Cl **000** *SC* **0** *P* **0** *L* **0** # 93

Brown, Matt — Applied Micro

Comment Type **T** *Comment Status* **D**

PICS in Annexes 135B to 135G and 136B are incomplete.

SuggestedRemedy

Complete PICS.

Proposed Response *Response Status* **O**

Cl **000** *SC* **0** *P* **0** *L* **0** # 67

Nowell, Mark — Cisco

Comment Type **T** *Comment Status* **D**

A number of specification specification values were adopted in baselines and colored magenta to represent that they were values which should be considered as TBDs but the current value used was a good starting point unless further analysis suggested changing it. If after the completion of D1.1 Task Force Review, any of these magenta values have not been commented on or modified, then suggest to convert them to black font to represent that they are no longer considered TBDs.

This will not limit and ability to comment and adjust these values during further reviews or ballots. They will be dealt with consistently with all other specification values in the document.

SuggestedRemedy

Change all magenta fonts values that have not been modified at the close of D1.1 comment review to black font.

Proposed Response *Response Status* **O**

Cl **000** *SC* **0** *P* **0** *L* **0** # 80

Brown, Matt — Applied Micro

Comment Type **T** *Comment Status* **D**

Most skew specifications for the various new sublayers specified in clause 131 to 140 are currently marked in magenta text.

SuggestedRemedy

For 50G sublayers, use numbers specified for corresponding 40G sublayers in 802.3-2015. For new 100G sublayers, use numbers specified for corresponding 100G sublayers in 802.3-2015. For new 200G sublayers, use numbers specified for corresponding 200G sublayers in P802.3bs.

Remove related editor's notes.

Proposed Response *Response Status* **O**

Cl **000** *SC* **0** *P* **0** *L* **6** # 150

Dudek, Mike — Cavium

Comment Type **T** *Comment Status* **D**

We have defined 100GBASE-P to represent the PMA for PAM4 100G. It would be good to change the names of the PHY's that use that PMA to P instead of R

SuggestedRemedy

Change 100GBASE-CR2 to 100GBASE-CP2
100GBASE-KR2 to 100GBASE-KP2
100GBASE-SR2 to 100GBASE-SP2
100GBASE-DR to 100GBASE-DP

Proposed Response *Response Status* **O**

Cl **000** *SC* **0** *P* **105** *L* **32** # 6

Anslow, Pete — Ciena

Comment Type **ER** *Comment Status* **D**

Many of the new PICS statements do not have the appropriate entries in the Support column.
If the Status is "M", then there should just be "Yes [ ]" in the Support column.
If the Status is "O", then there should just be "Yes [ ]" and "No [ ]" in the Support column.
If the Status is conditional on something else and M, then there should just be "Yes [ ]" and "N/A [ ]" in the Support column.
If the Status is conditional on something else and O, then there should be "Yes [ ]", "No [ ]", and "N/A [ ]" in the Support column.

SuggestedRemedy

Scrub the New PICS statements to apply the rules in the comment.

Proposed Response *Response Status* **O**

Cl **000** *SC* **0** *P* **197** *L* **20** # 57

Ran, Adee — Intel

Comment Type **E** *Comment Status* **D**

200GBASE-CR4 (and 200GBASE-KR4) use the same PMD control function as the 100G and 50G PHYs, which includes PAM4 precoding request. If PAM4 is requested then the PMD "shall cause the adjacent PMA tp transmit ... with precoding", and similarly for receive. But the 200G PHYs use clause 120 PMA which does not include precoding capability.

Precoding is useful not only for controlling error propagation but also for enabling alternative receiver architectures which may be favorable in highly dispersive channels (such as cable assembly and backplane). Implementation of PMDs, especially with breakout capability (where 200G, 100G, and 50G using the same circuitry), may become more complex if the 200G PMA alone does not support precoding.

Suggested change is to add optional precoding to the clause 120 PMA for usage with CR4/KR4 PMDs.

SuggestedRemedy

Bring in 120.5.7 and amend it by changing the structure that of 135.5.7 (Title "PAM4 encoding", subclause for Gray coding including the existing text, new subclause for precoding based on 135.5.7.2).

Support for precoding in 200GBASE-R PMA should be optional, and is required for PMAs adjacent to 200GBASE-CR4 or 200GBASE-KR4 PMDs.

Add new control variable definitions.

Add control variable mappings in 120.6 and expand MDIO register definitions in 45.2.1.116h through 45.2.1.116n from two to four lanes.

Proposed Response *Response Status* **O**

Cl **001** *SC* **1.4.7** *P* **36** *L* **39** # 2

Marris, Arthur — Cadence Design Syste

Comment Type **T** *Comment Status* **D**

Explain what 50GAUI and 100GAUI

SuggestedRemedy

In the definition section point out that 50GAUI and 100GAUI carry FEC encoded data while LAUI and CAUI do not.

Also point this out in Annex 135A

Proposed Response *Response Status* **O**

Cl **001** *SC* **1.4.54a** *P* **36** *L* **1** # 151

Dudek, Mike — Cavium

Comment Type **E** *Comment Status* **D**

It seems strange to insert 100GBASE-DR between 100GBASE-CR10 and 100GBASE-KP4. It would make more sense to insert it between 100GBASE-LR4 and 100GBASE-SR2. Also to have 100GBASE-KR2 after 100GBASE-KR4 while 100GBASE_CR4 is between

SuggestedRemedy

Make
100GBASE-DR become 1.4.58a1
100GBASE-SR2 become 1.4.58a2
100GBASE-KR2 become 1.4.54a

Proposed Response *Response Status* **O**

Cl **001** *SC* **1.4.81** *P* **37** *L* **17** # 152

Dudek, Mike — Cavium

Comment Type **T** *Comment Status* **D**

There are two four-lane versions.

SuggestedRemedy

Replace "a four-lane version (CAUI-4, GAUI-4)" with "two four-lane versions (CAUI-4, GAUI-4)"

Proposed Response *Response Status* **O**

Cl **031B** *SC* **31B.3.7** *P* **308** *L* **17** # 3

Marris, Arthur — Cadence Design Syste

Comment Type **T** *Comment Status* **D**

Replace TBD on lines 17 and 25

SuggestedRemedy

Make these the same as 100G, that is 394 and 25216

Proposed Response *Response Status* **O**

Cl **045** *SC* **45.2.1** *P* **63** *L* **48** # 100

Wertheim, Oded — Mellanox Technologie

Comment Type **T** *Comment Status* **D**

There are no MDIO registers to configure the training protocol presets.

SuggestedRemedy

Add the following MDIO registers:
Preset 3 1st pre-cursor coefficient:
1 1 1 Reserved
1 1 0 Reserved
1 0 1 preset_3_cm1 = 5 (c(-1) ratio -0.25)
1 0 0 preset_3_cm1 = 4 (c(-1) ratio -0.2)
0 1 1 preset_3_cm1 = 3 (c(-1) ratio -0.15)
0 1 0 preset_3_cm1 = 2 (c(-1) ratio -0.1)
0 0 1 preset_3_cm1 = 1 (c(-1) ratio -0.05)
0 0 0 preset_3_cm1 = 0 (c(-1) ratio 0)

Preset 3 2nd pre-cursor coefficient:
1 1 1 Reserved
1 1 0 Reserved
1 0 1 Reserved
1 0 0 preset_3_cm2 = 4 (c(-2) ratio 0.1)
0 1 1 preset_3_cm2 = 3 (c(-2) ratio 0.075)
0 1 0 preset_3_cm2 = 2 (c(-2) ratio 0.05)
0 0 1 preset_3_cm2 = 1 (c(-2) ratio 0.025)
0 0 0 preset_3_cm2 = 0 (c(-2) ratio 0)

Preset 3 post-cursor coefficient:
1 1 1 Reserved
1 1 0 Reserved
1 0 1 preset_3_c1 = 5 (c(1) ratio -0.25)
1 0 0 preset_3_c1 = 4 (c(1) ratio -0.2)
0 1 1 preset_3_c1 = 3 (c(1) ratio -0.15)
0 1 0 preset_3_c1 = 2 (c(1) ratio -0.1)
0 0 1 preset_3_c1 = 1 (c(1) ratio -0.05)
0 0 0 preset_3_c1 = 0 (c(1) ratio 0)

Proposed Response *Response Status* **O**

Cl **045** *SC* **45.2.1.7.4** *P* **49** *L* **10** # 4

Anslow, Pete — Ciena

Comment Type **ER** *Comment Status* **D**

In Tables 45-9, 45-10, and 45-12 IEEE Std 802.3bq-2016 has inserted a row for 40GBASE-T below the row for 40GBASE-FR.

SuggestedRemedy

Change the editing instructions for the 50G insertions to be below 40GBASE-T

Proposed Response *Response Status* **O**

Cl **045** *SC* **45.2.1.116d** *P* **55** *L* **8** # 124

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

45.2.1.116d has been updated in P802.3bs draft.

SuggestedRemedy

Change "The transmitter, receive direction, is the transmitter that sends data towards the PCS."

to

"The transmitter, receive direction, is the transmitter that sends data towards the MAC."

Proposed Response *Response Status* **O**

Cl **045** *SC* **45.2.1.116e** *P* **57** *L* **38** # 125

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

45.2.1.116e has been updated in P802.3bs draft.

SuggestedRemedy

Change "The transmitter, receive direction, is the transmitter that sends data towards the PCS."

to

"The transmitter, receive direction, is the transmitter that sends data towards the MAC."

Proposed Response *Response Status* **O**

Cl **045** *SC* **45.2.1.124** *P* **63** *L* **41** # 1

Marris, Arthur — Cadence Design Syste

Comment Type **T** *Comment Status* **D**

Remove editors note

SuggestedRemedy

Add 50G, 100G PAM4 to 45.2.1.124 text as modified by 802.3bs

Proposed Response *Response Status* **O**

Cl **073** *SC* **73.3** *P* **76** *L* **49** # 29

Ran, Adee — Intel

Comment Type **E** *Comment Status* **D**

"see 73-9" should be "see 73.9".

SuggestedRemedy

correct per comment

Proposed Response *Response Status* **O**

Cl **080** *SC* **80.1.2** *P* **85** *L* **4** # 12

Anslow, Pete — Ciena

Comment Type **T** *Comment Status* **D**

An item should be added to 80.1.2 for the 1 lane MDI for 100GBASE-DR

SuggestedRemedy

Show item g) as changing to: "The MDIs as specified in Clause 89 for 40GBASE-FR and Clause 140 for 100GBASE-DR use a single lane data path."

Proposed Response *Response Status* **O**

Cl **082** *SC* **82.7.4.7** *P* **94** *L* **38** # 83

Brown, Matt — Applied Micro

Comment Type **E** *Comment Status* **D**

Editor's note has served it's purpose.

SuggestedRemedy

Remove editor's note.

Proposed Response *Response Status* **O**

Cl **082** *SC* **82.7.4.11** *P* **95** *L* **9** # 5

Anslow, Pete — Ciena

Comment Type **E** *Comment Status* **D**

In the table in 82.7.6.4 (renumbered as 82.7.4.11) the entries in the support column are incorrect in the base standard.
Since this table is being changed in this draft, these should be corrected.

SuggestedRemedy

In the row for *AN1 add "No [ ]" in underline font in the support column.
In the rows for AN2 through AN4 add "N/A [ ]" in underline font in the support column.

Proposed Response *Response Status* **O**

Cl **091** *SC* **91.5** *P* **99** *L* **1** # 174

Dudek, Mike — Cavium

Comment Type **TR** *Comment Status* **D**

The 100G Phy's call out clause 91 FEC but there is no call out in those clauses as to which FEC is used. There may also be other changes needed in clause 91 for exceptions.

SuggestedRemedy

Either Amend clause 91 to explicitly add Clauses 136, 137, 138, 140, and annexes 135F and 135G (or the PHY and AUI names) with any amendments necessary (eg in section 91.5.2.7. maybe in 91.5.2.8, maybe in 92.5.3.1 definitely in 91.5.3.3 etc.)
or. Write a FEC subsection for the 100G versions to go into each of these clauses describing which FEC is used and any exceptions to clause 91.

Proposed Response *Response Status* **O**

Cl **091** *SC* **91.5.3.1** *P* **98** *L* **12** # 206

Nicholl, Gary — Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

Figure 91-8. The new optional state "COMP_AM" does not have any functions associated with it (i.e. the box is empty).

SuggestedRemedy

Define and add the appropriate functions into the "COMP_AM" state. The new function would be similar (but not identical) to AMP_COMPARE defined in 91.5.4.2.2.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **091** *SC* **91.5.3.1** *P* **98** *L* **15** # 207

Nicholl, Gary — Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

Figure 91-8. I am not sure that "amp_valid and !amp_valid" are the correct exit conditions for the "COMP_AM" state. amp_valid as defined in 91.5.4.2.1 just checkes that the received 64-bit block is a valid alignment marker payload, whereas in this state we also need to check that it is the correct alignment marker payload for the specific FEC lane being tested.

SuggestedRemedy

Need to define a new version of "amp_valid" that is set to true if the received 64-bit block matches the expected alignment marker payload. Also in this case I think that amp_valid has to be based on more than checking 64 bits (as the first 64 bits received on each FEC lane are identical ?

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **091** *SC* **91.5.3.1** *P* **98** *L* **27** # 208

Nicholl, Gary — Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

Figure 91-8. Why are variables "first_pcsl" and "current_pcsl" being used in a FEC synchronization state diagram. The definitions in 91.5.4.2.1 do not seem to apply here. I would have thought that the FEC synchronization state machine would be operating of FEC lanes (as defiend in 91.5.4.2.1) and not PCS lanes?

SuggestedRemedy

Perhaps "first_pcsl" and "current_pcsl" should be changed to "first_fecl" and "current_fecl" with new definitions. The definition should be changed to a variables that hold the " FEC lane number " and not the "PCS lane number" as in the current definition.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **091** *SC* **91.5.3.1** *P* **98** *L* **33** # 176

Nicholl, Gary Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

Figure 91-8. Is the defintion of the "AMP_COMPARE" function correct ? It is not clear if "AMP_COMPARE" only compares a single 64 bit alignment maker payload (and if so which one), or a sequence of 64 bit alignment marker payloads. Figure 91-4 indicates that the start of each FEC lane is comprised of 5 x 64 bit alignment marker payloads , e.g. FEC Lane 0 starts with amp_tx_0, amp_tx_4, amp_tx_8, amp_tx_12 and amp_tx_16". Which of these are used by the "AMP_COMPARE" function ? The situation is further confused by the fact that "AMP_COMPARE" refers to comparing values of "PCS lanes" rather than "FEC lanes", even though the output of the "AMP_COMPARE" function is essentially to drive a FEC lane mapping (i.e. FEC_lane_mapping<x>
fec_lane)

SuggestedRemedy

No proposed solution. Discuss in task force.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **091** *SC* **91.5.3.1** *P* **98** *L* **39** # 175

Nicholl, Gary Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

Figure 91-8. The "2_Good" state is not consistent with the original Clause 91. I think it may have been copied from Clause 119 by mistake. In Clause 119 there are no FEC lanes.

SuggestedRemedy

Change "pcs_lane_mapping<x>
pcs_lane" to "FEC_lane_mapping<x>
fec_lane"

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **091** *SC* **91.5.3.1** *P* **98** *L* **45** # 177

Nicholl, Gary Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

It is not clear that there are four instances of the FEC alignment state machine running (one per FEC lane).

SuggestedRemedy

Add a note to make it clear that there are four instances of the "FEC synchronization state machine" shown in Figure 91-8, compared to only a single instance of the "FEC alignment state machine" shown in Figure 91-9

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **091** *SC* **91.5.4.2.3** *P* **99** *L* **27** # 178

Nicholl, Gary Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

Need to define more clearly what is meant by "alignment markers" in the definition for "amp_bad_count". For example there are only four "amp_bad_count" counters (one for each FEC lane), but there are 20 alignment markers. Does alignment marker mean a signle 66 bit PCS lane alignment marker, a single 64 bit amp_tx_x (Figure 91-4) or a collection of five 64 bit amp_tx that occur at the start of each FEC lane ?

SuggestedRemedy

No proposed solution. Discuss in task force.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **131** *SC* **131.1.2** *P* **107** *L* **10** # 179

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

Reading bullet "2c" it could be interpreted that LAUI-2 can use Annex 135D/E.

SuggestedRemedy

Reword to make it clear that LAUI-2 uses Annex135B/C and 50GAUI-2 uses Annex 135 D/E. Something like: "The PMA service interface, which, when physically implemented as LAUI-2 at an observable interconnection port uses a 2-lane data path as specified in Annex 135B or Annex 135C and when physically implemented as 50GAUI-2 (50 Gb/s two-lane Attachment Unit Interface) uses a 2-lane data path as specified in Annex 135D or Annex 135E" or change the text for bullet 2c to add the words "as appropriate" at the end so "The PMA service interface, which, when physically implemented as LAUI-2 and 50GAUI-2 (50 Gb/s two-lane Attachment Unit Interface) at an observable interconnection port, uses a 2-lane data path as specified in Annex 135B, Annex 135C, Annex 135D or Annex 135E, as appropriate"

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **131** *SC* **131.1.2** *P* **107** *L* **10** # 104

Ghiasi, Ali — Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

LAUI-2 and 50GAUI-2 are introduced to this point the reader does not know what they till they read page 113

SuggestedRemedy

We either need to add explicit definition for LAUI-2 is an optional 2 lanes electrical interface above the FEC operating at 25.78125 GBd and 50GAUI-2 is an optional 2 lanes electrical interface below the FEC operating at 26.5625 GBd. This wording should in this section or it could added in front material.

Proposed Response *Response Status* **O**

Cl **131** *SC* **131.2.3** *P* **109** *L* **13** # 180

Nicholl, Gary — Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

FEC is mandatory for all PHYs.

SuggestedRemedy

Change: "An FEC sublayer specified in Clause 134 is available for all 50GBASE-R PHYs" to "50GBASE-R PHYs use the FEC sublayer specified in Clause 134". This makes the description consistent with 131.2.2.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **131** *SC* **131.2.4** *P* **109** *L* **19** # 181

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

There is no mention of FEC in this section ? For example "The 50GBASE-R PMA performs the mapping of transmit and receive data streams between the PCS and PMA via the PMA service interface, and the mapping and multi-plexing of transmit and receive data streams between the PMA and PMD via the PMD service interface" The 50GBASE-R PMA also performs the mapping of transmit and receive data streams between the FEC and PMA via the PMA service interface.

SuggestedRemedy

Change the sentence to read " The 50GBASE-R PMA performs the mapping of transmit and receive data streams between the PCS and PMA via the PMA service interface, the mapping of transmit and receive data streams between the FEC and the PMA via the PMA service interface, and the mapping and multi-plexing of transmit and receive data streams between the PMA and PMD via the PMD service interface"

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **131** *SC* **131.5** *P* **114** *L* **21** # 74

Dawe, Piers — Mellanox

Comment Type **TR** *Comment Status* **D**

We need to go back to the principles in http://ieee802.org/3/ba/public/may08/anslow_01_0508.pdf to work out the Skew and Skew Variation limits. Applies to 50GE and 100GBASE-P PHYs such as 100GBASE-SR2, 100GBASE-DR

SuggestedRemedy

Take into account that the unit interval here is 38 ps not 97 ps, the number of lanes is 2 not 10, some PMDs are serial so can't add Skew or SV, and the Skew from a possible 2-lane 40/80 km WDM PMD may not be the same as for a 4-lane 80 km WDM PMD that P802.3ba considered. Also whether there are now cost-sensitive 50GE applications for which support of 40 km, maybe even 10 km, is irrelevant. Take care to round the right thing: if the buffers have to be twice as long as the SV, and if we want them in whole UI, SV should be rounded up to the next 0.5 UI not 1 UI.

Proposed Response *Response Status* **O**

Cl **132** *SC* **132.4** *P* **119** *L* **44** # 182

Nicholl, Gary — Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

I didn't think we supported LPI for 50G PHYs (EEE deep sleep mode is not supported)?

SuggestedRemedy

No proposed solution.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **134** *SC* **134.2** *P* **133** *L* **33** # 81

Brown, Matt — Applied Micro

Comment Type **E** *Comment Status* **D**

Given that there are both "FEC lanes" and "PCS lanes", the full term should be used rather than just "lanes".

SuggestedRemedy

Where "lanes" is referring to FEC lanes, replace "lanes" with "FEC lanes" as necessary. Where "lanes" is referring specifically to PCS lanes, replace "lanes" with "PCS lanes" as necessary.

Some specific locations:
page 133, line 33, "FEC lane"
page 134, lines 16 and 32, "PCS lane"
page 135, Figure 134-2
page 138, line 5
page 141, Figure 134-5

Proposed Response *Response Status* **O**

Cl **134** *SC* **134.5.2.6** *P* **136** *L* **52** # 120

Slavick, Jeff — Broadcom Limited

Comment Type **T** *Comment Status* **D**

The AM marker pad bit is defined to alternate between 1 and 0. 802.3by sets it's AM marker pad bit to always be 0. A 0 is an indicator of a "Control" block and the AM 66b blocks are constructed as Control blocks.

SuggestedRemedy

To be consistent with 802.3by remove "or 1 in an alternating pattern" from the last paragraph on page 136.

Proposed Response *Response Status* **O**

Cl **134** *SC* **134.5.2.6** *P* **137** *L* **24** # 105

Ghiasi, Ali — Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

Tx_scrambled no clear

SuggestedRemedy

change to Start of tx_scrambled data

Proposed Response *Response Status* **O**

Cl **134** *SC* **134.5.3.3** *P* **139** *L* **16** # 121

Slavick, Jeff — Broadcom Limited

Comment Type **T** *Comment Status* **D**

Error marking is part of the decoder. The error marking pattern in Clause 91 is not appropriate for a single 257b AM block. You need to use the text from Clause 108.

SuggestedRemedy

Add an exception to the decoder section stating the error marking is done as follows and copy the 4th paragraph of 108.5.3.2 as the new text.

Proposed Response *Response Status* **O**

Cl **134** *SC* **134.5.3.7** *P* **140** *L* **13** # 84

Brown, Matt — Applied Micro

Comment Type **E** *Comment Status* **D**

Editor's note has served it's purpose.

SuggestedRemedy

Remove editor's note.

Proposed Response *Response Status* **O**

Cl **134** *SC* **134.5.3.8** *P* **141** *L* **50** # 183

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

It would be better if Figure 134-5 was relocated to appear before sub-section 134.5.4.

SuggestedRemedy

Move Figure 134-5.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **134** *SC* **134.5.4.2.1** *P* **142** *L* **9** # 85

Brown, Matt — Applied Micro

Comment Type **E** *Comment Status* **D**

Editor's note has served it's purpose.

SuggestedRemedy

Remove editor's note.

Proposed Response *Response Status* **O**

Cl **134** *SC* **134.5.4.2.1** *P* **142** *L* **44** # 82

Brown, Matt — Applied Micro

Comment Type **T** *Comment Status* **D**

The redefinition for fec_optional_states includes the opening sentence "Boolean variable that is true if the optional states are implemented and false otherwise." For the Clause 134 FEC, this sentence is out of context since the "optional states" are always implemented.

SuggestedRemedy

Delete "Boolean variable that is true if the optional states are implemented and false otherwise."

Proposed Response *Response Status* **O**

Cl **135** *SC* **135.1.1** *P* **150** *L* **11** # 184

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

"The PMA allows the PCS (see Clause 133 and Clause 82) to connect in a media-independent way with a range of physical media. " Why is there no mention of FEC here ? The PMA also allows the FEC sub-layer (see Clause 91 and Clause 134) to connect in a media-independent way with a range of physical media. Why do we single out the PCS but not mention FEC ?

SuggestedRemedy

No proposed solution.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.1.2** *P* **151** *L* **13** # 185

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

Figure 135-1. We should decide whether to use "FEC" or "RS-FEC" in these OSI reference models, and then be consistent across all clauses

SuggestedRemedy

Decide whether to use "FEC" or "RE-FEC" for the OSI reference models and be consistent across all Clauses.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.1.4** *P* **152** *L* **28** # 186

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

Figure 135-2. Suggest extending Figure 135-2 to show LAUI-2 interface between 50G PCS and FEC , and CAUI-n between 100G PCS and FEC, to better align with the subsequent text which talkes about both LAUI-2 and CAUI-n.

SuggestedRemedy

Add LAUI-2 and CAUI-n to Figure 135-2.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.1.4** *P* **153** *L* **12** # 187

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

CAUI-4 should be CAUI-10.

SuggestedRemedy

Replace "CAUI-4 is specified Clause 83 and associated annexes." with "CAUI-10 is specified Clause 83 and associated annexes."

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.1.4** *P* **153** *L* **12** # 127

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

Item 3) of item g) is describing CAUI-10.

SuggestedRemedy

Change "CAUI-4" in item 3) of item g) to "CAUI-10".

Proposed Response *Response Status* **O**

Cl **135** *SC* **135.2** *P* **154** *L* **30** # 188

Nicholl, Gary — Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

Figure 135-4. "z" can also be 20 for 100GBASE-P.

SuggestedRemedy

Replace "z = 4 for 100GBASE-P" with "z = 4 or 20 for 100GBASE-P" in the diagram. If you want to be more precise you could also indetify PCSL and FECL so soemthing like "z = 4 FECLs or 20 PCSLs for 100GBASE-P" and "z = 2 FECLs or 4 PCSLs for 50GBASE-R"

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.4** *P* **156** *L* **1** # 189

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

Why is the text starting with "In the Tx direction, the PMA transfers …." repeated from section 135.3 (page 155, line 10). Same comment for the text starting with "In the Rx direction, if the symbol is " on line 10.

SuggestedRemedy

Propose deleting this text and perhaps the whole of section 135.4. At the very least we appear to be mixing the definition of the PMA service interface and the description of the funtions within the PMA sub-layer (which belong in 135.5). Could also delete the same text in 135.3.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5** *P* **156** *L* **27** # 190

Nicholl, Gary Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

It is not clear what the word "divisors" means in the following sentence " As described in 135.1.4, the number of input lanes and the number of output lanes for a given PMA are divisors of 2 (below the FEC) or 4 (above the FEC) for 50GBASE-R, or 4 for 100GBASE-P, which are the number of PCSLs/FECLs for the respective PHYs". A retimer PMA would have the same number of input lanes as output lanes, in which case I don't see how the divisor can be 2 (or 4) ?

SuggestedRemedy

Reword to make it clear what is meant by "divisors".

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5** *P* **156** *L* **38** # 191

Nicholl, Gary Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

The list starting on line 38 is missing the condition "Whether the PMA is adjacent to the FEC"

SuggestedRemedy

Update the list to include "Whether the PMA is adjacent to the FEC"

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5** *P* **157** *L* **37** # 192

Nicholl, Gary Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

Note LAUI-2 is missing from notes "a" and "b" in Figure 135-5.

SuggestedRemedy

Change "a If 50GAUI-n or 100GAUI-n immediately above this PMA" to "a If LAUI-2, 50GAUI-n or 100GAUI-n immediately above this PMA" and change "b If 50GAUI-n or 100GAUI-n immediately below this PMA or if this is the closest PMA to the PMD" to "b If LAUI-2, 50GAUI-n or 100GAUI-n immediately below this PMA or if this is the closest PMA to the PMD"

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.1** *P* **157** *L* **50** # 193

Nicholl, Gary Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

Missing reference to LAUI-2

SuggestedRemedy

Change "If the interface between the sublayer below the PMA and the PMA is physically instantiated as 50GAUI-n or 100GAUI-n, the PMA....." to "If the interface between the sublayer below the PMA and the PMA is physically instantiated as LAUI-2, 50GAUI-n or 100GAUI-n, the PMA....."

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.2** *P* **158** *L* **7** # 194

Nicholl, Gary Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

"The bit multiplexing behavior is illustrated in Figure 135–4." If the bit muxing behavior is a detail of the more generic PMA functional block diagram, then I suggest it would be better for Figure 135-4 to come after 135-5. It is a bit confusing the way it is currently structured where a diagram of some internal detail of the PMA comes before the high level PMA functional block diagram.

SuggestedRemedy

Move Figure 134-5 to after Figure 134-5 (i.e. reorder the figues).

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.2** *P* **158** *L* **11** # 195

Nicholl, Gary Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

There are no PCLS below the FEC (or if they are then the number is 4 and not 2) so the text is somewhat confusing.

SuggestedRemedy

Change "The number of PCLS/FECLs z is 2 (below the FEC) and 4 (above the FEC) for 50GBASE-R interface and 4 for 100GBASE-P interfaces" to "The number of PCSLs/FECLs z is 2 FECLs (below the FEC) and 4 PCSLs (above the FEC) for 50GBASE-R interface and 4 FECLs (below the FEC) for 100GBASE-P interfaces"

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.2** *P* **158** *L* **12** # 196

Nicholl, Gary — Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

"The nominal bit rate Rlane of each PCSL/FECL
is 25.78125 Gb/s for 50GBASE-R above the FEC and…." This is incorrect. The nominal bit rate for the 50GBASE-R PCS lane is 12.890625 Gb/s as described in Clause 133. There are also no FECLs above the FEC.

SuggestedRemedy

Change "The nominal bit rate Rlane of each PCSL/FECL is 25.78125 Gb/s for 50GBASE-R above the FEC and…" to "The nominal bit rate Rlane of each PCSL is 12.890625 Gb/s for 50GBASE-R above the FEC and…" This wording is still a bit cumbersome and could be improved further.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.2** *P* **158** *L* **18** # 197

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

The following sentence is a bit cumbersome "The Baud rate is equal to half of the bit rate when the number of physical lanes is 1 for 50GBASE-R or the number of physical lanes is 1 or 2 for 100GBASE-P (PAM4 symbols are sent or received on the lanes)"> This text, or similar, seems to be repeated several times in the clause.

SuggestedRemedy

Why not simply state that "the Baud rate is equal to half the bit rate when PAM4 encoding is implemented". It is already stated elsewhere (several times) that PAM4 encoding is used when "the number of physical lanes is 1 for 50GBASE-R or the number of physical lanes is 1 or 2 for 100GBASE-P ". Too much repetition to quote a BBC radio 4 program !

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.2** *P* **158** *L* **33** # 198

Nicholl, Gary — Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

"As the PCS (see Clause 133 and Clause 82) has fully flexible receive logic, an implementation is free to perform the mapping of PCSLs/FECLs from input lanes to output lanes without constraint" It is also a requirement that the FEC (Clause 91 and Clause 134) has flexible receive logic as well to make this satement true.

SuggestedRemedy

Include a reference to FEC (Clause 91 and 134).

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.2** *P* **159** *L* **9** # 199

Nicholl, Gary — Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

Figure 135-6. The result of the equation "x+4/m" is incorrect. The correct answer should be x+1 and not 1.Same comment for equation x+4/n on line 27.

SuggestedRemedy

Replace "x+4/m=1" with "x+4/m=x+1" and replace "x+4/n=2" with "x+4/n=x+2"

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.2** *P* **159** *L* **13** # 200

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

Figure 135-6. Redundant set of muxes.

SuggestedRemedy

Delete the redundant set of muxes.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.3** *P* **159** *L* **41** # 201

Nicholl, Gary — Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

"The Skew (relative delay) between the PCSLs/FECLs must be kept within limits so that the information on the lanes can be reassembled by the PCS" This statement also applies to the FEC.

SuggestedRemedy

Change "The Skew (relative delay) between the PCSLs/FECLs must be kept within limits so that the information on the lanes can be reassembled by the PCS" to "The Skew (relative delay) between the PCSLs/FECLs must be kept within limits so that the information on the lanes can be reassembled by the PCS and FEC"

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.3.2** *P* **160** *L* **12** # 202

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

(toward the PMD) is redundant as transmit direction has already been defined.

SuggestedRemedy

Remove "(toward the PMD)"

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.3.8** *P* **161** *L* **6** # 203

Nicholl, Gary — Cisco Systems

Comment Type **T** *Comment Status* **D** *<late>*

Remove the reference to PCSLs.

SuggestedRemedy

Change "while maintaining the bit order and position of PCSLs/FECLs on lanes sent in the receive direction towards the MAC." to "while maintaining the bit order and position of FECLs on lanes sent in the receive direction towards the MAC.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.7.2** *P* **162** *L* **54** # 204

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

"precoder_up_tx_enable_i, precoder_up_rx_enable_i, precoder_down_tx_enable_i," ..In these variable names do tx and rx still represent direction of data flow with respect to the PMD , so for example "precoder_up_tx_enable_0" would turn on decoding for precoded PAM4 symbols recevied on lane 0 from the FEC, e.g. generating G(j) from P(j) ?, or to put it another way is "precoder_up_tx" an input to the PMA and "precoder_up_rx" an output of the PMA (and from/to the FEC susblayer).

SuggestedRemedy

No proposed solution.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.5.8** *P* **163** *L* **23** # 30

Ran, Adee — Intel

Comment Type **T** *Comment Status* **D**

If the PMA is adjacent to a PMD, it would be beneficial for diagnostic purposes to have local loopback implemented through the PMD (the PMDs have no loopback control and the PMD clauses refer to the PMA loopback).

Also, Note 2 in 136.8.8 regarding network disruption should really be placed here, since this is where loopback is controlled.

SuggestedRemedy

Add the following NOTE after the second paragraph:

NOTE 1—The intention of providing this loopback mode is to permit diagnostic or self-test functions to test the transmit and receive data paths using actual data. If the PMA is adjacent to a PMD, it is recommended that the local loopback be implemented through the PMD and that the signal paths that are exercised in the loopback mode encompass as much of the PMD circuitry as is practical.

Add the following NOTE after the last paragraph:

NOTE 2—Placing a network port into loopback mode can be disruptive to a network.

Proposed Response *Response Status* **O**

Cl **135** *SC* **135.6** *P* **165** *L* **21** # 205

Nicholl, Gary — Cisco Systems

Comment Type **E** *Comment Status* **D** *<late>*

There are no detailed descriptions provided for each of the MDIO variables in Table 135-2. Please see section 134.6 or 91.6 as examples.

SuggestedRemedy

Add a description for each of the MDIO variables in Table 135-2.

Proposed Response *Response Status* **O**

Late comment: This comment was submitted after the Task Force review closed.

Cl **135** *SC* **135.6** *P* **165** *L* **44** # 126

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

The description of PMA precoder control in Table 135-2 is inconsistent with Clause 45.

SuggestedRemedy

Change "1.152.7" to "1.602.1"
Change "1.152.6" to "1.602.0"
Change "1.152.5" to "1.603.1"
Change "1.152.4" to "1.603.0"
Change "1.152.3" to "1.600.1"
Change "1.152.2" to "1.600.0"
Change "1.152.1" to "1.601.1"
Change "1.152.0" to "1.601.0"
Change "precoder_up_tx_enable_1" to "precoder_tx_up_enable_1"
Change "precoder_up_tx_enable_1" to "precoder_tx_up_enable_0"
Change "precoder_up_rx_enable_1" to "precoder_rx_up_enable_1"
Change "precoder_up_rx_enable_1" to "precoder_rx_up_enable_0"
Change "precoder_down_tx_enable_1" to "precoder_tx_down_enable_1"
Change "precoder_down_tx_enable_1" to "precoder_tx_down_enable_0"
Change "precoder_down_rx_enable_1" to "precoder_rx_down_enable_1"
Change "precoder_down_rx_enable_1" to "precoder_rx_down_enable_0"
Change "PMA precoder control" for the appropriate name of "PMA precoder control Tx down", "PMA precoder control Rx down", "PMA precoder control Tx up", or "PMA precoder control Rx up".
Add rows for "PMA precoder request down (1.605)".
Add rows for "PMA precoder request up (1.606)".

Proposed Response *Response Status* **O**

Cl **135** *SC* **135.6** *P* **167** *L* **1** # 130

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

"PMA precode request status (1.604)" is missing in Table 135-3.

SuggestedRemedy

Add rows for "PMA precode request status (1.604)" to Table 135-3.

Proposed Response *Response Status* **O**

Cl **135G** *SC* **135G.1** *P* **349** *L* **10** # 116

Ghiasi, Ali — Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

For this clause we are referencing CL120.D broken specification. C2M simulation were based on channels with ICN of ~0.7 dB where QSFP28 ICN is in excess of 4 mV. For background please see attach presentation
http://www.ieee802.org/3/bs/public/16_09/ghiasi_3bs_01_0916.pdf

SuggestedRemedy

Both BS and CD task force need to develop a robust C2M specifications, this will likley involve tighting the transmiter RLM and jitter and receiver sensitivity.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.1** *P* **176** *L* **28** # 86

Brown, Matt — Applied Micro

Comment Type **E** *Comment Status* **D**

Editor's note has served it's purpose.

SuggestedRemedy

Remove editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.1** *P* **177** *L* **1** # 31

Ran, Adee Intel

Comment Type **T** *Comment Status* **D**

The three paragraphs starting here describe the expected performance of a "link" in a very detailed way using normative language. But this "link" comprises multiple components - two hosts (each containing one or more PHY chips, PCB, connectors, and spanning multiple sublayers), and medium. These components may be supplied by multiple vendors.

The standard is written with the objective that a system of compliant transmitter, compliant cable assembly, and compliant receiver, will operate at the required BER (and FLR); but it is the task force's responsibility, not any single vendor's responsibility. No single vendor can guarantee a normative requirement for link performance.

There are separate specifications for the transmitter, receiver, and cable assembly, and they are coupled together to facilitate the expected overall "link" performance. These normative requirements are sufficient, and there is no need to add a system-level normative statement that no vendor is accountable for.

There should be no "shall" and no PICS item for this text. Instead, it would be a service to readers if the introduction includes the expected performance of a complete physical layer (in terms of frame loss ratio or mean time between errors) and the suggested performance of a PMD and an adjacent PMA (in terms of detector/bit/symbol error ratio).

This applies to other PMD clauses too.

SuggestedRemedy

A detailed replacement text will be presented.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.1** *P* **177** *L* **1** # 73

Dawe, Piers Mellanox

Comment Type **T** *Comment Status* **D**

As far as I can see, "link BER" is not defined or even referenced. The term was used in 802.3by where there is only one lane so less ambiguity, but not normatively, nor explicitly defined.

SuggestedRemedy

Is this is the interface BER defined in 86.8.2.1? If so, call it interface BER.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.3** *P* **179** *L* **12** # 153

Dudek, Mike Cavium

Comment Type **T** *Comment Status* **D**

The inter-sublayer interface for 100G isn't defined in 116.3

SuggestedRemedy

Replace 116.3 with 80.3

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.3** *P* **179** *L* **13** # 128

Hidaka, Yasuo Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

The PMD service interface for 100Gb/s PHYs is defined in 80.3.

SuggestedRemedy

Change the reference to 116.3 in the third paragraph of 136.3 to a reference to 80.3.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.5** *P* **180** *L* **23** # 129

Hidaka, Yasuo Fujitsu Labs. of Ameri

Comment Type **T** *Comment Status* **D**

The bit time in the footnote a) of Table 136-4 is wrong.

SuggestedRemedy

Change "20ns for 50GBASE-CR, 10ns for 100GBASE-CR2, and 5ns for 200GBASE-CR4" to "20ps for 50GBASE-CR, 10ps for 100GBASE-CR, and 5ps for 200GBASE-CR4".

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.6** *P* **180** *L* **34** # 32

Ran, Adee Intel

Comment Type **E** *Comment Status* **D**

Editor's note has served its purpose.

SuggestedRemedy

Delete the editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.6.1** *P* **180** *L* **48** # 33

Ran, Adee Intel

Comment Type **T** *Comment Status* **D**

Skew constraints are TBD.

Based on discussions in the task force meetings and ad hoc call, it is proposed that the PMD skew constraints be independent of PMD type and that 50G skew constraints enable future multi-lane 50G PMDs. The suggested numbers are the same as the ones on clause 80 (100 Gb/s Ethernet) and clause 116 (200 Gb/s, 802.3bs D2.2).

Since this is a single-lane PMD, an informative note can be added for the fact that PMD and medium do not add skew and have no skew variation.

SuggestedRemedy

For Skew at SP2, change TBD to 43 ns.
For Skew at SP3, change TBD to 53 ns.
For Skew at SP4, change TBD to 134 ns.
For Skew at SP5, change TBD to 145 ns.

Delete the sentences "Since the signal at the (...)
represents a serial bit stream, there is no Skew Variation at this point" and instead add the following informative NOTE before the final paragraph:

NOTE--Since the signals at the PMD service interface and the MDI represent a serial bit stream, there is no Skew Variation at these points. The 50GBASE-CR PMDs and cable assembly do not contribute to the skew between SP2 and SP5.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.6.2** *P* **181** *L* **17** # 34

Ran, Adee Intel

Comment Type **T** *Comment Status* **D**

Skew constraints are in magenta.

Based on discussions in the task force meetings and ad hoc call, it is proposed that the PMD skew constraints be independent of PMD type. The numbers in 136.6.2 are consistent with clauses 116 for 200G and clause 80 for 100G.

Comment can be appied to all PMD clauses.

SuggestedRemedy

Change all numbers in 136.6.2 from magenta to black.

Use same skew and skew variation numbers in other clauses.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.7** *P* **181** *L* **41** # 35

Ran, Adee Intel

Comment Type **T** *Comment Status* **D**

Control and status variable mapping should be updated, so that the editor's note can be removed.

SuggestedRemedy

Update table 136-5 and table 136-6 according to variable defiinitions in 136.8.12.7 and register mapping in clause 45. Add registers in clause 45 if necessary.

Implement with editorial license.

Delete editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.1** *P* **183** *L* **5** # 87

Brown, Matt Applied Micro

Comment Type **E** *Comment Status* **D**

Editor's note has served it's purpose.

SuggestedRemedy

Remove editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.1** *P* **183** *L* **6** # 154

Dudek, Mike — Cavium

Comment Type **T** *Comment Status* **D**

The Editor's note is helpful and would be helpful for future readers of the standard. Why do we want to remove the note prior to publication? However Clause 92 (including the MDI which is specified for clause 136 by reference to Clause 92) uses the 0 to 3 nomenclature not 1 to 4. It may be better to re-label the lanes here to match what is done in Clause 92.

SuggestedRemedy

Either Change the Note from an Editor's note to a note. or as the previous paragraph already starts with "note that" just make this sentence into the last sentence of that paragraph.

Or remove the +1 in Figure 136-2 and the labels for SL and DL (throughout the clause) and the editors note.

Make the same change to Clause 137 (and the editors note on page 277 line 13

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.4.2.2** *P* **206** *L* **3** # 160

Dudek, Mike — Cavium

Comment Type **T** *Comment Status* **D**

The reference to 110.8.4.2.2 would require the test channel meets the requirements for clause 110 not for 136.

SuggestedRemedy

Add "except that the cably assembly shall meet the requirements of 136.11 and the cable assembly test fixture shall meet the requirements of 136B.1

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.8** *P* **185** *L* **22** # 38

Ran, Adee — Intel

Comment Type **T** *Comment Status* **D**

Editor's note has served its purpose.

SuggestedRemedy

Delete the editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.8** *P* **185** *L* **35** # 36

Ran, Adee — Intel

Comment Type **T** *Comment Status* **D**

"Other loopback signal paths may also be enabled independently using loopback controls within other devices or sublayers"

The statement is vague and arguably incorrect. The only loopback controls specified are in the PMA (referenced below). The "other loopback paths" include remote loopback, but enabling both local loopback and remote loopback together on the same PHY may yield unexpected results.

This statement is within an informative note, but does not add any valuable information.

SuggestedRemedy

Delete the quoted statement.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.8** *P* **185** *L* **37** # 37

Ran, Adee — Intel

Comment Type **E** *Comment Status* **D**

This subclause describes the _local_ loopback function. Control of the local loopback function is specified in 135.5.8.

SuggestedRemedy

Change the cross reference from 135.5.9 to 135.5.8.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.1.3** *P* **187** *L* **34** # 106

Ghiasi, Ali — Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

It would be nice to have one sentence description of Fig 136-4 instead of the read whole next page

SuggestedRemedy

You could coule right something like "The output of PRBS generator is demultiplexed 1:2 into A and B. The ouput A goes through block x3 (maybe you need better name) to generate PAM2 signal. For PAM4 signal generation the output A and B are 1st gray encoded or optionally the pre-coder is enabled.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.1.3** *P* **188** *L* **36** # 155

Dudek, Mike — Cavium

Comment Type **E** *Comment Status* **D**

Rather than defining the pre-coding here it would be better to reference it from clause 135

SuggestedRemedy

Reference clause 135.5.7.2 and delete equation 136-1.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.2.4** *P* **190** *L* **34** # 122

Slavick, Jeff — Broadcom Limited

Comment Type **T** *Comment Status* **D**

Forcing of c(0) to zero is not the desired affect for the "No Equalization" state of the cursor. Since we do refer to it as cursor and not an attenuator.

SuggestedRemedy

Change "by forcing its value to be zero" to "forcing its value to have no equalization effect."

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.2.4** *P* **190** *L* **34** # 39

Ran, Adee — Intel

Comment Type **T** *Comment Status* **D**

In "no equalization" state c(0) should not be set to zero but rather to 1. setting c(0) to zero would practically create an attenuated, inverted, or zero signal.

SuggestedRemedy

Change FROM
forcing its value to zero
TO
setting it to “No equalization”. The “No equalization” value is 1 for c(0) and 0 for c(–2), c(–1), and c(1).

In the coefficient update algorithm (136.8.12.5) replace line 43 "ck_ask=0" with the following lines:

```
if k = 0
  ck_ask = 1
else
  ck_ask = 0
end if
```

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.3** *P* **190** *L* **36** # 102

Rechtman, Zvi — Mellanox

Comment Type **TR** *Comment Status* **D**

The Control and status fields of the traning frame are DME endcoded. When those fields have an odd number of logical ones, the encoded DME is not DC balanced (+6.25%), and therefore the traning frame is not DC balanced.

SuggestedRemedy

Add a parity bit to the Status field. This bit will be used to keep an even number of logcial ones and to ensure DC balance of the traning frame

Add new variable "paritiy bit" to the Status field as bit 7.
"parity bit" - even parity bit is used to ensure that the encoded DME field is DC balanced.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.3.3** *P* **191** *L* **42** # 16

Ran, Adee — Intel

Comment Type **T** *Comment Status* **D**

To address the editor's note, some additional text is suggested.

SuggestedRemedy

Add the following paragraph at the end of this subclause:
"Receiver frame lock shall be set to 0 upon entering TRAINING mode and shall not be set to 1 until tf_lock is true."

Delete editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.3.3** *P* **191** *L* **43** # 118

Slavick, Jeff — Broadcom Limited

Comment Type **T** *Comment Status* **D**

In forced bring-up mode using link training, if both sides are in TRAINING_FAILED state, and one side is reset, it could immediately start it's max_wait_timer because it's got tf_lock and if the other side is still sending "ready to respond" the rcv_tf_lock could be true good.

SuggestedRemedy

Add the following text to 136.8.12.3.3
"While training_failure is TRUE this bit is transmitted as a 0."

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.5** *P* **192** *L* **43** # 123

Slavick, Jeff — Broadcom Limited

Comment Type **T** *Comment Status* **D**

The NO_EQ state for c(0) is 1 not 0.

SuggestedRemedy

Replace ck_ask = 0 with "if k = 0 ck_ask = 1 else ck_ask = 0 end if" in the coef_req = NO EQUALIZATION

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.5** *P* **193** *L* **26** # 40

Ran, Adee — Intel

Comment Type **T** *Comment Status* **D**

The definition of CHECK_VOLTAGE is strictly based on whether the specified maximum output voltage would be exceeded if the request is carried out.

In practice a transmitter may be unable to carry out the request due to the combination of coefficients, even though the specified maximum voltage is not reached. The transmitter may even be designed so that it is limited to a voltage strictly below the specified maximum, so that it would not exceed that maximum even if the request were carried out.

The definition should be changed so that it does not address the max voltage specification but rather the transmitter equalization capability. The required capability is specified in the electrical characteristics subclauses; it does not need to be listed here.

SuggestedRemedy

Change the function name to CHECK_EQ in the definition and in the algorithm listing above.

Change he definition text FROM
"against the maximum steady-state voltage (see 136.9.3.1.2). Returns true if the steady-state voltage would exceed the maximum. "
TO
"against the transmitter's steady-state voltage (see 136.9.3.1.2) and equalization capability. Returns true if the resulting combination of coefficients would exceed the maximum steady-state voltage or the transmitter's equalization capability."

Change the status string from "maximum voltage" to "equalization limit" in 136.8.12.5 and in table 136-10.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.6** *P* **193** *L* **46** # 17

Ran, Adee — Intel

Comment Type **T** *Comment Status* **D**

The number 2 is in magenta, a peculiar color. Nothing seems wrong with this value.

SuggestedRemedy

Paint it black.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.7.2** *P* **196** *L* **20** # 18

Ran, Adee — Intel

Comment Type **E** *Comment Status* **D**

There has been no discussion based on the editor's note. The function definition does not imply immediate execution, similar to other funcitons, e.g. UPDATE_Cn and UPDATE_IC which may take some time to execute.

SuggestedRemedy

delete editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.7.5** *P* **198** *L* **18** # 119

Slavick, Jeff — Broadcom Limited

Comment Type **T** *Comment Status* **D**

rcv_tf_lock is used in Figure 136-7 but never defined

SuggestedRemedy

Add definition for rcv_tf_lock into 136.8.12.7.1
Variable derived from the Reciever Frame Lock bit of the status field of the received training frames.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.7.5** *P* **198** *L* **35** # 101

Wertheim, Oded — Mellanox Technologie

Comment Type **TR** *Comment Status* **D**

Reset the PMD control state machine upon timeout a-synchronically with the peer state machine can create a race where each state machine assumes the peer is locked, tries to lock and fails.

SuggestedRemedy

Add a transition from TRAINING_FAILED to INITIALIZE on break_training_timer_done.

Add a break_link_timer variable to 136.8.12.7.3
Timer for the amount of time to wait in TRAINING_FAILED to assure that the link partner also entered a the TRAINING_FAILED state. The timer shall expire 60 ms to 75 ms after being started.

Set local_rx_ready <= false in the TRAINING_FAILED state.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.8.12.7.5** *P* **198** *L* **37** # 19

Ran, Adee — Intel

Comment Type **T** *Comment Status* **D**

Behavior in TRAINING_FAILED state is not specified to be different from other states. If training frames are still transmitted with frame lock indication, the partner may time out and reach TRAINING_FAILED too; this could become a deadlock unless both sides are reset within a short period of each other.

This deadlock can be avoided by having the "training" variable set to false in TRAINING_FAILED state, and making this value resets the training frame lock state diagram:

- The "failed" device would go out of lock and signal no frame lock until it is reset by mangement; by that time, the partner will also fail.
- Resetting one device would make it go to either AN signaling or, if AN is bypaeed, to SEND_TF, but it will not proceed to train_local because the other device does not signal tf_lock.
- Resetting the second device would make both devices go to either AN or SEND_TF, and then they can acheive training frame lock and advance to TRAIN_LOCAL

SuggestedRemedy

In figure 136-7, add inside TRAINING_FAILED:
"training <= False"
In figure 136-8, change the open condition "reset" to "reset + !training".

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.** *P* *L* # 161

Dudek, Mike — Cavium

Comment Type **T** *Comment Status* **D**

Total symbol error ratio (used in table 136-14) is confusing. It means here FEC symbol error ratio not PAM symbol error ratio

SuggestedRemedy

Change the parameter name to "FEC symbol error ratio" here and in section 136.9.4.2.5.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3** *P* **201** *L* **21** # 145

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **T** *Comment Status* **D**

Table 136-11 has reference to 92.8.3.1. 92.8.3.1 specifies that differential and common-mode signal levels are measured with a PRBS9 test pattern.

SuggestedRemedy

Change the first sentence of 136.9.3 as follows:

The transmitter on each lane shall meet the specifications given in Table 136-11 and detailed in the referenced subclauses excepting that the differential and common-mode signal levels are measured with a PRBS13Q test pattern (see 120.5.11.2.1).

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3** *P* **201** *L* **26** # 20

Ran, Adee — Intel

Comment Type **E** *Comment Status* **D**

Editor's note has served its purpose.

SuggestedRemedy

delete editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3** *P* **201** *L* **34** # 72

Dawe, Piers — Mellanox

Comment Type **E** *Comment Status* **D**

The first sentence of 136.9.3 says these are specifications. This is a spec, not a datasheet.

SuggestedRemedy

Change Table 136-11--Transmitter characteristics at TP2 summary
to Table 136-11--Summary of transmitter specifications at TP2

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3** *P* **202** *L* **7** # 157

Dudek, Mike — Cavium

Comment Type **E** *Comment Status* **D**

The -1 to 1 is not very explicit. using -1,0,1 is no more characters and is less likely to cause confusion.

SuggestedRemedy

Change it.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3** *P* **202** *L* **18** # 69

Dawe, Piers — Mellanox

Comment Type **TR** *Comment Status* **D**

If the BER is 2.4e-4, then J4 (all but 1e-4 of the edges, or about 5e-5 of the number of UI, divided between early and late, so ~2.5e-5 per UI) is overkill, and J3 is a good match to the BER - just as J4 is a good match to the BER of 1e-5 (PCS FEC Symbol error ratio 1e-4) for 120D. Getting this right makes the spec better and reduces test time.

SuggestedRemedy

Change J4 to J3

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3.1.1** *P* **203** *L* **16** # 131

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **TR** *Comment Status* **D**

The linear fit procedure described in 92.8.3.5.1 uses PRBS9 as the test pattern.

SuggestedRemedy

Add the following exception:

The test pattern is PRBS13Q as specified in 120.5.11.2.1.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3.1.1** *P* **203** *L* **16** # 133

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **TR** *Comment Status* **D**

The linear fit procedure described in 92.8.3.5.1 uses D_p=2 to compute the linear fit pulse response p(k) from the captured waveform. Since the range of the index i is changed from "-1 to 1" to "-2 to 1", D_p should be changed to 3.

SuggestedRemedy

Add the following exception:

The value of D_p is 3.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3.1.1** *P* **203** *L* **17** # 132

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **TR** *Comment Status* **D**

The definition of R_m in the second paragraph of 92.8.3.5.1 and Equation 92-4 is not general enough to change the range of the index i from "-1 to 1" to "-2 to 1", because the second index of R_m in Equation 92-4 must be changed from "i + 2" to "i + 3".

SuggestedRemedy

Change the items a) and b) as follows:

Define an M N_p-by-4 matrix R_m. The elements of R_m are assigned values per Equation (136-xx) where i = -2 to 1, j = 1 to M N_p, and m = -M/2 to M/2 - 1 when M is even and -(M-1)/2 to (M-1)/2 when M is odd.

R_m(j, i + 3) = { r(m + j - i M) if 1 <= m + j - i M <= M N_p }
{ 0 otherwise } (136-xx)

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3.1.1** *P* **203** *L* **20** # 143

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

c_m(i) is the normalized coefficients of the transmit equalizer for a given value of m. (Note that the phrase of "for a given value of m" is missing in the description of Equation (92-5).)

The normalized transmit equalizer coefficients c(i) are the values of c_m(i) for the value of m that minimizes epsilon(m)^2. (See description of Equation (92-7).)

It is also recommended to give a description of the normalized transmit equalizer coefficients with a reference to Equation (92-7) using a notation that is different from the equalizer coefficient c(k) in 136.9.3.1 in order to avoid confusion.

SuggestedRemedy

Change the item c) as follows:

c1) The normalized transmit equalizer coefficients c_m(i) are computed for for each value of m using Equation (136-2).

c2) The normalized transmit equalizer coefficients ~c(i) are the values of c_m(i) for the value of m that minimizes epsion(m)^2 which are computed using Equation (92-7).

Change c(*) to ~c(*) in Table 136-12 and 136.9.3.1.4.

Change the second through fourth paragraphs in 136.9.3.1.5 as follows:

With c(-2) and c(-1) both set to zero and both c(0) and c(1) having received sufficient "decrement" requests so that they are at their respective minimum values, the normalized transmit equalizer coefficient ~c(1) shall be less than or equal to -0.25.

With c(−2) and c(1) set to zero and both c(−1) and c(0) having received sufficient “decrement” requests so that they are at their respective minimum values, the normalized transmit equalizer coefficient ~c(−1) shall be less than or equal to −0.25.

With c(−1) and c(1) set to zero, c(0) having received sufficient “decrement” requests so that it is at its minimum value, and c(−2) having received sufficient “increment” requests so that it is at its maximum value, the normalized transmit equalizer coefficient ~c(−2) shall be greater than or equal to 0.1.

In the above, ~c represents a letter c with a tilde above c.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3.1.2** *P* **203** *L* **42** # 21

Ran, Adee Intel

Comment Type **E** *Comment Status* **D**

The number 0.49 is in magenta, a peculiar color. Nothing seems wrong with this value.

Editor's note has served its purpose.

SuggestedRemedy

Paint it black. Also in table 136-11.
Delete editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3.1.3** *P* **204** *L* **3** # 99

Wertheim, Oded Mellanox Technologie

Comment Type **T** *Comment Status* **D**

The training protocol uses 3 fixed preset values that don't use information about the channel which in many cases is available (for example the channel attenuation).
Starting the tuning with a good starting point can allow the peer port to only do fine tuning

SuggestedRemedy

Define preset 3 as channel based equalization preset.
Add MDIO registers to configure preset 3.

Preset 3 is set to equalize the channel when channel data is available. When channel data is not available, preset 3 is set to the default value according to table 136-12.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3.1.3** *P* **204** *L* **9** # 22

Ran, Adee Intel

Comment Type **T** *Comment Status* **D**

We need numbers to replace TBDs in initial conditions.

Suggested values include:
- A no-equalization combination as initial setting (OUT_OF_SYNC) and as a result of preset 1.
- A maximum "de-emphasis" setting (minimum phase, c(+1) at minimum) as preset 2.
- A maximum "preshoot" setting (maximum phase, c(-1) at minimum) as preset 3.

This enables clear starting conditions suitable for a wide range of implementions.

Coefficient tolerance is suggested to be a maximum single step size.

c(1) is not necessarily zero in all presets.

SuggestedRemedy

Set values in the table to:
In "OUT_OF_SYNC" and "preset 1" rows: [0, 0, 1, 0]
In "preset 2" row: [0, 0, 0.75, -0.25]
In "preset 3" row: [0, -0.25, 0.75, 0]

Set tolerances to [0.025, 0.05, 0.05, 0.05] in all rows.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3.1.4** *P* **204** *L* **19** # 144

Hidaka, Yasuo Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

c(coef_sel) is the normalized transmit equalizer coefficient, not the normalized amplitude.

SuggestedRemedy

Change "the normalized amplitude" to "the normalized transmit equalizer coefficient" at two locations in the first paragraph of 136.9.3.1.4 and two locations in the second paragraph of 136.9.3.1.4.

Change "the normalized amplitude of a coefficient" to "the normalized transmit equalizer coefficient" in the third paragraph of 136.9.3.1.4.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3.1.4** *P* **204** *L* **19** # 23

Ran, Adee Intel

Comment Type **T** *Comment Status* **D**

We need numbers to replace TBDs in minimum steps.

A minimum step should be larger than zero and smaller than the maximum step. A specified minimum of 0.005 seems suitable for all coefficients.

SuggestedRemedy

Set all TBDs in 136.9.3.1.4 to 0.005.

Delete editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3.1.5** *P* **204** *L* **37** # 24

Ran, Adee Intel

Comment Type **T** *Comment Status* **D**

The restriction on "minimum steady-state differential output voltage" is irrelevant here; it is specified only for unequalized setting (in 136.9.3.1.2).

There is no specification for a minimum output voltage in an equalized state - there was one in 72.7.1.11 (where this text also originated), but it was not carried over to clause 85 and newer clauses.

The condition for maximum or minimum indications (besides reaching specific coefficient bound) should allow the case where the sum of coefficient absolute values required by the request would exceed the capability of the transmitter. This is an implementation-specific limitation and will typically occur when the output differential voltage is still below the specified maximum PtP.

SuggestedRemedy

Change FROM:
When sufficient “increment” or “decrement” requests have been received for a given coefficient, the coefficient reaches a lower or upper bound based on the coefficient range or restrictions placed on the minimum steady-state differential output voltage or the maximum peak-to-peak differential output voltage.
TO:
When sufficient “increment” or “decrement” requests have been received for a given coefficient, the coefficient reaches a lower or upper bound based on the coefficient range or the combination of all coefficients.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.3.1.5** *P* **204** *L* **38** # 158

Dudek, Mike Cavium

Comment Type **T** *Comment Status* **D**

There isn't a minimum steady state differential voltage when equalization is enabled. (just with equalization off).

SuggestedRemedy

Delete "the minimum steady-state differential output voltage or"

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.4.1** *P* **205** *L* **12** # 146

Hidaka, Yasuo Fujitsu Labs. of Ameri

Comment Type **T** *Comment Status* **D**

A reference to 92.8.3.1 is not appropriate, because 92.8.3.1 specifies that differential signal levels are measured with a PRBS9 test pattern.

SuggestedRemedy

Change the reference to 92.8.3.1 to a reference to 136.9.3 where we can add an exception to 92.8.3.1.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.4.1** *P* **205** *L* **22** # 159

Dudek, Mike Cavium

Comment Type **E** *Comment Status* **D**

typo

SuggestedRemedy

Change "requirements in" to "requirements are"

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.4.2** *P* **205** *L* **22** # 147

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

A grammer error.

SuggestedRemedy

Change "in specified in Table 136-13" to "are specified in Table 136-13".

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.4.2** *P* **205** *L* **38** # 25

Ran, Adee — Intel

Comment Type **E** *Comment Status* **D**

The number 13.28 is in magenta, a peculiar color (twice). Nothing seems wrong with this value.
Also in 136.9.4.2.3.

SuggestedRemedy

Paint'em black.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.4.2** *P* **207** *L* **34** # 166

Dudek, Mike — Cavium

Comment Type **T** *Comment Status* **D**

The symbol error ratio should not be the sum of the error ratios it should be the average. It is the sum of the total number of errored symbols divided by the total number of symbols. Each FEC lane symbol error ratio is the number of errored symbols divided by the number of symbols on that lane.

SuggestedRemedy

Change to the average of the symbol error ratios.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.4.2** *P* **207** *L* **34** # 164

Dudek, Mike — Cavium

Comment Type **T** *Comment Status* **D**

We should be more explicit about what "multiple measurements have to be summed to yield the total symbol error ratio".

SuggestedRemedy

Replace "If noise is applied to one lane at a time, multiple measurements have to be summed to yield the total symbol error ratio." with "If noise is applied to one lane at a time, there will be n tests (where n is the number of lanes) and the total FEC symbol error ratio is the average of the FEC symbol error ratios on each FEC lane summed for all the n tests." (Average and FEC used based on other comments).

Make the equivalent change to page 208 line 1 (with jitter replacing noise)

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.4.2.3** *P* **206** *L* **36** # 162

Dudek, Mike — Cavium

Comment Type **TR** *Comment Status* **D**

It is not appropriate to use Jrms as the value for sigma rj as the two will be very different if there is significant Dj. Also the value of ADD is TBD.

SuggestedRemedy

Use the equations developed in 802.3bs section 120D.3.2.1 to convert from Jrms and J4 to Add and Signma rj.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.4.2.4** *P* **206** *L* **54** # 163

Dudek, Mike — Cavium

Comment Type **T** *Comment Status* **D**

An alternating one-zero pattern isn't appropriate for this PAM4 pattern

SuggestedRemedy

Change to "alternating zero-three pattern" (Two places)

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.4.2.4** *P* **207** *L* **8** # 165

Dudek, Mike Cavium

Comment Type **TR** *Comment Status* **D**

"The Broadband noise may be added either to one lane at a time or to all lanes in parallel" is not specific enough.

SuggestedRemedy

Replace "The Broadband noise may be added either to one lane at a time or to all lanes in parallel" with "The broadband noise required for each lane is calibrated. The noise may be added either to one lane at a time or using multiple noise sources to all lanes at the same time"

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.4.2.4** *P* **207** *L* **10** # 26

Ran, Adee Intel

Comment Type **E** *Comment Status* **D**

Editor's note has served its purpose.

SuggestedRemedy

delete editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.4.2.5** *P* **207** *L* **25** # 27

Ran, Adee Intel

Comment Type **E** *Comment Status* **D**

Editor's note has served its purpose.

SuggestedRemedy

delete editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.9.12.7.3** *P* **197** *L* **3** # 156

Dudek, Mike Cavium

Comment Type **T** *Comment Status* **D**

There is only a factor of a little under 3 between min and max for the wait timer in us but it says this is equivalent to a ratio of 5 in training frames. One or other of these seems wrong.

SuggestedRemedy

Fix it, or clarify why there is a discrepancy.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11** *P* **208** *L* **23** # 103

Rechtman, Zvi Mellanox

Comment Type **TR** *Comment Status* **D**

The Cable assembly characteristics doesn't define max loss variation between cable channels.

SuggestedRemedy

Add an Insertion Loss Variation (ILV) peak to peak limit of 2dB between lanes at 13.28GHz to Table 136–14—Cable assembly characteristics summary

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11** *P* **208** *L* **29** # 167

Dudek, Mike Cavium

Comment Type **E** *Comment Status* **D**

The grammar is wrong. The sentences need an object.

SuggestedRemedy

Change "100GBASE-CR2 uses two lanes of the multi-lane (QSFP28, specified in 92.12). 200GBASE-CR4 uses four lanes of the multi-lane (QSFP28, specified in 92.12)." to "100GBASE-CR2 uses two lanes of the multi-lane QSFP28, (specified in 92.12). 200GBASE-CR4 uses four lanes of the multi-lane QSFP28, (specified in 92.12)."

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11** *P* **208** *L* **29** # 96

Maki, Jeffery — Juniper Networks

Comment Type **TR** *Comment Status* **D**

QSFP28 is used erroneously when describing the use of the QSFP form factor with 56 Gb/s electrical lanes. It is only appropriate to use QSFP28 when describing the use of the QSFP form factor with 28 G/s electrical lanes. QSFP28 host and module piece parts and their assembly as an interface are only tested for operation up to 28 Gb/s. The QSFP form factor for use with 56 Gb/s electrical lanes that have been tested for such performance are called QSFP56. Unnessary confusion in the industry and market expectation of performance will be created by using QSFP28 when QSFP56 is meant.

SuggestedRemedy

Replace QSFP28 when referring to operating with 56 Gb/s electrical lanes with QSFP56 here and all other locations in the draft.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11** *P* **208** *L* **30** # 107

Ghiasi, Ali — Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

One discuss SFP28 and QSFP28, I don't see the third conector

SuggestedRemedy

either change three connector to two or add the third connector

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11** *P* **208** *L* **38** # 41

Ran, Adee — Intel

Comment Type **E** *Comment Status* **D**

Text in magenta has not drawn any discussion. It can be made black.

SuggestedRemedy

Paint it black.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11** *P* **208** *L* **39** # 148

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

"2", "4", and "s" are missing.

SuggestedRemedy

In item a, change "two 50GBASE-CR PHY" to "two 50GBASE-CR PHYs".
In item b, change "two 100GBASE-CR PHY" to "two 100GBASE-CR2 PHYs".
In item c, change "two 200GBASE-CR PHY" to "two 200GBASE-CR4 PHYs".

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11** *P* **208** *L* **39** # 168

Dudek, Mike — Cavium

Comment Type **T** *Comment Status* **D**

The paragraph above which says that 50GBASE-CR can be used with QSFP is conflicting with the definitions of the cable types as the QSFP will not be a single-lane cable assembly. also PHY should be plural

SuggestedRemedy

Change "50GBASE-CR: Single-lane cable assembly that supports links between two 50GBASE-CR PHY with achievable cable length of at least 3 m." to "50GBASE-CR: cable assembly that supports single-lane links between two 50GBASE-CR PHYs with achievable cable length of at least 3 m."

100GBASE-CR2: cable assembly that supports two lane links between two 100GBASE-CR PHYs with achievable cable length of at least 3 m.

Add the "s" to "PHY" in c)

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11** *P* **209** *L* **10** # 108

Ghiasi, Ali — Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

Not sure how 6 dB RL got into the draft!
A 6 dB RL results in 50% reflection and at low frequency a double reflection with no loss can destroy the PAM4 eye!

SuggestedRemedy

Use equation 92-27 but extend the range to 26.5525 GHz and extend the low frequency to 10 Mhz as PAM4 is more sensitive to baseline wander
RL=16.5-2*sqrt(f) from 10 MHz to 4.1 GHz
10.66 -14*log10(f/5.5) from 4.1 Ghz to 26.5525 Ghz

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11** *P* **209** *L* **12** # 109

Ghiasi, Ali — Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

In many of NRZ application the return loss has been defined to the Buadrate, PAM4 being more sensitive we should at last do the same .
Dfferential to common mode return loss range should be 26.5525. in CL 137 these parameters are specifiied to Baudrate why the cable get to test to just 19 GHz!

SuggestedRemedy

Updated EQ
Return_loss(f) ≥ □ 22 – (20/25.78)f 0.01 ≤ f < 12.89 (dB)
and 15–(6/25.78)f 12.89≤f≤26.5525 GHz

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11** *P* **209** *L* **14** # 110

Ghiasi, Ali — Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

In many of NRZ application the return loss has been defined to the Buadrate, PAM4 being more sensitive we should at last do the same.
Dfferential to common mode conversion loss range should be 26.5525, in CL 137 these parameters are specifiied to Baudrate why the cable get to test to just 19 GHz!

SuggestedRemedy

Updated EQ
RL=10 0.01≤f<12.89 GHz
27–(29/22)f 12.89≤f<15.7 GHz
6.3 from 15.7 to 26.5525 GHz

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11** *P* **209** *L* **14** # 111

Ghiasi, Ali — Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

In many of NRZ application the return loss has been defined to the Buadrate, PAM4 being more sensitive we should at last do the same.
Common mode conversion range should be 26.5525

SuggestedRemedy

Updated EQ
RL = 2 dB from 0.2 Ghz to 26.5525 GHz

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.2** *P* **209** *L* **33** # 68

Dawe, Piers — Mellanox

Comment Type **TR** *Comment Status* **D**

We expect that the lanes in a 2-lane or 4-lane cable will be reasonably matched, and it is convenient to know that - but there is nothing in the spec that requires it.

SuggestedRemedy

Add a loss matching spec (max loss - min. loss at 13.28 GHz); max 2 dB so as not to add significantly to cable costs yet provide assurance to host implementers.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.3** *P* **209** *L* **36** # 42

Ran, Adee Intel

Comment Type **E** *Comment Status* **D**

Reference in magenta has not drawn any discussion. It can be made forest green.

SuggestedRemedy

Paint it forest green.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.4** *P* **209** *L* **40** # 43

Ran, Adee Intel

Comment Type **E** *Comment Status* **D**

Reference in magenta has not drawn any discussion. It can be made forest green.

SuggestedRemedy

Paint it forest green.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7** *P* **209** *L* **24** # 44

Ran, Adee Intel

Comment Type **E** *Comment Status* **D**

Values in magenta have not drawn any discussion. They can be made black.

SuggestedRemedy

Paint all magenta values in table 136-15 black.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7** *P* **210** *L* **6** # 88

Brown, Matt Applied Micro

Comment Type **T** *Comment Status* **D**

Editor's note suggests that if COM parameters are the same for all cable types then Table 136-15 need not have a column for each column type. All parameters are the same for all cable types.

SuggestedRemedy

The 3 column headings into a single column and delete the editor's note.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7** *P* **210** *L* **15** # 63

Sakai, Toshiaki Socionext

Comment Type **E** *Comment Status* **D**

COM paramter table
Table 136-15(50GBASE-CR/100GBASE-CR2/200GBASE-CR4), table item express is not the same as Table 137-5(50GBASE-KR/100GBASE-KR2/200GBASE-KR4).
Table 136-15 : Parameter - Symbol - 50GBASE-CR/100GBASE-CR2/200GBASE-CR4- Units
Table 137-5 : Parameter - Symbol - Value - Units

SuggestedRemedy

Since other clauses use"Parameter - Symbol - Value - Units"
change table item expression from,
Parameter - Symbol - 50GBASE-CR/100GBASE-CR2/200GBASE-CR4- Units
to
Parameter - Symbol - Value - Units

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7** *P* **210** *L* **39** # 98

Wertheim, Oded Mellanox Technologie

Comment Type **ER** *Comment Status* **D**

Table 136-15-COM parameter values - Transmitter equalizer, 2nd post-cursor coefficient should be 2nd pre-cursor coefficient

SuggestedRemedy

Fix the text to Transmitter equalizer, 2nd pre-cursor coefficient

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7** *P* **211** *L* **10** # 65

Sakai, Toshiaki Socionext

Comment Type **E** *Comment Status* **D**

Table 136-15, Continuous time filter, zero frequencies
Symbol "fz" is used for high frequency CTLE zero. In 802.3bs D2.2, corresponding symbol is "fz1". Also, corresponding pole is fp1.

SuggestedRemedy

Change Table 136-15, Continuous time filter, zero frequencies "Symbol"
fz
to
fz1

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7** *P* **211** *L* **13** # 64

Sakai, Toshiaki Socionext

Comment Type **T** *Comment Status* **D**

Table 136-15, Continuous time filter, pole frequencies
do not include low frequency CTLE pole.
fp1 : fb/2.5, fp2 : fb
should be
fp1 : fb/2.5, fp2 : fb/40, fp3 : fb
Preliminary COM paramter spreadsheet includes this low frequency CTLE pole. (f_HP_PZ : fb/40 = 0.6640625 GHz)

SuggestedRemedy

Change Table 136-15, Continuous time filter, pole frequencies
fp1 : fb/2.5, fp2 : fb
to
fp1 : fb/2.5, fp2 : fb/40, fp3 : fb

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7** *P* **211** *L* **21** # 209

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **D**

Since Tx SNR uses Np=200, host ISI is left unspecified

SuggestedRemedy

add line as table 120D for Transmitter Output residual ISI SNR_ISI (max) and set to 30dB

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7** *P* **211** *L* **29** # 115

Ghiasi, Ali Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

Random jitter of 0.01 UI or ~0.37 ps seems outrageous

SuggestedRemedy

Something more like 0.0065 would be more reasonable or item needs to stay magenta to study it further

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7** *P* **211** *L* **35** # 66

Sakai, Toshiaki Socionext

Comment Type **E** *Comment Status* **D**

Table 136-15 : COM table has "Channel Operating Margin (min)" row, while "50G-KR (CL137)", "100GKR-4 (CL93)" and 100G"KP-4 (CL94)" do not have.

SuggestedRemedy

Use consistent table items.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7.1.1** *P* **211** *L* **8** # 45

Ran, Adee Intel

Comment Type **E** *Comment Status* **D**

Value in magenta has not drawn any discussion. It can be made black.

SuggestedRemedy

Paint it black.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7.1.1** *P* **212** *L* **8** # 169

Dudek, Mike Cavium

Comment Type **T** *Comment Status* **D**

The value of 6.26dB was the correct value at 12.8906GHz. It needs to be changed for 13.28GHz.

SuggestedRemedy

Change 6.26dB to 6.42dB

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7.1.2** *P* **212** *L* **30** # 170

Dudek, Mike Cavium

Comment Type **T** *Comment Status* **D**

The 3dB was the correct value for 12.89GHz it needs changing for 13.28GHz

SuggestedRemedy

Change 3dB to 3.1dB.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.11.7.2.2** *P* **213** *L* **29** # 97

Maki, Jeffery Juniper Networks

Comment Type **TR** *Comment Status* **D**

SFP28 is used erroneously when describing the use of the SFP form factor with 56 Gb/s electrical lanes. It is only appropriate to use SFP28 when describing the use of the SFP form factor with 28 G/s electrical lanes. SFP28 host and module piece parts and their assembly as an interface are only tested for operation up to 28 Gb/s. The SFP form factor for use with 56 Gb/s electrical lanes that have been tested for such performance are called SFP56. Unnessary confusion in the industry and market expectation of performance will be created by using SFP28 when SFP56 is meant.

SuggestedRemedy

Replace SFP28 when referring to operating with a 56 Gb/s electrical lane with SFP56 here and all other locations in the draft.

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.12** *P* **214** *L* **17** # 171

Dudek, Mike Cavium

Comment Type **T** *Comment Status* **D**

In 92.12.1.1 the lanes are labelled 0 to 3 rather than 1 to 4.

SuggestedRemedy

Change SL4 to SL0 and DL4 to DL0 and re-order

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.12** *P* **214** *L* **23** # 172

Dudek, Mike Cavium

Comment Type **T** *Comment Status* **D**

For inter-operability it would be better for 100GBASE-CR2 if which lanes and paired and which lanes are not used in a partially used QSFP were specified. Also 92.12.1.1 labels the lanes as 0 to 3 not 1 to 4.

SuggestedRemedy

Change "For 100GBASE-CR2 multilane MDI, two of the paired transmit and receive lanes (SL1, DL1), (SL2, DL2), (SL3, DL3) or (SL4, DL4) may be used for the transmit and receive connections (SL1, DL1), (SL2, DL2)." to
"For 100GBASE-CR2 multilane MDI, the paired transmit and receive lanes for one Phy shall be (SL0, DL0)and(SL1, DL1), and if a second Phy uses the same MDI connector it uses (SL2, DL2) and (SL3, DL3).

Proposed Response *Response Status* **O**

Cl **136** *SC* **136.14** *P* **215** *L* **5** # 28

Ran, Adee Intel

Comment Type **T** *Comment Status* **D**

PICS tables for clause 136 are not updated.

SuggestedRemedy

Create PICs tables based on the clause text.

Proposed Response *Response Status* **O**

Cl **136A** *SC* **136A.4** *P* **354** *L* **31** # 134

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **TR** *Comment Status* **D**

The recommended minimum printed circuit board trace insertion loss is specified by Equation (92A-2), not by Equation (92A-1).

SuggestedRemedy

Change "The recommended maximum and minimum printed circuit board trace insertion losses are specified in Equation (92A-1)."

to

"The recommended maximum and minimum printed circuit board trace insertion losses are specified in Equation (92A-1) and Equation (92A-2), respectively."

Proposed Response *Response Status* **O**

Cl **136A** *SC* **136A.4** *P* **354** *L* **41** # 117

Ghiasi, Ali — Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

The maximum insertion loss from TP0 to TP2 or from TP3 to TP5 is defined in clause to be 10.07 dB but in clause 135G is 10.2 dB

SuggestedRemedy

Increase the loss from 10.07 to 10.2 dB in the text and on figure 136A-1 and andjust the end to end loss from 28.9 dB to 29.2 dB

Proposed Response *Response Status* **O**

Cl **136A** *SC* **136A.5** *P* **355** *L* **11** # 136

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

The nominal insertion loss of the mated test fixture is defined by Equation (136A-2), not by Equation (136A-3).

SuggestedRemedy

Change the reference of IL_MatedTF(f) from Equation (136A-3) to Equation (136A-2).

Proposed Response *Response Status* **O**

Cl **136A** *SC* **136A.5** *P* **355** *L* **12** # 76

Dawe, Piers — Mellanox

Comment Type **E** *Comment Status* **D**

Wrong reference

SuggestedRemedy

Reference to using Equation (136A-3)should be to Equation (136A–2).

Proposed Response *Response Status* **O**

Cl **136A** *SC* **136A.5** *P* **355** *L* **16** # 75

Dawe, Piers — Mellanox

Comment Type **T** *Comment Status* **D**

I believe real mated compliance boards show more low frequency loss than this.

SuggestedRemedy

Keeping the established 3.59 dB at 12.8906 GHz:
Change 0.091sqrt(f) + 0.25f to 0.475sqrt(f) + 0.1204f +0.002f^2

Proposed Response *Response Status* **O**

Cl **136A** *SC* **136A.5** *P* **355** *L* **17** # 135

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **T** *Comment Status* **D**

The nominal insertion loss of the mated test fixture is defined for the frequency from 0.01GHz up to 25GHz. Although it is consistent with the reference test fixtures PCB insertion loss defined in Equation (92-34), the upper frequency was replaced with 26.5625 GHz in 120E.4.1. Since the symbol rate is higher than clause 92, it is recommended to follow the change in 120E.4.1.

SuggestedRemedy

Change the upper frequency of Equation (136A-2) from 25 GHz to 26.5625 GHz.

Proposed Response *Response Status* **O**

Cl **136B** *SC* **136B.1** *P* **358** *L* **20** # 94

Brown, Matt — Applied Micro

Comment Type **T** *Comment Status* **D**

If any changes are required to the QSFP28 specifications then a comment is required.

SuggestedRemedy

Remove editor's note.

Proposed Response *Response Status* **O**

Cl **136B** *SC* **136B.1.1** *P* **358** *L* **38** # 137

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **T** *Comment Status* **D**

92.11.3 specifies the characteristics of the mated test fixtures up to 25GHz. In 120E.4.1, the upper frequency of the reference test fixture PCB insertion loss was raised to 26.5625GHz. Since the symbol rate of clause 136 is higher than clause 92, it is recommended to raise the upper frequency from 25GHz.

SuggestedRemedy

Add the exception of the upper frequency that is changed from 25GHz to 26.5625GHz for

The requirements of the differential insertion loss of the mated test fixtures in 92.11.3.1.
The requirements of the FOM_ILD of the mated test fixtures in 92.11.3.1.
The requirements of the differential return loss of the mated test fixtures in 92.11.3.2.
The requirements of the common-mode conversion insertion loss of the mated test fixtures in 92.11.3.3.
The requirements of the common-mode return loss of the mated test fixtures in 92.11.3.4.
The requirements of the common-mode to differential mode return loss in 92.11.3.5.

Proposed Response *Response Status* **O**

Cl **136B** *SC* **136B.1.1.6** *P* **359** *L* **14** # 138

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **TR** *Comment Status* **D**

110B.1.1.7 uses f_r (the 3dB reference receiver bandwidth) of 18.75GHz that is inconsistent with the 3dB reference receiver bandwidth of the COM parameter, 0.75 * f_b = 0.75 * 26.5625GHz = 19.921875GHz.

SuggestedRemedy

Add the following row to Table 136B-1:

Description: The 3dB reference receiver bandwidth
Symbol: f_r
Value: 19.92
Units: GHz

Proposed Response *Response Status* **O**

Cl **136B** *SC* **136B.1.1.6** *P* **359** *L* **31** # 139

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **TR** *Comment Status* **D**

Mated test fixture integrated crosstalk RMS noise voltages determined using Equation (92-44) through Equation (92-48) uses a parameter f_r that is the 3dB reference receiver bandwidth and is set to 18.75 GHz. This is inconsistent with the 3dB reference receiver bandwidth of the COM parameter that is 0.75 * f_b = 0.75 * 26.5625GHz = 19.921875GHz.

SuggestedRemedy

Add the following row to Table 136B-2:

Description: The 3dB reference receiver bandwidth
Symbol: f_r
Value: 19.92
Units: GHz

Proposed Response *Response Status* **O**

Cl **136B** *SC* **136B.1.1.6** *P* **359** *L* **33** # 140

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

Table 136B-2 gives parameters for near-end crosstalk as well as far-end crosstalk.

SuggestedRemedy

Change the title of Table 136B-2 from "Mated test fixture integrated near-end crosstalk noise parameters" to "Mated test fixture integrated crosstalk noise parameters".

Proposed Response *Response Status* **O**

Cl **136C** *SC* **136C** *P* **362** *L* **7** # 141

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **E** *Comment Status* **D**

The title of 136C says 100GBASE-CR1.

SuggestedRemedy

Change "100GBASE-CR1" in the title of 136C to "100GBASE-CR2".

Proposed Response *Response Status* **O**

Cl **136C** *SC* **136C.1** *P* **362** *L* **23** # 142

Hidaka, Yasuo — Fujitsu Labs. of Ameri

Comment Type **T** *Comment Status* **D**

Three references of "(see 92.10)" look inappropriate. The text in 110C.1 was "The CA-25G-L specifications are based on a single lane of 100GBASE-CR4 cable assembly (see 92.10), enabling a 5m length, and …". Since the phrase of "of 100GBASE-CR4" was removed, the reference of "(see 92.10)" became inappropriate.

SuggestedRemedy

Change the third paragraph of 136C.1 as follows:

Cable assemblies have a common set of electrical specifications, denoted 50GBASE-CR, 100GBASE-CR2, or 200GBASE-CR4, as specified in 136.11 based on 100GBASE-CR4 cable assembly, although the data rate per lane is higher than 100GBASE-CR4 (see 92.10). The 50GBASE-CR specifications are based on a single-lane cable assembly, enabling a 3 m length. The 100GBASE-CR2 specifications are based on a two lane cable assembly, enabling a 3 m length. The 200GBASE-CR4 specifications are based on a four-lane cable assembly, enabling a 3 m length.

Proposed Response *Response Status* **O**

Cl **136C** *SC* **136C.3.1** *P* **363** *L* **13** # 95

Brown, Matt — Applied Micro

Comment Type **T** *Comment Status* **D**

Editor's note solicits contributions on breakout from 200GBASE-CR4 to 100GBASE-CR2. Since there have been no contributions remove editor's note.

SuggestedRemedy

Remove editor's note.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.1** *P* **222** *L* **39** # 46

Ran, Adee — Intel

Comment Type **T** *Comment Status* **D**

The first three paragraphs starting on line 39 describe the expected performance of a link that comprises multiple components - two physical layers (which may each contain one or more chips, PCB, connectors, and span multiple sublayers), and a "backplane" channel which may consist of multiple PCBs and connectors. These components may be supplied by multiple vendors.

The standard is written with the objective that a system of compliant transmitter, compliant channel, and compliant receiver, will operate at the required BER (and FLR); but it is the task force's responsibility, not any single vendor's responsibility. No single vendor can guarantee a normative requirement.

There are separate specifications for the transmitter, receiver, and channel, and they are coupled together to facilitate the expected overall "link" performance. These normative requirements are sufficient, and there is no need to add a system-level normative statement that nobody is accountable for.

There should be no "shall" and no PICS item for this text. Instead, it should be phrased in a way that explains the expected performance of a complete physical layer (in terms of frame loss ratio) and suggests the performance of a PMD and an adjacent PMD (in terms of detector/bit/symbol error ratio).

SuggestedRemedy

A detailed replacement text will be presented.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.1** *P* **223** *L* **28** # 47

Ran, Adee Intel

Comment Type **E** *Comment Status* **D**

Editor's note has served its purpose.

SuggestedRemedy

delete editor's note.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.1** *P* **231** *L* **9** # 149

Hidaka, Yasuo Fujitsu Labs. of Ameri

Comment Type **TR** *Comment Status* **D**

The worst case is often overlooked with a combination of an R_d value higher than the nominal value and a Z_c value lower than the nominal value.

Simulation of publicly available channel data shows testing with high/low, low/high, and high/high combinations of R_d and Z_c significantly improves the test coverage. The low/low combination is less important.

On the other hand, the short package test condition of z_p=12mm is not important and may be dropped.

There is also an effort of an adaptive scheme to choose Z_c based on TDR of the channel, but the adaptive scheme is not working well yet.

Although we may continue to study the adaptive shceme, we need to have a concrete scheme with coverage better than D1.1.

This comment is continued from comment #74 against D1.0.

SuggestedRemedy

Change the values of Table 137-5 as follows:

Remove Test 1 and Test 2 from z_p (transmission line length).
Define z_p as 30 mm for Tx (victim, FEXT) and Rx, and 12 mm for Tx (NEXT).
Define Z_c as 90 ohms for Test 1, 110 ohms for Test 2, 110 ohms for Test 3.
Define R_d as 55 ohms for Test 1, 45 ohms for Test 2, 55 ohms for Test 3.
Define A_v as 0.436 V for Test 1, 0.394 V for Test 2, 0.436 V for Test 3.
Define A_fe as 0.436 V for Test 1, 0.394 V for Test 2, 0.436 V for Test 3.
Define A_ne as 0.581 V for Test 1, 0.642 V for Test 2, 0.581 V for Test 3.

Apply the same changes to Table 136-15.

Add clause 136.11.7.1.1.1 "TP0 to TP1 and TP4 to TP5 signal paths" to clause 136.11.7.1.1 based on clause 92.10.7.1.1 with a new table based on Table 92-12 with the following modifications:

Define Z_c in the new table as 109.8 ohms for Test 1, 90.2 ohms for Test 2, 109.8 ohms for Test 3.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.1** *P* **231** *L* **9** # 211

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **D**

Table 135-5: Z and Rd should represent a worst case. However, tolerance values around those values represents a hole in the spec reducing COM by around 0.4dB at 30dB loss. This was suggested in hidaka_100516_3cd_adhoc.pdf.

SuggestedRemedy

Index entries for Zc and Rd, Av, Afe, and Afe. Add sections in Annex 93A on how to determine driving point impedance, zp11 and zp22. Use maximum difference between driving point impedance and Zc to determine which indexed value of Zc, Rd, Av, Afe, and Ane is used in COM. See presentation for COM impact data, decision algorithms, and suggestions on what lines in Annex 93A should be indexed. In addition table entries will be proposed.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.1** *P* **232** *L* **8** # 114

Ghiasi, Ali Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

Random jitter of 0.01 UI or ~0.37 ps seems outrageous

SuggestedRemedy

Something more like 0.0065 would be more reasonable or item needs to stay magenta to study it further

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.8.1** *P* **227** *L* **13** # 89

Brown, Matt Applied Micro

Comment Type **E** *Comment Status* **D**

Editor's note has served it's purpose.

SuggestedRemedy

Remove editor's note.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.1** *P* **228** *L* **35** # 173

Dudek, Mike Cavium

Comment Type **E** *Comment Status* **D**

"L" should have been converted to "n" as was done for many other instances.

SuggestedRemedy

Make the change.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.1** *P* **228** *L* **39** # 48

Ran, Adee Intel

Comment Type **E** *Comment Status* **D**

Despite the editor's note here, there has been no proposal for a different test fixture.

SuggestedRemedy

Change the references to black and delete editor's note.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.2** *P* **228** *L* **48** # 49

Ran, Adee Intel

Comment Type **T** *Comment Status* **D**

Transmitter return loss specifications are part of table 120D-1, but do not appear in the referenced subclauses, nor anywhere in this clause.

SuggestedRemedy

Add a reference to 93.8.1.4.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.2** *P* **228** *L* **52** # 210

Mellitz, Richard Samtec

Comment Type **TR** *Comment Status* **D**

Since Tx SNR uses Nb=12 and larger than in clause 120d, SNR_ISI need to different

SuggestedRemedy

Set Transmitter Output residual ISI SNR_ISI (max) to 40dB Presentation will be available

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.2** *P* **229** *L* **3** # 90

Brown, Matt — Applied Micro

Comment Type **T** *Comment Status* **D**

Editor's note speculates that a different SNR may be required. If this is necessary then a comment a supporting information is required.

SuggestedRemedy

Remove editor's note.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.3.1** *P* **228** *L* **23** # 51

Ran, Adee — Intel

Comment Type **T** *Comment Status* **D**

The receiver return loss is stated as normative. In practice, devices may use impedance different than 100 Ohm. It should not matter as long as the receiver functions correctly (any functional requirements and BER).

Any reflections caused by return loss are not expected to have a significant effect on the receiver, and would not affect interoperability. Design choices should be enabled.

SuggestedRemedy

Change the normative statements (shall) in this clause to recommendations (should/recommended), with editorial license.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.3.1** *P* **228** *L* **24** # 50

Ran, Adee — Intel

Comment Type **T** *Comment Status* **D**

"This output impedance requirement applies to all valid output levels"

This is the receiver specification. It has no output impedance and no output levels.

SuggestedRemedy

Delete the quoted statement.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.3.1** *P* **229** *L* **28** # 112

Ghiasi, Ali — Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

In many of NRZ application the return loss has been defined to the Buadrate, PAM4 being more sensitive we should at last do the same. in CL 137 these parameters are specifiied to Baudrate why the cable get to test to just 19 GHz!

SuggestedRemedy

Change max range from 19 to 26.5525 Ghz

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.3.1** *P* **230** *L* **2** # 113

Ghiasi, Ali — Ghiasi Quantum LLC

Comment Type **TR** *Comment Status* **D**

In many of NRZ application the return loss has been defined to the Buadrate, PAM4 being more sensitive we should at last do the same

SuggestedRemedy

Change max range from 19 to 26.5525 Ghz

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.9.3.1** *P* **230** *L* **2** # 52

Ran, Adee — Intel

Comment Type **E** *Comment Status* **D**

Values in magenta have not drawn any discussion. They can be made black.

SuggestedRemedy

Paint'em black, and delete editor's note.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.10** *P* **230** *L* **38** # 53

Ran, Adee Intel

Comment Type **T** *Comment Status* **D**

We should decide if channel RL specs are normative or informative.

It seems that making them informative would put this to sleep, so it seems like easy choice. But if we can agree on normative specs it would improve interoperability and make a better standard.

SuggestedRemedy

Change the text to "shall" in black and update 137.10.2 accordingly, using black text and editorial license. Delete editor's note on page 233.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.10** *P* **231** *L* **6** # 54

Ran, Adee Intel

Comment Type **E** *Comment Status* **D**

Values in magenta have not drawn any discussion. They can be made black.

SuggestedRemedy

Paint all magenta values in table 137-5 black.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.10** *P* **231** *L* **37** # 62

Sakai, Toshiaki Socionext

Comment Type **E** *Comment Status* **D**

Table 137-5, Continuous time filter, zero frequencies
Symbol "fz" is used for high frequency CTLE zero. In 802.3bs D2.2, corresponding symbol is "fz1". Also, corresponding pole is fp1.

SuggestedRemedy

Change Table 137-5, Continuous time filter, zero frequencies "Symbol"
fz
to
fz1

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.10** *P* **231** *L* **40** # 61

Sakai, Toshiaki Socionext

Comment Type **T** *Comment Status* **D**

Table 137-5, Continuous time filter, pole frequencies
do not include low frequency CTLE pole.
fp1 : fb/2.5, fp2 : fb
should be
fp1 : fb/2.5, fp2 : fb/40, fp3 : fb
Preliminary COM paramter spreadsheet includes this low frequency CTLE pole. (f_HP_PZ : fb/40 = 0.6640625 GHz)

SuggestedRemedy

Change Table 137-5, Continuous time filter, pole frequencies
fp1 : fb/2.5, fp2 : fb
to
fp1 : fb/2.5, fp2 : fb/40, fp3 : fb

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.10.1** *P* **232** *L* **18** # 78

Dawe, Piers Mellanox

Comment Type **T** *Comment Status* **D**

This says "The recommended insertion loss of the channel is limited by Equation (137–3)." A recommendation doesn't limit.

SuggestedRemedy

If such an equation is kept, change to "The maximum recommended insertion loss of the channel is given by Equation (137–3)."

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.10.1** *P* **232** *L* **21** # 77

Dawe, Piers — Mellanox

Comment Type **TR** *Comment Status* **D**

The max. recommended insertion loss of the KRn channel, Equation (137–3) comes from D1.0 comment 122 which says "loss from 0.05 to Fb/2 has very strong SQRT(f) which is not typical of backplane material", and ghiasi_3cd_02_1116.pdf says "represent any common implementation of low loss PCB". I don't agree with the reasoning; these days a "backplane" might be a cable backplane, or it might be a board (of something) using very thin traces to save space, which is OK if the trace lengths are short. So there could be very strong SQRT(f). I would expect that a KRn PMD could handle a CRn-like channel. Also, I would expect that the cleaner 100GBASE-KR4 and 25GBASE-KR channels should be usable here.

SuggestedRemedy

We could remove the maximum loss curve and rely on maximum loss at Nyquist, plus COM, as in Clause 136. If we want to keep a curve - here is Eq 93-6 (100GBASE-KR4), scaled and tweaked to go through -30 dB at this PMD's Nyquist: 1.25 + 3.9sqrt(f) + 1.095f , 12.5-3.2f.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.10.1** *P* **232** *L* **21** # 55

Ran, Adee — Intel

Comment Type **E** *Comment Status* **D**

Values in magenta seem agreeable. They can be made black.

SuggestedRemedy

Paint'em black.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.10.2** *P* **233** *L* **2** # 91

Brown, Matt — Applied Micro

Comment Type **T** *Comment Status* **D**

Parameters in Equation 137-4 are magenta. The editor's note below says that the figure must be updated if the parameters change.

SuggestedRemedy

Change the parameters to black text and remove editor's note.

Proposed Response *Response Status* **O**

Cl **137** *SC* **137.12** *P* **234** *L* **5** # 56

Ran, Adee — Intel

Comment Type **T** *Comment Status* **D**

PICS tables for clause 137 are not updated.

SuggestedRemedy

Create PICs tables based on the clause text.

Proposed Response *Response Status* **O**

Cl **138** *SC* **138.1** *P* **242** *L* **30** # 92

Brown, Matt — Applied Micro

Comment Type **E** *Comment Status* **D**

Editor's note has served it's purpose.

SuggestedRemedy

Remove editor's note.

Proposed Response *Response Status* **O**

Cl **138** *SC* **138.8.1** *P* **253** *L* **22** # 10

Anslow, Pete — Ciena

Comment Type **T** *Comment Status* **D**

Comment #49 against P802.3bs D2.1 made a change to allow OMAouter to be measured using pattern 6 (SSPRQ)
Comment #50 against P802.3bs D2.1 made a change to allow ER to be measured using pattern 6 (SSPRQ)

SuggestedRemedy

In Tables 138-12, 139-10 and 140-10 change "4" to "4 or 6" in the rows for OMAouter and Extinction ratio.
In 139.7.4, change:
"if measured using the PRBS13Q pattern as defined in 120.5.11.2.3." to:
"if measured using a test pattern specified for extinction ratio in Table 139-10."
Also change "the run of" to "a run of" in two places.
Make equivalent changes in 139.7.6, 140.7.4, and 140.7.6.
In the titles of Figures 139-3 and 140-3, change "Power levels" to "Example power levels"

Proposed Response *Response Status* **O**

Cl **138** *SC* **138.8.5** *P* **254** *L* **21** # 7

Anslow, Pete Ciena

Comment Type **T** *Comment Status* **D**

Since the BER requirement in 138.1.1 is now 2.4E-4, there is no need for the last exception in 138.8.5.
(also, the equation number is now 121-9)

SuggestedRemedy

Remove the last exception.

Proposed Response *Response Status* **O**

Cl **138** *SC* **138.10.3.1** *P* **258** *L* **48** # 13

Kolesar, Paul CommScope

Comment Type **TR** *Comment Status* **D**

Content is absent regarding optical lane assignements. There are two different array interfaces that require lane assignements: 100G-SR2 and 200G-SR4. This comment will address the first. A subsequent comment will address the second. Add the content proposed in the suggested remedy. Supporting information, including the proposed figure, can be found in contribution kolesar_3cd_01_0117.

SuggestedRemedy

138.10.3.1 Optical lane assignments for 100GBASE-SR2

The two transmit and two receive optical lanes of 100GBASE-SR2 shall occupy the positions depicted in Figure 138–4 when looking into the MDI receptacle with the connector keyway feature on top. The interface contains four active lanes within 12 total positions. The four center positions and the outermost two lanes on the left and outermost two lanes on the right are unused. The transmit optical lanes occupy the remaining two position on the left. The receive optical lanes occupy the remaining two positions on the right.

Proposed Response *Response Status* **O**

Cl **138** *SC* **138.10.3.2** *P* **259** *L* **1** # 15

Kolesar, Paul CommScope

Comment Type **TR** *Comment Status* **D**

Content is absent regarding MDI requirements. All three different MDI interfaces require performance specifications, and two require physical specification: 100G-SR2 and 200G-SR4. Add the content proposed in the suggested remedy. Supporting information, including the proposed figure, can be found in contribution kolesar_3cd_01_0117. Note that this comment proposes to increment the subclause number, as implementation of prior comments regarding lane assignements consumed two subclauses rather than the one that had been allocated.

SuggestedRemedy

138.10.3.3 Medium Dependent Interface (MDI) requirements

The MDI shall optically mate with the compatible plug on the optical fiber cabling.

For 100GBASE-SR2 and 200GBASE-SR4 the MDI adapter or receptacle shall meet the dimensional specifications for interface 7-1-3: MPO adapter interface – opposed keyway configuration, or interface 7-1-10: MPO active device receptacle, flat interface, as defined in IEC 61754-7-1. The plug terminating the optical fiber cabling shall meet the dimensional specifications of interface 7-1-4: MPO female plug connector, flat interface for 2 to 12 fibers, as defined in IEC 61754-7-1.

Figure 138–6 shows an MPO female plug connector with flat interface, and an MDI.

The MDI connection shall meet the interface performance specifications of IEC 61753-1 and IEC 61753-022-2 for performance class Bm/2m.

NOTE—Transmitter compliance testing is performed at TP2 as defined in 138.5.1, not at the MDI.

Proposed Response *Response Status* **O**

Cl **138** *SC* **138.10.3.2** *P* **259** *L* **1** # 14

Kolesar, Paul CommScope

Comment Type **TR** *Comment Status* **D**

Content is absent regarding optical lane assignements. There are two different array interfaces that require lane assignements: 100G-SR2 and 200G-SR4. This comment will address the second. A prior comment addressed the first. Add the content proposed in the suggested remendy. Supporting information, including the proposed figure, can be found in contribution kolesar_3cd_01_0117.

SuggestedRemedy

138.10.3.2 Optical lane assignments for 200GBASE-SR4

The four transmit and four receive optical lanes of 200GBASE-SR4 shall occupy the positions depicted in Figure 138–5 when looking into the MDI receptacle with the connector keyway feature on top. The interface contains eight active lanes within 12 total positions. The four center positions are unused. The transmit optical lanes occupy the leftmost four positions. The receive optical lanes occupy the rightmost four positions.

Proposed Response *Response Status* **O**

Cl **138** *SC* **138.11.4.5** *P* **263** *L* **39** # 8

Anslow, Pete Ciena

Comment Type **T** *Comment Status* **D**

Since the Hazard Level in 138.9.2 and 138.9.7 is TBC, it should be TBC here also

SuggestedRemedy

Change "1M" to "TBC" in item ES2 (2 instances)

Proposed Response *Response Status* **O**

Cl **139** *SC* **139.6.1** *P* **271** *L* **45** # 71

Dawe, Piers Mellanox

Comment Type **TR** *Comment Status* **D**

The Average launch power of OFF transmitter (max) should allow for shared-laser transmitters (typically, one end of each single-lane link could be in e.g. QSFP with a shared laser). 100GBASE-DR already does this.

SuggestedRemedy

Change -30 dBm to -20 dBm. Also for signal detect in 139.5.4.

Proposed Response *Response Status* **O**

Cl **139** *SC* **139.6.1** *P* **271** *L* **47** # 79

Dawe, Piers Mellanox

Comment Type **TR** *Comment Status* **D**

If short wavelength 27 GBd PAM4 is viable, won't long wavelength direct modulated PAM4 be viable sometime? Particularly for a single-lane PMD.

SuggestedRemedy

Reduce the minimum extinction ratio from 4.5 dB to 3 dB, as for 50GBASE-SR.

Proposed Response *Response Status* **O**

Cl **139** *SC* **139.7.5.3** *P* **276** *L* **45** # 9

Anslow, Pete Ciena

Comment Type **T** *Comment Status* **D**

Since the BER requirement in 139.1.1 is now 2.4E-4, there is no need for the second exception in 139.7.5.3.
(also, the equation number is now 121-9)

SuggestedRemedy

Remove the second exception.

Proposed Response *Response Status* **O**

Cl **139** *SC* **139.7.9.1** *P* **278** *L* **21** # 11

Anslow, Pete Ciena

Comment Type **T** *Comment Status* **D**

Comment #168 against P802.3bs D2.0 changed the filter used in the SRS test from a "Fourth-order Bessel-Thomson low-pass filter" to just a "Low-pass filter". This change is reflected in the text of 139.7.9.1, but not in Figure 139-5.

SuggestedRemedy

In Figure 139-5 change "Fourth-order Bessel-Thomson low-pass filter" to "Low-pass filter".

Proposed Response *Response Status* **O**

Cl **139** *SC* **140.6** *P* *L* # 59

Stassar, Peter Huawei

Comment Type **TR** *Comment Status* **D**

In Tables 139-6, 139-7 and 139-8 there are several values listed as TBD and others still in Magenta.
There has been a presentation stassar_120716_3cd_adhoc to the CD ad hoc on 7 December. There appears to be consensus on the proposals for replacing the TBDs by certain values, except on the values for Stressed Receiver Sensitivity. There appears some support for SRS values of -5dBm and -6.3dBm for 50GBASE-FR and 50GBASE-LR respectively, which would be mathematically consistent with the other values.
Also there have been no further inputs on the magenta values, so it is appropriate to make them "black"

SuggestedRemedy

Table 139-6:
Average launch power (min), -5dBm for 50GBASE-FR and -4dBm for 50GBASE-LR
Make other "magenta" values "black"
Table 139-7:
Damage threshold: +5.2dBm for both columns
Average receive power (max): 3dBm for 50GBASE-FR and 4.2dBm for 50GBASE-LR
Average receive power (min): -9dBm for 50GBASE-FR and -10.3dBm for 50GBASE-LR
Receive power (OMAouter) (max): 2.8dBm for 50GBASE-FR and 4dBm for 50GBASE-LR
Stressed receiver sensitivity (OMAouter) (max): -5dBm for 50GBASE-FR and -6.3dBm for 50GBASE-LR
Make other "magenta" values "black"
Table 139-8: Make "magenta" values "black"

Proposed Response *Response Status* **O**

Cl **140** *SC* **6** *P* *L* # 60

Stassar, Peter Huawei

Comment Type **TR** *Comment Status* **D**

In the baseline for 100GBASE-DR adopted in the September 2016 meeting in Fort Worth, an MPI penalty of 0.3dB was contained, to provide an Allocation for penalties (for max TDECQ) of 2.8 dB. Comments had been made to draft 1.0, which were discussed at the November meeting in San Antonio, proposing to use total of link loss and MPI penalty in the link budget consideration, and keep the optical specs unchanged from 400GBASE-DR4 specs. No changes in Tx OMA and Tx OMA - TDECQ. The proposed resolution in presentation traverso_3cd_01a_1116 was not accepted.

Resolution to main comment #108 says "There is consensus on the concept to allow a tradeoff between the channel insertion loss and MPI penalty. Refer traverso_3cd_01a_1116. How to account of this in the draft is for further consideration. No changes to the draft at that this time."

There have however been no follow-up inputs to any CD Ad Hoc until 15 December. Therefore it is proposed to go back to the initial baseline adopted in the Fort Worth meeting in September and base values on an MPI penalty of 0.3dB and split the additional 0.2 dB needed for the budget equally over transmitter and receiver

SuggestedRemedy

Table 140-6:
Modify Average launch power (min) from -2.4dBm to -2.3dBm
Modify Outer Optical Modulation Amplitude (OMAouter) (min) from -0.3dBm to -0.2dBm
Modify Launch power in OMAouter minus TDECQ (min) from -1.3dBm to -1.2dBm

Table 140-7:
Modify Receiver sensitivity (OMAouter) (max) from -4.4dBm to -4.5dBm
Modify Stressed receiver sensitivity (OMAouter) (max) from -1.9dBm to -2dBm

Table 140-8:
Modify Power budget (for max TDECQ) from 5.6dB to 5.8dB
Modify Allocation for penalties (for max TDECQ) from 2.6dB to 2.8dB

Proposed Response *Response Status* **O**

Cl **140** *SC* **6** *P* *L* # 58

Stassar, Peter Huawei

Comment Type **T** *Comment Status* **D**

In Tables 140-6 values for "RIN21.4OMA (max)" and "Optical return loss tolerance (max)" are still labelled "magenta". There have no further inputs to modify these, so it is appropriate to turn them "black"

SuggestedRemedy

Turn values for "RIN21.4OMA (max)" and "Optical return loss tolerance (max)" into "black"

Proposed Response *Response Status* **O**

Cl **140** *SC* **140.6.1** *P* **294** *L* **49** # 70

Dawe, Piers Mellanox

Comment Type **TR** *Comment Status* **D**

53 GBd PAM4 is hard! Speed and linearity are important. Please remove unnecessary difficulties.

SuggestedRemedy

Reduce the minimum extinction ratio from 5 dB to 3 dB.

Proposed Response *Response Status* **O**