or 134.5.3.3.1)"

Proposed Response *Response Status* **O**

Cl **069** *SC* **69.2.3** *P* **84** *L* **46** # 5

Anslow, Pete — Ciena

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

After this amendment is applied the table titles will be:
Table 69–1—Nomenclature and clause correlation for 1 Gb/s and 10 Gb/s Backplane Ethernet Physical Layers
Table 69–1a—Nomenclature and clause correlation for 25 Gb/s Backplane Ethernet Physical Layers
Table 69–2—Nomenclature and clause correlation for 40 Gb/s and 100 Gb/s Backplane Ethernet Physical Layers
Table 69–2a—Nomenclature and clause correlation for 2.5 Gb/s and 5 Gb/s Backplane Ethernet Physical Layers
Table 69–2b—Nomenclature and clause correlation for 50Gb/s Backplane Ethernet Physical Layers
Table 69–2c—Nomenclature and clause correlation for 100Gb/s two-lane Backplane Ethernet Physical Layers
Table 69–2d—Nomenclature and clause correlation for 200Gb/s Backplane Ethernet Physical Layers
To make this more consistent, I will comment against P802.3cb to move 2.5 Gb/s and 5 Gb/s between Table 69-1 and 69-1a.
Also, the title of Table 69-2 should be changed to clarify that it does not contain all 100G PHYs.

SuggestedRemedy

Either:
Add a change to the title of Table 69-2 to be:
"Table 69–2—Nomenclature and clause correlation for 40 Gb/s and 100 Gb/s four-lane Backplane Ethernet Physical Layers"
or:
Add a change to the title of Table 69-2 to be:
"Table 69–2—Nomenclature and clause correlation for 40 Gb/s and four-lane 100 Gb/s Backplane Ethernet Physical Layers"
Change the title of Table 69-2c to:
"Table 69–2c—Nomenclature and clause correlation for two-lane 100Gb/s Backplane Ethernet Physical Layers"

Proposed Response *Response Status* **O**

Cl **078** *SC* **78.1** *P* **94** *L* **11** # 55

Slavick, Jeff — Broadcom Limited

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

We've added 100GAUI-n for 100Gb/s PHYs to the list of AUIs, which now has 3+ AUI's listed, but didn't change CAUI-4 and CAUI-10 to be CAUI-n

SuggestedRemedy

IEEE base text has "CAUI-4 or CAUI-10 for 100 Gb/s PHYs" update the modified text to read "CAUI-n or 100GAUI-n for 100 Gb/s PHYs"

Proposed Response *Response Status* **O**

Cl **091** *SC* **91.6.5a** *P* **114** *L* **7** # 15

Ran, Adee — Intel

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

Paragraph is read as if MDIO mapping is only valid if the degraded SER ability is not supported.

The description should be aligned with other "ability" bits in clause 91.

SuggestedRemedy

Change the third sentence in this paragraph text

FROM
This variable is set to zero if this ability is not supported and is mapped to the bit defined in 45.2.1.102 (1.201.3).

TO
The variable is set to zero if this ability is not supported. This variable is mapped to the bit defined in 45.2.1.102 (1.201.3).

Proposed Response *Response Status* **O**

Cl **091** *SC* **91.7.4.2** *P* **116** *L* **16** # 56

Slavick, Jeff — Broadcom Limited

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

Feature RF6 has updated Feature text but missed updating Status column.

SuggestedRemedy

Add "or FDDP:M" to the Status column for RF6

Proposed Response *Response Status* **O**

Cl **093A** *SC* **93A-1** *P* **330** *L* **12** # 81

Dudek, Mike — Cavium

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

The other AUI C2C specs have C2C in their titles in table 93A-2, and C2C is in the titles of these annexes.

SuggestedRemedy

Add C2C to the 100GAUI-4 and 100GAUI-2 Physical layers in table 93A-2

Proposed Response *Response Status* **O**

Cl **133** *SC* **133.5.3** *P* **19** *L* **146** # 6

Anslow, Pete — Ciena

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

The ruling at the ned of a table should be "thin" not "very thin".
Same issue for the table in 133.5.4.8

SuggestedRemedy

Highlight the bottom row of the table, Table, Format, Custom Ruling & Shading, Apply Ruling Style: "From Table" to "Bottom" edge.
Make the same change to the table in 133.5.4.8.

Proposed Response *Response Status* **O**

Cl **134** *SC* **134.1.1** *P* **150** *L* **20** # 57

Slavick, Jeff — Broadcom Limited

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

Repetition of the words "for the fact" in the last sentence.

SuggestedRemedy

Change ", and for the fact the alignment marker mapping to the" to ", and the alignment marker mapping of the"

Proposed Response *Response Status* **O**

Cl **134** *SC* **134.5.2.6** *P* **154** *L* **51** # 16

Ran, Adee Intel

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

Now that the FEC degraded feature is introduced into 802.3cd, there is an inconsistency between the feature in 200 Gb/s links and in 50 or 100 Gb/s links: for the latter there is no signaling of the status of the FEC_degraded_SER variable to the link partner.

(compare to 119.2.4.4 which defines that FEC_degraded_SER is signalled to the link partner using a status field in the alignment marker).

This creates a major difference between the usage models which may go unnoticed.

The alignment marker in this clause and in clause 91 has a single pad bit (P154 L51 in this clause) which can be used to signal the degradation status to the partner.

Since no XS is defined for these PHYs, it is suggested to only signal the local degradation.

Alternatively, if the signaling to the link partner is not provided, there should at least be informative NOTEs in 134.5.3.3.2 and in 91.5.3.3.1, telling the reader about the difference from 200 Gb/s (and 400 GB/s).

SuggestedRemedy

Specify that the pad bit is alternating between 0 and 1 when FEC_degraded_SER is not asserted, and is set to 0 when FEC_degraded_SER is asserted.

Add a variable rx_rm_degraded that holds the remote degradation status and is set based on the pad bit (e.g. set to true when two consecutive AM blocks are received with pad bits equal to 0) and an MDIO register mapped to this variable.

Apply similarly in clause 91.

Proposed Response *Response Status* **O**

Cl **134** *SC* **134.5.3.3** *P* **151** *L* **49** # 14

Ran, Adee Intel

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

As shown in a contribution to 802.3bs (see http://www.ieee802.org/3/bs/public/16_09/ran_3bs_01a_0916.pdf), predicting the link performance by the binary event of the average symbol error ratio exceeding some threshold is error prone.

In mass deployment of 802.3cd links, as expected in future data centers, this may result in multiple false alerts or perceived degradations in links that have ample margin for practically error-free operation. The only way to avoid these false alarms is to have a very high margin in all links, but that would likely increase the cost.

An alternative solution, outlined in http://www.ieee802.org/3/bs/public/16_09/ran_3bs_02a_0916.pdf, is to count codewords with a specific number of symbol errors in separate counters. This information is available from the RS-FEC decoder and would be much more useful for predicting uncorrectable errors and identifying links that have insufficient margin (and the desired margin can be defined after the data is collected).

The proposal was not accepted in 802.3, the main objection being that it is tightly coupled with the PCS FEC which might only be used in an XS while the actual PMD-PMD link would use another FEC. But in 802.3cd there are no XS's and no other FEC is expected, so this method is perfectly adequate.

If information on degradation or prediction of uncorrectable errors is desirable, it should use the relevant information.

SuggestedRemedy

A detailed proposal will be presented.

Proposed Response *Response Status* **O**

Cl **134** *SC* **134.6** *P* **162** *L* **32** # 7

Anslow, Pete Ciena

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

The title of Table 134-2 is missing the Table continuation variable.
Also, the number of orphan rows for the table should be set lower than 10.

SuggestedRemedy

Place the cursor at the end of table title on first page. Then click on the Variables Tab and insert "Table Continuation" variable.
In Table designer, set the number of orphan rows to 5.

Proposed Response *Response Status* **O**

Cl **134** *SC* **134.6.1** *P* **163** *L* **50** # 8

Anslow, Pete Ciena

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

There are several instances in 134.6 of text such as "the bit defined in 45.2.1.101 (1.200.1)". But 45.2.1.101 defines a whole register (1.200) not just one bit. Bit 1.200.1 is defined in 45.2.1.101.1 and it would be more helpful to change the cross-reference to this, despite the fact that the equivalent subclauses in Clause 91 reference the register.

SuggestedRemedy

In 134.6.1, change "45.2.1.101" to "45.2.1.101.1" (in forest green).
In 134.6.2, change "45.2.1.101" to "45.2.1.101.aa".
In 134.6.6, change "45.2.1.102" to "45.2.1.102.8" (in forest green).
In 134.6.7, change "45.2.1.102" to "45.2.1.102.7" (in forest green).
In 134.6.8, change "45.2.1.102" to "45.2.1.102.6c".
In 134.6.9, change "45.2.1.102" to "45.2.1.102.6b".
In 134.6.10, change "45.2.1.102" to "45.2.1.102.6a".
In 134.6.12, change "45.2.1.102" to "45.2.1.102.2".
In 134.6.17, change "45.2.1.102" to "45.2.1.102.1".

Proposed Response *Response Status* **O**

Cl **135** *SC* **135.5.7.2** *P* **183** *L* **13** # 60

Slavick, Jeff Broadcom Limited

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

What does the term terminating mean? I think if you list the C2C interfaces first you can remove the word terminating

SuggestedRemedy

Change "For PMA lanes connected to the PMD service interface of a 50GBASE-CR, 50GBASE-KR,
100GBASE-CR2, or 100GBASE-KR2 PMD, or terminating a 50GAUI-1 C2C or 100GAUI-2 C2C link" to: "For PMA lanes connected to a 50GAUI-1 C2C or 100GAUI-2 C2C link, or to the PMD service interface of a 50GBASE-CR, 50GBASE-KR,
100GBASE-CR2, or 100GBASE-KR2 PMD,"

Proposed Response *Response Status* **O**

Cl **135** *SC* **135.5.7.2** *P* **183** *L* **27** # 61

Slavick, Jeff Broadcom Limited

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

We've stated that precoding is mandatory for some PMA to implement on output lanes. We state how the precoder is enabled. There are equations for how the precoded symbols are processed. But there's no definition of what is done if precoding is OFF (disabled).

SuggestedRemedy

Add this sentence before the sentence that begins with "If a Clause 45".
When precoding is disabled P(j-1) in equations (135-1) and (135-2) is always a 0.

Proposed Response *Response Status* **O**

Cl **135** *SC* **135.5.7.2** *P* **183** *L* **28** # 12

Lusted, Kent Intel

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

In the first sentence of the first paragraph starting with "The precoder is enabled..." there is an explicit reference to lane 0 and lane 1.

This error in the paragraph occurred as a result of changes made to the subclause for D2.1 (see D2.0 comment #173). The first paragraph in the subclause now states both 1 lane and 2 lane PMD types. (i.e. 50GBASE-CR and 100GBASE-CR2).

The first sentence of this paragraph includes the phrase "one each lane (0 and 1)." This denotes a 2 lane PMD. For the case of a 1 lane PMD, the reference to two lanes is incorrect.

SuggestedRemedy

Remove "(0 and 1)" from the first sentence in the paragraph.

Proposed Response *Response Status* **O**

Cl **135** *SC* **135.5.7.2** *P* **183** *L* **28** # 13

Lusted, Kent Intel

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

This error occurred as a result of changes made to the subclause for D2.1 (see D2.0 comment #173). The first paragraph in the subclause now states both 1 lane and 2 lane PMD types. (i.e. 50GBASE-CR and 100GBASE-CR2).

The second sentence in the paragraph starting with "The precoder is enabled..." there is an explicit reference to lane 0 and lane 1: "(where i is 0 or 1)". This denotes a 2 lane PMD. For the case of a 1 lane PMD, the reference to two lanes is incorrect.

SuggestedRemedy

Remove "(where i is 0 or 1)" from the second sentence in the paragraph.

Proposed Response *Response Status* **O**

Cl **135D** *SC* **135D.5.4.1** *P* **354** *L* **46** # 82

Dudek, Mike Cavium

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

The Output jitter should have the same exceptions as 802.3bs.

SuggestedRemedy

Change to "Metts Table 83D-1 constraints with the exceptions in 120B.3.1

Proposed Response *Response Status* **O**

Cl **135E** *SC* **135E.1** *P* **357** *L* **1** # 72

Dudek, Mike Cavium

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

Normally things are "shown" in figures not in sections

SuggestedRemedy

Change "shown" to "described" Make the same change in annex 135G on page 370 line 3.

Proposed Response *Response Status* **O**

Cl **135E** *SC* **135E.1** *P* **357** *L* **50** # 83

Dudek, Mike Cavium

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

The 50GAUI-2 and 100GAUI-4 don't use PAM4 signalling

SuggestedRemedy

Change "PAM4" to "NRZ".

Proposed Response *Response Status* **O**

Cl **135E** *SC* **135E.5.4.3** *P* **362** *L* **16** # 84

Dudek, Mike Cavium

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

Wrong reference

SuggestedRemedy

Change 120C.3.3 to 120C.3.4

Proposed Response *Response Status* **O**

Cl **135F** *SC* **135F.3.2.1** *P* **365** *L* **49** # 67

Slavick, Jeff — Broadcom Limited

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

Comment #176 from D2.0 was rejected stating insufficient consensus. How about if we do this similarly to how Cl 83D describes the transmit eq process.

SuggestedRemedy

Add the following with editorial license (including adding a diagram similar to Figure 83D-5).

135F.x Example usage of the optional transmitter precoder request
135F.x.1 Overview
If implemented, transmitter precoder request from a 50GAUI-1 C2C or 100GAUI-2 C2C receiver may be used to set the precoder configuration for each lane within the link as requested by the receiver. An example of a possible precoder configuration process using the transmitter precoder request is provided in this subclass.

In this example, two components, A and B, are connected by a C2C link, such that A is closest to the PCS and B is closest to the PMD. Clause 45 MDIO is implemented by both components, with component A at device address 11 and component B at device address 10. Transmitter precoder request is implemented by either component A, component B, or both. One Station Management (STA) controls both components.

135F.x.2 Configuring precoder setting in the transmit direction
1) For each lane
1a) Read precoder_tx_out_enable_i from component A.
1b) Write precoder_rx_in_enable_i of component B with the read value.
2) Read request_precoder_tx_in_flag from component B
2a) If the flag is a one, then for each lane
2aa) Read request_precoder_tx_in_i from component B
2ab) Write precoder_rx_in_enable_i of component B and precoder_tx_out_enable_i from component A with the read value.
2ac) Go to step 2

135F.x.3 Configuring precoder setting in the receive direction
1) For each lane
1a) Read precoder_rx_out_enable_i from component B.
1b) Write precoder_tx_in_enable_i of component A with the read value.
2) Read request_precoder_rx_in_flag from component A
2a) If the flag is a one, then for each lane
2aa) Read request_precoder_rx_in_i from component A
2ab) Write precoder_tx_in_enable_i of component A and precoder_rx_out_enable_i from component B with the read value.
2ac) Go to step 2

Proposed Response *Response Status* **O**

Cl **135F** *SC* **135F.5.4.1** *P* **367** *L* **41** # 85

Dudek, Mike — Cavium

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

The equation reference is now wrong (as 802.3bs now has a different local equation)

SuggestedRemedy

Change equation 93-3 to equation 120D-2 Also in PICS RC1

Proposed Response *Response Status* **O**

Cl **135G** *SC* **135G.5.4.** *P* **373** *L* **28** # 86

Dudek, Mike — Cavium

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

The order of the PICS is different from Clause 120E

SuggestedRemedy

Re-order the PICS to match Clause 120E

Proposed Response *Response Status* **O**

Cl **135G** *SC* **135G.5.4.1** *P* **374** *L* **17** # 87

Dudek, Mike — Cavium

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

The PICS don't match the requirements (problem commented on in 802.3bs on Annex 120E as well)

SuggestedRemedy

Change TH11 to 0.22UI, TH12 to 32mV, TM10 to 70mV.

Proposed Response *Response Status* **O**

Cl **135G** *SC* **135G.5.4.2** *P* **374** *L* **24** # 88

Dudek, Mike — Cavium

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

The host output does not have a Vertical eye closure specification

SuggestedRemedy

Delete TH14

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.11.1.3** *P* **209** *L* **43** # 34

Hidaka, Yasuo — Fujitsu Lab. of Americ

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

It seems the variable 'n' in this sub-clause does not follow the convention in 136.2, where the parameter 'n' is said to be used to describe the number of lanes in a specific PMD. Change the letter. Also, it is not clear what 'n' represents. Short description of 'n' may help as well.

SuggestedRemedy

Change 'n' to another letter such as 'p' at two locations in the text and two locations in Table 136-8.

Add a brief description about what 'n'.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.11.3.2** *P* **213** *L* **4** # 66

Slavick, Jeff — Broadcom Limited

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

This field is really the local_tp_mode status and that is now defined in 136.8.11.5, the current pointer points to the pattern generation logic.

SuggestedRemedy

Change the 136.8.11.1.3 to 136.8.11.5

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.11.4** *P* **213** *L* **40** # 53

Slavick, Jeff — Broadcom Limited

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

The word "preset" has some previous conitations from Cl72 meaning NoEq. Cl134 has multiple Initial Conditions it can use named PRESET1,2,3. These initial conditions are predefined by the standard equalizer settings.

SuggestedRemedy

Change "preset initial conditions" to "predefined initial conditions"

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.11.4.1** *P* **213** *L* **50** # 64

Slavick, Jeff — Broadcom Limited

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

If we're describing how to get an ic_request made, then there's more things that need to be configured to ensure the request will be made regardless of the remote sides Figure 136-9 state

SuggestedRemedy

Move the following from step c) to step a)

and the coefficient request bits (136.8.11.2.4) to “hold”.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.11.4.2** *P* **214** *L* **31** # 62

Slavick, Jeff — Broadcom Limited

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

To update an individual coefficient the ic_req needs to be set to individual control. If we're spelling out the flow then this should be included.

SuggestedRemedy

Add "set the initial condition request bits (136.8.11.2.1) to individual control," after "control field," in a)

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.11.4.2** *P* **214** *L* **42** # 35

Hidaka, Yasuo — Fujitsu Lab. of Americ

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

It seems the function name UPDATE_Cn does not follow the convention in 136.2, where the parameter 'n' is said to be used to describe the number of lanes in a specific PMD. Change 'n' in 'UPDATE_Cn' to another letter such as 'k'.

SuggestedRemedy

Change 'n' of UPDATE_Cn to another letter such as 'k'.

P214 L42
P217 L9
P219 L7
P222 L27 in Figure 136-9

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.11.7.1** *P* **217** *L* **10** # 63

Slavick, Jeff — Broadcom Limited

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

coef_sts is controlled by both Figure 136-9 and the UPDATE_Cn function.

SuggestedRemedy

Change "The value is assigned by the UPDATE_Cn function and encoded" to: "The value is assigned by the UPDATE_Cn function and Coefficient update state diagram (136-9), then encoded"

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.11.7.5** *P* **219** *L* **49** # 10

Lusted, Kent — Intel

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

It is unclear in the paragraph which modulation and precoding status bits are relevant for the shall statement. Are the bits in this paragraph for the tx path or the rx path or both? The direction is implied to be transmit but not specified.

Cl 135.5.7.2 describes the precoder and the associated bits, however the connection of the direction to the shall statement is weak or ambiguous.

SuggestedRemedy

Add the phrase "transmit related" before "modulation and precoding".

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.11.7.5** *P* **220** *L* **1** # 11

Lusted, Kent — Intel

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

It is unclear in the paragraph which modulation and precoding status bits are relevant for the shall statement. Are the bits in this paragraph for the tx path or the rx path or both? The direction is implied to be receive but not specified.

Cl 135.5.7.2 describes the precoder and the associated bits, however the connection of the direction to the shall statement is weak or ambiguous.

SuggestedRemedy

Add the phrase "receive related" before "modulation and precoding".

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.11.7.5** *P* **222** *L* **31** # 65

Slavick, Jeff — Broadcom Limited

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

The addition of "+ coef_sel != k" enables users to get non-deterministic TxFIR updates. Since a mis-decode of select bits could cause an update to occur multiple times to different TxFIR settings in situations where the Rx is able to process a request within a single frame. The DME encoding enables improved robustness, but does not preclude mis-decodes and there's nothing that defines how to act upon a mis-decode, that's left to the implementor. Example failure would be Tx sends PRE1, DEC which is 11110 if the Rx receives that and does the DEC, then parses a 11010 due to a mis-decode it would adjust PRE2 and then gets a 11110 again from original PRE1 request, would adjust PRE1 a 2nd time.

SuggestedRemedy

Remove the "+ coef_sel != k" from the exit condition of NEW_REQUEST in Figure 136-9
Change steps a,b,c in 136.8.11.4.2 to be the following steps
a) In the transmitted control field, set the initial condition request bits (136.8.11.2.1) to individual control, coefficient request bits (136.8.11.2.4) to “hold” and wait until the received coefficient status bits (136.8.11.3.7) indicate “not updated”.
b) Set the coefficient select bits (136.8.11.2.3) to the desired value and optionally wait for the coefficient select echo bits (136.8.11.3.6) to indicate the requested coefficient select value.
c) Set the coefficient request bits to the desired value and wait until the received coefficient status bits (136.8.11.3.7) no longer indicates “not updated” and the coefficient select echo bits indicate the requested coefficient select value
d) Set the coefficient request bits to “hold”.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3** *P* **224** *L* **6** # 46

Dawe, Piers — Mellanox

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

Please put the abbreviation that one will string-search for (SNDR) in the table, as done for RLM and SNRISI.
Other examples:
Side-mode suppression ratio (SMSR), (min) Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane (max) Transmitter and dispersion eye closure (TDEC), each lane (max) Vertical eye closure penalty (VECP), each lane Transmitter and dispersion penalty (TDP), each lane (max)

SuggestedRemedy

Signal-to-noise-and-distortion ratio (SNDR), (min.)

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3** *P* **224** *L* **10** # 43

Dawe, Piers — Mellanox

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

As explained before, J4u should be changed to J3u. The equivalent J3u is known (D2.0 comment 144) but we need an estimate of the difference in jitter between TP0a and TP2 so that we can choose more appropriate limits for the two test points (D2.0 comment 143).

SuggestedRemedy

Change J4u to J3u, here and in 137. Choose the limit at TP2 considering jitter limit at TP0a, the mated compliance board crosstalk specs, and the slower edges at TP2.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3** *P* **224** *L* **22** # 17

Ran, Adee — Intel

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

The editor's note should be removed at some point if there is no discussion of suggested changes in SNDR, SNR_ISI, and SNR_TX.

SuggestedRemedy

Unless other comments prevent this, remove this note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.4.2.2** *P* **228** *L* **42** # 45

Dawe, Piers — Mellanox

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

It seems the test channel RL (Rx end) needs some tightening, even if not as much as in D2.0 comment 72.

SuggestedRemedy

Implement D2.0 comment 72 but with a different equation in place of 92-38.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.2** *P* **232** *L* **28** # 44

Dawe, Piers — Mellanox

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

Where did 17.16 dB come from? the limit should be consistent with other 3 m cables: 16.48 or 15.5 dB (CA-25G-S CA-25G-N), adjusted for Nyquist frequency. Setting it too high is objective creep.

SuggestedRemedy

Set the max loss to be no more than consistent with CA-25G-S. Set the RITT losses accordingly.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7** *P* **233** *L* **18** # 47

Dawe, Piers — Mellanox

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

The COM impedances should be moved towards neutral, as explained in D2.0 comment 71 and 113.

SuggestedRemedy

Make changes proposed in D2.0 comment 71 and hidaka_3cd_01_0717 - except don't change the parameter name unless it is coordinated with the name used in Annex 93A.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7.1.1** *P* **234** *L* **49** # 48

Dawe, Piers — Mellanox

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

Now that we have moved COM to a neutral impedance basis, using 109.8 ohm PCB impedance seems inconsistent.

SuggestedRemedy

Add another exception to Table 92-12: Zc = 100. In 136.11.7.1.1 and 136.11.7.1.2, delete "and the parameter values given in Table 92–12" (that is stated in 136.11.7.1).

Proposed Response *Response Status* **O**

Cl **136A** *SC* **136A.5** *P* **377** *L* **15** # 74

Dudek, Mike — Cavium

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

Section 136A is informative and 136A.5 is titled "channel insertion loss". The equation for the nominal insertion loss of the mated test fixture however should be normative as measurements are to be adjusted based on deviations from it. It also more logically belongs in section 136B which has the specifications for the mated test fixture.

SuggestedRemedy

Move this section including equation 136A-2 into annex 136B.1.1.1 at page 380 line 41. Consider leaving a reference to this equation in section 136A. Suggested sentence. "The nominal insertion loss of the mated test fixture is determined using Equation new.

Proposed Response *Response Status* **O**

Cl **136C** *SC* **136C.1** *P* **385** *L* **40** # 36

Hidaka, Yasuo — Fujitsu Lab. of Americ

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

136.9.1 states AC-coupling within the cable assembly plug connectors (as specified in 136C.1), whereas 136C.1 states that the receive lanes are AC-coupled within the plug connectors. In PICS, item CA9 refers AC-coupling on the receive lane within the plug connector. It is not clear whether the transmit lanes are AC-coupled or not. If they are AC-coupled, it is not clear where they are AC-coupled.

SuggestedRemedy

Change "For 50GBASE-CR, 100GBASE-CR2, and 200GBASE-CR4, the receive lanes are AC-coupled. The AC-coupling shall be within the plug connectors."

to

"For 50GBASE-CR, 100GBASE-CR2, and 200GBASE-CR4, the receive lanes are AC-coupled. The AC-coupling shall be within the plug connectors. The transmit lanes are AC-coupled at the receive lanes in the plug connectors on the other end of the cable assembly."

Proposed Response *Response Status* **O**

Cl **136D** *SC* **136D.3** *P* **395** *L* **28** # 19

Ran, Adee Intel

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

"The examples are;" should be "The examples are:" (colon instead of semicolon)

SuggestedRemedy

per comment

Proposed Response *Response Status* **O**

Cl **136D** *SC* **136D.3.1** *P* **395** *L* **37** # 20

Ran, Adee Intel

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

The result of the added text is an awkward pair of statements: first we specify a cable assembly form factor (singular) with a choice of connectors on both ends, and then state that cables (plural) can also have different plugs on each end, and then "It may be used" (singluar again).

This can be made simpler, eliminating the plural statement.

SuggestedRemedy

Change FROM
(…)"on both ends. One plug to one plug cables can also have different cable plugs on each end."
TO
(…)"on either end."

Proposed Response *Response Status* **O**

Cl **136D** *SC* **136D.3.1** *P* **395** *L* **38** # 21

Ran, Adee Intel

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

"It may be used to connect the host form factors in 136D.2 with a single or multiple 50 Gb/s link".

This is an incorrect statement - 136D.2 specifies the single-lane SFP28 host form factor (taken from 802.3by), which can only form a single 50 Gb/s link.

It is also irrelevant to refer to the SFP28 host form factor, since these one-plug to one-plug cable assembly can have any type of connector on each end and also form multiple links and 100 Gb/s or 200 GB/s links.

SuggestedRemedy

Delete the quoted sentence.

Proposed Response *Response Status* **O**

Cl **136D** *SC* **136D.3.2** *P* **396** *L* **24** # 24

Ran, Adee Intel

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

How about a one-plug end with a by-8 plug (OSFP or QSFP-DD) to two-plug ends with by-4 plugs? Do we need a separate cable form factor, or should we add this to the one-plug to two-plug form factor?

It seems that any way we do this will be confusing to the reader, since the number of connectors on each end does not fully decribe the cable form factor.

It is suggested to rename the form factors to be more definitive, and add a new form factor that is currently missing.

SuggestedRemedy

Rename the form factors according to the number of lanes on each plug on each end. This will create the following form factors:

- 1:1 (existing 136D.3.1)
- 4:2 (existing 136D.3.2)
- 4:1 (existing 136D.3.3)
- 8:1 (existing 136D.3.4)
- 8:4 (new form factor as per comment).

Add a new subclause 136D.3.5 to describe the new form factor, based on 136D.3.2.

Proposed Response *Response Status* **O**

Cl **136D** *SC* **136D.3.2** *P* **396** *L* **25** # 22

Ran, Adee Intel

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

In a cable, near-end and far-end depend on the end that you are at.

136D.3.3.has a better phrasing.

Also applies to 136D.3.4.

SuggestedRemedy

Change "on the near end" to "on one end", and "on the far end" to "on the other end".

Apply similarly in 136D.3.4

Proposed Response *Response Status* **O**

Cl **136D** *SC* **136D.3.2** *P* **396** *L* **26** # 23

Ran, Adee Intel

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

"It may be used to connect a QSFP28 or microQSFP form factor host (see 136D.2.2 or 136D.2.3) to two QSFP28 or microQSFP form factor hosts with two 50GBASE-CR links or one 100GBASE-CR2 link"

The phrase "with two 50GBASE-CR links or one 100GBASE-CR2 link" is true for each of the two hosts on the two-plug end. The host on the one-plug end will have either four or two links. This is not clear from first reading.

SuggestedRemedy

Change the quoted sentence to

"It may be used to connect a QSFP28 or form factor host (see 136D.2.2) or a microQSFP form factor host (see 136D.2.3) on the one-plug end to two QSFP28 or microQSFP form factor hosts on the two-plug end, such that the host on the one-plug end forms two 50GBASE-CR links or one 100GBASE-CR2 link with each of the hosts on the two-plug end."

Proposed Response *Response Status* **O**

Cl **137** *SC* **137** *P* **249** *L* **1** # 26

Mellitz, Richard Samtec

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

ERL requires a descrition on how to measure and compute
This comment is a potential solution for the variability of COM due to potential manufacturing variations of package parameters referred to in d2.0 unresolved comments 71, 72, and 113.
In addition this comment is also a potential solution issued of return loss issues indicated d2.0 unresolved comments 140 and 141.

SuggestedRemedy

Add annex describing ERL measurement and computation. See this interim and prior presentations for description

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.8.3** *P* **247** *L* **52** # 31

Hidaka, Yasuo Fujitsu Lab. of Americ

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

137.8.3 describes the PMD receive function.

SuggestedRemedy

Change "transmit" to "receive" in the first paragraph of 137.8.3.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.8.3** *P* **247** *L* **52** # 75

Dudek, Mike Cavium

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

The section heading is for PMD receive function as is the reference to 136.8.3 but the text is talking about the transmit function. Also the MDI exception is in 137.8.2 and for consistency should be in this section as well.

SuggestedRemedy

Change the sentence to "The PMD receive function specification is identical to that of 136.8.3 with the exception that electrical signals are received from the MDI, according to the receive electrical specifications in 137.9.3"

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.8.4** *P* **248** *L* **25** # 32

Hidaka, Yasuo — Fujitsu Lab. of Americ

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

137.8.4 describes the PMD global signal detect function.

SuggestedRemedy

Change "global signal" to "global signal detect" in the first paragraph of 137.8.4.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.8.5** *P* **248** *L* **29** # 76

Dudek, Mike — Cavium

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

Missing word.

SuggestedRemedy

Change "signal function" to "signal detect function"

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.8.5** *P* **248** *L* **29** # 33

Hidaka, Yasuo — Fujitsu Lab. of Americ

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

137.8.5 describes the PMD lane-by-lane signal detect function.

SuggestedRemedy

Change "lane-by-lane signal" to "lane-by-lane signal detect" in the first paragraph of 137.8.5.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.8.7** *P* **248** *L* **37** # 77

Dudek, Mike — Cavium

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

All the other optional functions on this page state that they are optional in the text. This one doesn't

SuggestedRemedy

For consistency change to "The PMD lane-by-lane transmit disable function is optional. Its specification is identical to that of 136.8.7."

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9** *P* *L* # 18

Ran, Adee — Intel

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

There is a long debate in this task force about how to account for transmitter and receiver impedance when qualifying a channel.

Since a backplane environment is mostly an engineered system, it is possible to design a backplane with a desired characteristic impedance, and use endpoint devices matched to that impedance. This can improve design flexibility of backplanes and silicon devices. However, COM calculation and Tx/RX tests will have to be altered for such a combination.

SuggestedRemedy

I will submit a presentation with proposed changes.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.2** *P* **249** *L* **22** # 25

Mellitz, Richard Samtec

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

Return loss in table 120D-1 is either too restrictive for devices and not restrictive enough for channels. This is likely because a frequency domain mask does not truly represent digital signaling at a given bit error ratio.

This comment is a potential solution for the variability of COM due to potential manufacturing variations of package parameters referred to in d2.0 unresolved comments 71, 72, and 113.
In addition this comment is also a potential solution issued of return loss issues indicated d2.0 unresolved comments 140 and 141.

SuggestedRemedy

Add item to list for an ERL requirement to be greater than 8 dB. Remove section 137.9.3.1 pertaining to differential return loss keeping common mode return loss

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.2** *P* **249** *L* **28** # 49

Dawe, Piers Mellanox

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

Transmitter output residual ISI SNR_ISI (min) 36.8 dB (Clause 136) and 43 dB (Clause 137) is still too high see dawe_3bs_04_0717 and dawe_3cd_02a_0717 - can barely measure the IC through the test fixture. The warning NOTE in 120D.3.1.7 shows the issue, but doesn't solve it. D2.0 comment 140

SuggestedRemedy

See presentation.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.2** *P* **249** *L* **29** # 51

Dawe, Piers Mellanox

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

COM SNR_TX is defined at the TX output. SNDR is measured thru package and TF by real (imperfect) test equipment therefore is lower than SNR_TX, causing some double counting in COM. D2.0 comment 139.

SuggestedRemedy

Reduce the SNDR specification to 29 dB for both Clause 136 and 137 to account for the degradation caused by the package and test fixture as well as by the measurement impairments.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.2** *P* **249** *L* **29** # 50

Dawe, Piers Mellanox

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

Signal-to-noise-and-distortion ratio (min), increased to 33.3 dB (Clause 136) and to 32.5 dB (Clause 137) for all Tx emphasis settings, is too high: see dawe_3bs_04_0717 and dawe_3cd_02a_0717 - can barely measure the IC through the test fixture. It seems SNDR depends on emphasis, while COM assumes the spec limit at all emphasis settings which is pessimistic and not realistic. Also I suspect there is double counting of jitter in SNDR and as jitter, in COM. D2.0 comment 139.

SuggestedRemedy

Apply a SNDR limit that accounts for the way Pmax varies with emphasis: SNDR0+20log10(Pmax_equalized/Pmax_unequalized), or apply the SNDR spec for no emphasis only.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.2** *P* **249** *L* **30** # 52

Dawe, Piers — Mellanox

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

Now that COM is defined with a near-neutral termination and package impedance, we don't expect transmitter return loss to align to the COM model any more. This RL is much tighter than CEI-56G-LR at low (and high) frequency (although apparently looser between 4 and 9 GHz). At low frequencies it is tighter than the channel RL. The effect of (good) RL at low frequency is much less than the less good RL at higher frequencies anyway, and there is less concern about end-to-end reflections than in C2C because the loss is higher when the receiver is challenged. So we can go back to what we had a few drafts ago.

SuggestedRemedy

If bs doesn't fix this, add another exception and create new equation for Tx RL that is similar to the Cl.93 and the channel RL at low frequencies; 12 -0.625f, 8.7-0.075f. Add figure to illustrate. Refer to new equation instead of existing 137-1.
If 137-1 is revised as above for the receiver, can continue to point to it.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.3** *P* **249** *L* **32** # 27

Mellitz, Richard — Samtec

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

Return loss in table 120D-1 is either too restrictive for devices and not restrictive enough for channels. This is likely because the frequency domain mask does not truly represent digital signaling at a given bit error ratio.
This comment is a potential solution for the variability of COM due to potential manufacturing variations of package parameters referred to in d2.0 unresolved comments 71, 72, and 113.
In addition this comment is also a potential solution issued of return loss issues indicated d2.0 unresolved comments 140 and 141.

SuggestedRemedy

Add item to list for an ERL requirement to be greater than 8 dB. Remove section 137.9.3.1 pertaining to differential return loss keeping common mode return loss

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.3** *P* **249** *L* **37** # 78

Dudek, Mike — Cavium

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

This is the KR clause not the CR clause

SuggestedRemedy

Change "50GBASE-CR and 100GBASE-CR2" to ""50GBASEKR and 100GBASE-KR2"

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.3** *P* **249** *L* **45** # 30

Hidaka, Yasuo — Fujitsu Lab. of Americ

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

137.9.3.1 specifies receiver input return loss which was also specified in Table 120D-5. If we specify here, it should be described as an exception. In addition, the specification in 137.9.3.1 looks same as Table 120D-5 including the new statement of "The test fixture return loss may be de-embedded from the return loss measurements." Equation (137-1) is same as Equation (120D-2) and Equation (137-2) is same as Equation (93-5). It seems we can remove the sub-clause 137.9.3.1. A reference to Table 120D-5 may be sufficient.

SuggestedRemedy

Remove the last statement in 137.9.3, sub-clause 137.9.3.1, Figure 137-3, and Figure 137-4.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.3.1** *P* **250** *L* **1** # 37

Dawe, Piers — Mellanox

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

Now that COM is defined with a near-neutral termination and package impedance, receiver mismatch is the receiver designer's concern, not the standard's, unless it is very extreme, because the receiver interference tolerance test finds its effect combined with other receiver attributes. And we don't expect transmitter return loss to align to the COM model any more. This RL is much tighter than CEI-56G-LR at low (and high) frequency (although apparently looser between 4 and 9 GHz). At low frequencies it is tighter than the channel RL. The effect of (good) RL at low frequency is much less than the less good RL at higher frequencies anyway. So we can go back to what we had a few drafts ago.

SuggestedRemedy

Change "shall meet
Equation (137-1)" to "shall meet Equation (93-3)" and delete Eq 137-1 and Fig 137-3.
Or, change 14.25 - f to 12 -0.625f, revise the figure.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.10** *P* **252** *L* **7** # 29

Hidaka, Yasuo — Fujitsu Lab. of Americ

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

f_LF is also a parameter for zero. In P802.3bs D3.3, it is named as "Continuous time filter, low frequency pole/zero".

SuggestedRemedy

Change "pole" to "pole/zero".

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.10.2** *P* **252** *L* **48** # 28

Mellitz, Richard — Samtec

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

Return loss in 137.10.2 is either too restrictive for devices and not restrictive enough for channels. This is likely because a frequency domain mask does not truly represent digital signaling at a given bit error ratio.
This comment is a potential solution for the variability of COM due to potential manufacturing variations of package parameters referred to in d2.0 unresolved comments 71, 72, and 113.
In addition this comment is also a potential solution issued of return loss issues indicated d2.0 unresolved comments 140 and 141.

SuggestedRemedy

Add a line for suggesting a channel ERL should be greater than 8 dB for channels which exhibit COM less than 3.5 dB. Remove sections of 137.10.2 pertaining to differential return loss keeping insertion loss recommendation

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.12.4.3** *P* **257** *L* **50** # 73

Dudek, Mike — Cavium

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

The return loss requirement in the spec is to meet Table 120D-1. The reference here in the PICS for TC3 is to 93.8.1.4 which has a different equation.

SuggestedRemedy

Change the section to 120D.3.1.1

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.12.4.3** *P* **257** *L* **50** # 79

Dudek, Mike — Cavium

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

Wrong reference in PICS.

SuggestedRemedy

Change 93.8.1.4 to 120D.3.1.1

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.12.4.3** *P* **258** *L* **15** # 80

Dudek, Mike — Cavium

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

The subclause reference is wrong

SuggestedRemedy

Change 120D.3.1.1 to 120D.3.1.8

Proposed Response *Response Status* **O**

Cl **138** *SC* **138.7.1** *P* **270** *L* **10** # 38

Dawe, Piers — Mellanox

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

It seems that it is possible to make a bad transmitter (e.g. with a noisy or distorted signal), use emphasis to get it to pass the TDECQ test, yet leave a realistic, compliant receiver with an unreasonable challenge, such as high peak power, high crest factor, or a need to remove emphasis from the signal, contrary to what equalizers are primarily intended to do. With some of the changed low-bandwidth TDECQ being used to equalize the reference receiver's own bandwidth, this issue becomes more apparent. Note the receiver is tested for a very slow signal only, not for any of these abusive signals. This is an issue for all the PAM4 optical PMDs, although it may be worse for MMF because of the high TDECQ limit.

SuggestedRemedy

1. To screen for noisy or distorted signals with heavy emphasis
Define TDECQrms = 10*log10(A_RMS/(s*3*Qt*R)) where A_RMS is the standard deviation of the measured signal after the 13.28125 GHz filter response, Qt and R are as already in Eq 212-12. s is the standard deviation of a fast clean signal with OMA=2 and without emphasis, observed through the 13.28125 GHz filter response (around 0.7 - can be calculated when the filter bandwidth is stable). Set limit for TDECQrms according to what level of dirty-but-emphasised signal we decide is acceptable, add max TDECQrms row to the table. Alternatively, if the same relative limit is acceptable for all PAM4 optical PMDs, the limit could be in the TDECQ procedure 121.8.5.3 as proposed in bs comment(s). Similarly in clauses 139, 140.
2. To protect the TIA input, consider a peak power spec as in Clause 86.
3. To protect the TIA and any AGC and TIA from unreasonable signals, consider a crest factor spec.
4. To protect the equalizer from having to support unnecessary settings, require that the cursor is one of the first three taps.
5. To protect the receiver from having to "invert" heavily over-emphasised signals, set a minimum cursor weight.

Proposed Response *Response Status* **O**

Cl **138** *SC* **138.7.3** *P* **271** *L* **42** # 71

Dudek, Mike — Cavium

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

The Power budget for other Ethernet clauses is equal to min OMA at maximum TDP minus Receiver Sensitivity. Due to having Receiver Sensitivity with SECQ at 0.9dB the equivalent equation doesn't hold. It would be good to clarify what the power budget is here.

SuggestedRemedy

In Table 138-10 Change parameter "Power budget (for max TDECQ)" to "Power budget (for max TDECQ and SECQ=0)". Make the same change in Tables 139-8 and 140-8.

Proposed Response *Response Status* **O**

Cl **138** *SC* **138.8.7** *P* **274** *L* **8** # 70

Dudek, Mike — Cavium

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

On this draft the Receiver sensitivity was changed to be with an SECQ of 0.9, but here it is defined to be for an ideal input signal. There appears to be a conflict here.

SuggestedRemedy

Change "Receiver sensitivity, which is defined for an ideal input signal", to "Receiver sensitivity, which is defined for a signal with SECQ=0.9dB (e.g. an ideal input signal without overshoot)", Make the same change in clauses 139.7.8 and 140.7.8

Proposed Response *Response Status* **O**

Cl **138** *SC* **138.8.8** *P* **274** *L* **29** # 68

Dudek, Mike — Cavium

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

I have made a comment to 802.3bs that will (by reference) change this specification. I'm making this comment in 802.3cd to alert this task force and provide the opportunity for the comment and solution to be evaluated separately for this specification. This comment is essentially the same as one I am making against Clause 139. It is related to the stressed sensitivity testing.

SuggestedRemedy

No change to the specification. Note that this change also affects Clause 140.

Proposed Response *Response Status* **O**

Cl **139** *SC* **139.6.1** *P* **291** *L* **36** # 39

Dawe, Piers — Mellanox

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

There's only one lane here.

SuggestedRemedy

Change "Total average launch power (max)" to "Average launch power (max)".

Proposed Response *Response Status* **O**

Cl **139** *SC* **139.6.1** *P* **291** *L* **36** # 40

Dawe, Piers — Mellanox

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

The discussion around D2.0 comment 152 implied that there is receiver margin to spare in 50GBASE-FR.

SuggestedRemedy

reduce all the optical power levels for 50GBASE-FR (except Rx damage) by 1 dB.
Bring more evidence for what optical power levels and TDECQ limits are right, including TDECQ measurements with SSPRQ, and correlation to actual receiver performance.
Review the TDECQ limit.

Proposed Response *Response Status* **O**

Cl **139** *SC* **139.7.1** *P* **294** *L* **34** # 41

Dawe, Piers — Mellanox

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

For SRS testing, while Table 138-12 following 802.3by Table 95-10 allows PRBS31Q, scrambled idle (with FEC) or valid 50GBASE-SR... signal, but this Table 139-10 (following the older 802.3ba) allows only PRBS31Q and scrambled idle. The 58-bit scrambler is so long that we can't tell the statistics of RS-FEC encoded scrambled idle from any other valid 50GBASE-R signal. RF, which is a valid 50GBASE-R signal, is often more convenient than scrambled idle. Table 89-10 (40GBASE-FR) also allows PRBS31, scrambled idle or valid 40GBASE-R signal.
We should consistently allow a valid xGBASE-R signal when FEC is mandatory (unlike clauses 87 and 88).

SuggestedRemedy

Change "3 or 5" to "3, 5, 6 or valid 50GBASE-R signal". Also in Table 140-10. Similar changes should be made in bs (D3.0 comment 25).

Proposed Response *Response Status* **O**

Cl **139** *SC* **139.7.9** *P* **298** *L* **20** # 69

Dudek, Mike — Cavium

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

This comment is the same as one made against 802.3bs. With this calibration method for stressed receiver sensitivity a receiver with wider bandwidth than Nyquist will have an improved stressed sensitivity. (around 0l.9dB if at 0.75*Baud rate). This may encourage vendors of receivers to have receiver bandwidths wider than Nyquist. However Transmitters are tested for TDECQ with the Nyquist filtered reference equalizer so that Energy above Nyquist is not "aliased" degrading their TDECQ. There will be an interoperability issue between Transmitters with bad high frequency content and Receivers which have wider bandwidth.

SuggestedRemedy

In Figure 139-5 move the sinusoidal amplitude interferer after the Low-pass filter. On page 297 line52 Change " to "The sinusoidal amplitude interferer is set to 0.71*Baud rate. Note that the reference to 121.8.9.2 on page298 line 43 will require "0.1dB SECQ to be created with the sinusoidal interference " if the comment against 802.3bs first choice is accepted.

Alternatively change the bandwidth of the reference receiver used for TDECQ back to 0.75*Baud rate and change the numbers back to what they were on earlier revisions.
Or add an additional test for the transmitter where TDECQ is measured with a 0.75*Baud rate filter and has to be <2.5dB

Make the equivalent changes in clauses 122 and 124 . (Note that if 0.71*Baud rate is changed to an exact frequency then another exception needs to be added in 124.8.9)

Proposed Response *Response Status* **O**

Cl **140** *SC* **140.6.1** *P* **314** *L* **33** # 42

Dawe, Piers — Mellanox

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

D2.0 comment 128: PAM4 optics is still new and raw, we are still debugging the specification methodology, and we have seen too little experimental information showing technical and economic feasibility. As measurements with the new TDECQ method and with new receiver designs become available, it may be that optical power levels can be reduced and the spec as in this draft would be uneconomic.

SuggestedRemedy

Reduce all the optical power levels for 100GBASE-DR by 0.5 dB.
Bring more evidence for what optical power levels and TDECQ limits are right; in particular, TDECQ measurements with SSPRQ, and correlation to actual receiver performance.
Review the TDECQ limit.

Proposed Response *Response Status* **O**