Cl **94** *SC* **94.2.10** *P* **326** *L* **38** # r01-1

Marris, Arthur — Cadence Design Syst

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

Reinstate deleted "1.16" for register numbers in Tables 94-4 and 94-5.

SuggestedRemedy

Add 1.16 in front of changed text for Register/bit number in Tables 94-4 and 94-5.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See comment r01-10.

Cl **45** *SC* **45.2.1.100** *P* **59** *L* **36** # r01-2

Marris, Arthur — Cadence Design Syst

Comment Type **T** *Comment Status* **A** *test control*

Add enable for transmitter linearity test pattern in Table 45-73 and reference it in Clause 94

SuggestedRemedy

1.1501.11 Transmitter linearity test pattern enable
1 = Enable transmitter linearity test pattern
0 = Disable transmitter linearity test pattern

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot. However, the comment highlights a deficiency that needs to be addressed.

Add the bit as suggested. Change the inserted paragraph to:

Register 1.1501 bit 8 enables testing with the JP03A pattern defined in 94.2.9.1 for 100GBASE-KP4 PMA/PMD. Register 1.1501 bit 9 enables testing with the JP03B pattern defined in 94.2.9.2 for 100GBASE-KP4 PMA/PMD. Register 1.1501 bit 10 enables testing with the QPRBS13 pattern defined in 94.2.9.3 for 100GBASE-KP4 PMA/PMD. Register 1.1501 bit 11 enables the transmitter linearity test defined in 94.2.9.4 for 100GBASE-KP4 PMA/PMD. The assertion of bits 1.1501.8, 1.1501.9, 1.1501.10, 1.1501.11 are mutually exclusive. If more than one bit is asserted the behavior is undefined. The assertion of 1.1501.8, 1.1501.9, 1.1501.10, and 1.1501.11 operates in conjunction with register 1.1501 bit 3 for 100GBASE-KP4 PMA/PMD.

See comment #17 for the corresponding changes in 94.2.9.4, Table 94-4.

Cl **80** *SC* **80.3.1** *P* **121** *L* **52** # r01-3

RAN, ADEE — Intel Corporation

Comment Type **ER** *Comment Status* **A** *FEC description*

Response to comment i-91 against D3.0 was implemented incorrectly:

The sentence starting with "The IS_RX_LPI_ACTIVE.request primitive" relates to clause 74 FEC rather than RS-FEC. The second sentence is badly punctuated (semicolon instead of a period as in the response).

In addition, stating what RS-FEC doesn't do (without referring to clause 91) is unnecessary. Clause 91 is clear enough. The fact that only clause 74 FEC uses this primitive is clearly stated in 80.3.3.6.

SuggestedRemedy

Change

"The IS_RX_LPI_ACTIVE.request primitive is used to communicate to the RS-FEC (see Clause 74) that the PCS has detected LPI signaling. This allows the FEC to use rapid block lock; the RS-FEC does not use this signal."

To

"The IS_RX_LPI_ACTIVE.request primitive is used to communicate to the BASE-R FEC (see Clause 74) that the PCS has detected LPI signaling. This allows the FEC to use rapid block lock."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

It is useful to point out that the signal is not used by the RS-FEC (by contrast).

Change

"The IS_RX_LPI_ACTIVE.request primitive is used to communicate to the RS-FEC (see Clause 74) that the PCS has detected LPI signaling. This allows the FEC to use rapid block lock; the RS-FEC does not use this signal."

To

"The IS_RX_LPI_ACTIVE.request primitive is used to communicate to the BASE-R FEC (see Clause 74) that the PCS has detected LPI signaling. This allows the FEC to use rapid block lock; the RS-FEC (see Clause 91) does not use this signal."

Cl **82** *SC* **82.6** *P* **164** *L* **49** # r01-4

RAN, ADEE — Intel Corporation

Comment Type **TR** *Comment Status* **A** *LPI state*

Transition condition includes "rx_down_count = 255". According to the response to comment i-104 against D3.0 it should include "rx_down_count = 1".

SuggestedRemedy

In transition from RX_WAKE to RX_ACTIVE, replace "rx_down_count = 255" with "rx_down_count = 1".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The error is in the transition from RX_WTF to RX_ACTIVE. Change the condition to:

!rx_tw_timer_done * rx_align_status * rx_down_count = 1

Cl **93A** *SC* **93A.1.3** *P* **413** *L* **22** # r01-5

RAN, ADEE — Intel Corporation

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

The reflection coefficients (Gamma 1 and 2), as defined, are constant across all frequencies, so they need not be a function of frequency. In equation 93A-16 they appear as scalars in the numerator and as functions of frequency in the denominator.

SuggestedRemedy

Delete the (f) arguments after Gamma_1 and Gamma_2, in equation 93A-15 and in the denominator of equation 93A-16 (6 instances total).

Response *Response Status* **C**

ACCEPT.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot.

However, the commenter correctly points out an editorial issue that should be corrected. Implement the suggested remedy.

Cl **99** *SC* **99** *P* **1** *L* **33** # r01-6

Anslow, Peter — Ciena Corporation

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

The text on page 1 line 33 should say "prepared for sponsor ballot recirculation" rather than "prepared for Working Group ballot". Also, the copyright year should be 2014 throughout the draft.

SuggestedRemedy

Change text to: "prepared for sponsor ballot recirculation". Also, change the copyright year to be 2014 throughout the draft.

Response *Response Status* **C**

ACCEPT.

Cl **00** *SC* **0** *P* **25** *L* **6** # r01-7

Anslow, Peter — Ciena Corporation

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

Once an amendment has been approved and published the 'P' in the designation is removed, hence IEEE Std P802.3bk-2013 should read IEEE Std 802.3bk-2013.

SuggestedRemedy

Change 'IEEE Std P802.3bk-2013' to read 'IEEE Std 802.3bk-2013' throughout the draft.

Response *Response Status* **C**

ACCEPT.

Cl **45** *SC* **45.2.1.88a** *P* **46** *L* **6** # r01-8

Anslow, Peter — Ciena Corporation

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

The tables inserted as Table 45-67b and 45-67c are the first tables being inserted after Table 45-67 so they should be Tablse 45-67a and 45-67b. (This incorrect numbering is probably due to the insertion of Table 45-15a above them in the draft.)

SuggestedRemedy

Re-number the tables as Tables 45-67a and 45-67b

Response *Response Status* **C**

ACCEPT.

Cl **78** *SC* **78.1.1** *P* **82** *L* **48** # r01-9

Anslow, Peter — Ciena Corporation

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

The newly added text in 78.1.1 contains six instances of "Clause xx". These should either be cross-references or shown in green.

SuggestedRemedy

Change the six instances of "Clause xx" to cross-references where they exist in the P802.3bj draft and in green where they don't.

Response *Response Status* **C**

ACCEPT.

Cl **94** *SC* **94.2.10** *P* **281** *L* **43** # r01-10

Anslow, Peter — Ciena Corporation

Comment Type **T** *Comment Status* **A** *Cross clause comment*

In Tables 94-4 and 94-5 several of the Register/bit number values are now incorrect ("1.16" has been removed from them).
Also, the MDIO status variable names for the last four rows of Table 94-5 don't match the names in Table 45-67c

SuggestedRemedy

For the last 6 rows of Table 94-4 and the last 4 rows of Table 94-5 insert the "1.16" missing at the beginning of the Register/bit number.
For instance the value for PMA transmit overhead pattern changes from "2.7:0" to "1.162.7:0"
Also, make the variable names in the last four rows of Table 94-5 and Table 45-67c match.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement remedy to comment r01-1:
"Add 1.16 in front of changed text for Register/bit number in Tables 94-4 and 94-5"

To align names with Table 94-5, in Table 45-67c in four places:
Change: "PMA receive status"
To: "PMA receive overhead sequence"

Cl **93C** *SC* **93C.1** *P* **357** *L* **46** # r01-11

Anslow, Peter — Ciena Corporation

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

In (see Figure 93C-6), "Figure 93C-6" should be a cross-reference.

SuggestedRemedy

Make "Figure 93C-6" a cross-reference.

Response *Response Status* **C**

ACCEPT.

Cl **78** *SC* **78.1.3.3.1** *P* **83** *L* **32** # r01-12

Anslow, Peter — Ciena Corporation

Comment Type **E** *Comment Status* **A** *EEE description*

This paragraph has been modified in the response to comment i-50 (and also considering comment #56 against P802.3bm D2.0).
However, the added sentence "For some PHYs with an operating speed of 40 Gb/s or greater, deep sleep is optional as shown in Table 78-1." is rather confusing.
Table 78-1 does not show anything related to deep sleep being an option for the PHYs in 802.3 as modified by P802.3bj. For all of the PHYs with an operating speed of 40 Gb/s or greater shown in Table 78-1 deep sleep is an option. This sentence would be much clearer if it had the same format as the last sentence of this paragraph concerning fast wake.

SuggestedRemedy

Change the sentence to "Deep sleep is optional for PHYs with an operating speed of 40 Gb/s or greater that implement EEE."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the sentence to "Deep sleep support is optional for PHYs with an operating speed of 40 Gb/s or greater that implement EEE."

See also comment #16

Cl **45** *SC* **45.2.1.98a** *P* **61** *L* **13** # r01-13

Szczepanek, Andre — Inphi Corporation

Comment Type **TR** *Comment Status* **R** *test control*

Allowing arbitrary non-zero polynomial seeds (via seed_i) breaks the uniqueness property of the training frame delimiter (0x00FF0000). Any seed that creates a PRBS pattern starting with 8 or more zero bits combined with a status report ending in 3 zero bits will create a false training frame delimiter, if there are an even number of DM transitions in the DM payload. If this occurs at training start there is a 50% probability of a consistent false lock.

SuggestedRemedy

Add this sentence to the end of the paragraph :
"If the default seed values are not used, the values used must be selected carefully. Seed values that produce a PRBS sequence starting with 8 or more zero bits shall not be used."

Response *Response Status* **W**

REJECT.

The commenter has offered to withdraw this comment.

The comment as written refers to a training frame delimiter with the value 0x00FF0000. The IEEE 802.3-2012 errata document identifies this as an error and provides the correct value 0xFFFF0000. It is not possible for a PRBS11 pattern generator to reproduce the pattern 0xFFFF0000, therefore the recommendation in the suggested remedy is not required.

The document "Errata to IEEE Standard for Ethernet" may be found here:
http://standards.ieee.org/findstds/errata/802.3-2012_errata.pdf

Cl **93A** *SC* **93A.1.6** *P* **416** *L* **11** # r01-14

RAN, ADEE — Intel Corporation

Comment Type **GR** *Comment Status* **A**

Table 93A-1 specifies ranges of values for c(-1) and c(1) without stating which combinations are permitted. It can be implied that any combination of valid c(-1) and valid c(1) is permitted.

On the other hand, the transmitter specifications in clauses 92-94 create minimum requirements for the ratios R_pre and R_post, which implicitly define minimum required values for c(-1), c(0) and c(1). Some combinations of c(-1) and c(+1) imply c(0) which is below its required minimum, so it is not guaranteed that all transmitters will support them.

For example, To reach R_post=4, the required coefficients are c(-1)=0, c(0)=0.62 and c(1) is -0.38; this creates minimum requirements for c(0) and c(1). Similiarly, from R_pre, the minimum requirement for c(-1) turns out to be -0.18. However, if c(-1) and c(+1) would both be set to their minimum values, the value for c(0) would be 0.44 which is below its minimum requirement.

It should be clarified that combinations in which any coefficient is outside its minimum requirement should not be used in COM.

SuggestedRemedy

Add the following sentence after "The FOM is calculated for each permitted combination of c(-1), c(1), and g_DC values per Table 93A-1":

The combination of c(-1), c(1) values is constrained as required by the transmitter full-scale ratio specifications for the Physical Layer that invokes this method.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot. However, this technical issue should be addressed.

The text proposed in the suggested remedy is ambiguous in that there no "full-scale ratio" requirements in the Physical Layer specifications that currently invoke the method. A compliant transmitter must satisfy the coefficient initialization and range requirements. In addition, the statement is unfriendly to users of the standard as it requires them to work out what the constraints are. The constraint can be clearly stated as a minimum value of c(0) that satisfies but does not significantly exceed the minimum requirements.

Add the following row to Table 93A-1.
Transmitter equalizer, minimum cursor coefficient | 93A.1.4.2 | c(0) | --

Add the corresponding row to Table 93-8 and Table 94-17 with the value 0.62.

Add the following sentence to the end of the first paragraph of 93A.1.4.2.
"If the value of c(0) is less than the specified minimum value, the corresponding combination of c(-1) and c(1) is considered invalid and is not used to calculate COM."

Cl **93A** *SC* **93A.1.4** *P* **403** *L* **39** # r01-15

Marris, Arthur — Cadence Design Syst

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

Equation 93A-17 is truncated

SuggestedRemedy

Fix to make H(k) visible. Also fix text on lines 43 and 45.

Response *Response Status* **C**

ACCEPT.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot.

However, the commenter correctly points out an editorial issue that should be corrected. Implement the suggested remedy.

Cl **78** *SC* **78.1.3.3.1** *P* **85** *L* **32** # r01-16

Marris, Arthur — Cadence Design Syst

Comment Type **TR** *Comment Status* **A** *EEE description*

This paragraph says that deep sleep support is called out in Table 71. This is not true, it will be 802.3bm that will indicate in Table 71 which PHYs do not support deep sleep.

Also it says deep sleep "is similar to the mechanism defined for PHYs with an operating speed less than 40 Gb/s". This is not correct, deep sleep is the mechanism defined for PHYs with an operating speed less than 40 Gb/s. So delete this qualification. It is important to do this because otherwise the explanation of AN in 78.3 will not make sense.

Also there should be an explanation of how fast wake differs from normal operation.

SuggestedRemedy

Change the paragraph so that it reads as follows:
"For PHYs with an operating speed of 40 Gb/s or greater that implement the optional EEE capability, two modes of LPI operation may be supported: deep sleep and fast wake. Deep sleep refers to the mode for which the transmitter ceases transmission during Low Power Idle (as shown in Figure 78-3). Deep sleep support is optional for PHYs with an operating speed of 40 Gb/s or greater that implement EEE and mandatory for PHYs with an operating speed less than 40 Gb/s that implement EEE. Fast wake refers to the mode for which the transmitter continues to transmit signals during Low Power Idle so that the receiver can resume operation with a shorter wake time (as shown in Figure 78-3a). Fast wake support is mandatory for PHYs with an operating speed of 40 Gb/s or greater that implement EEE.

For transmit, other than the PCS encoding LPI, there is no difference between fast wake and normal operation.

Add the following text to the end of the second sentence in the first paragraph of 78.1.3.3.2 PHY LPI receive operation
"If in fast wake mode BIP running disparity is not calculated while in the fast wake state which is entered on reception of the sleep signal."

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Deep sleep is not defined for any PHYs <40Gb/s. Unless changes are made to all of the clauses written in P802.3az, the paragraph here should refer only to PHYs >=40Gb/s. Also, BIP statistics are not updated for either deep sleep or fast wake operation while the receiver is in any state other than RX_ACTIVE. It's not clear that special text is required for fast wake and/or BIP in this clause.

Change the paragraph so that it reads as follows:
"For PHYs with an operating speed of 40 Gb/s or greater that implement the optional EEE capability, two modes of LPI operation may be supported: deep sleep and fast wake. Deep sleep refers to the mode for which the transmitter ceases transmission during Low Power Idle (as shown in Figure 78-3) and is equivalent to the only mechanism defined for PHYs

with an operating speed less than 40 Gb/s. Deep sleep support is optional for PHYs with an operating speed of 40 Gb/s or greater that implement EEE. Fast wake refers to the mode for which the transmitter continues to transmit signals during Low Power Idle so that the receiver can resume operation with a shorter wake time (as shown in Figure 78-3a). For transmit, other than the PCS encoding LPI, there is no difference between fast wake and normal operation. Fast wake support is mandatory for PHYs with an operating speed of 40 Gb/s or greater that implement EEE."

Also change the first sentence in 78.3 from
"PHYs capable of deep sleep operation shall advertise that capability during the Auto-Negotiation stage."
to
"The EEE capability shall be advertised during the Auto-Negotiation stage, except for PHYs that only support fast wake operation."

Cl **94** *SC* **94.2.9.4** *P* **326** *L* **10** # r01-17

Marris, Arthur — Cadence Design Syst

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

Add the word "repeating" to make it consistent with previous test pattern subclauses.

Add text to describe control variables for the Transmitter linearity test pattern

SuggestedRemedy

Change:
"The transmitter linearity test pattern is a 160-symbol pattern"
To:
"The transmitter linearity test pattern is a repeating 160-symbol pattern"

Add following text to the end of 94.2.9.4:
"The transmitter linearity test pattern is enabled by the test_pattern_enable and TX_linearity_enable control variables. If the optional Clause 45 MDIO is implemented, the control variables map to the registers and bits defined in 94.2.10."

Add TX_linearity_enable to Table 94-4 referencing 1.1501.11

Also make sure the enable bit 1.1501.11 is added in Clause 45. I have submitted a separate comment for this.

Response *Response Status* **C**

ACCEPT.

Cl **94** *SC* **94.3.10.10** *P* **341** *L* **49** # r01-18

Marris, Arthur — Cadence Design Syst

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

Re-instate deleted text "data stream". This text is shown as deleted in the comparison version but not the clean version.

SuggestedRemedy

If necessary re-instate deleted text "data stream" at the end of 94.3.10.10.

Response *Response Status* **C**

ACCEPT.

The cited text shows up as deleted text in the compare version but is present in the clean version.

No change is necessary.

Cl **80** *SC* **80.3.3.5** *P* **116** *L* **10** # r01-19

Marris, Arthur — Cadence Design Syst

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

For consistency consider changing all instances of:
"Without EEE capability (with the deep sleep mode option)"
To:
"Without EEE deep sleep mode capability"

SuggestedRemedy

Change all instances of:
"Without EEE capability (with the deep sleep mode option)"
To:
"Without EEE deep sleep mode capability"

Response *Response Status* **C**

ACCEPT.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot. However, the comment fixes an inconsistency introduced by a previous comment.

Cl **01** *SC* **1.4.52b** *P* **25** *L* **39** # r01-20

Rolfe, Benjamin — Blind Creek Associate

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

The resolution to comment I-8 fails to provide an valid reason for rejecting the comment. The statement identified in comment I-8 constitutes information not appropriate in a definition as defined by the ieee style manual. This standard does not meet the requirements stated therein, and no valid reason is given for correcting the deficiency. The resulting error hides potentially important information in a non-normative clause, which may lead to implementation errors and interoperability issues (thus it is a technical issue). Admitting that a a normative requirement is stated in non-normative language reinforces the need to correct the draft.

SuggestedRemedy

Implement the proposed resolution to I-8 and remove extraneous text from the definition of the term and ensure that normative characteristics are properly contained in appropriate normative clauses. Alternately delete the definition.

Response *Response Status* **W**

REJECT.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot.

The definitions in question follow the general form of other Physical Layer definitions in IEEE Std 802.3-2012. Two examples of other definitions follow:

“1.4.52 100GBASE-CR10: IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over ten lanes of shielded balanced copper cabling, with reach up to at least 7 m. (See IEEE Std 802.3, Clause 85.)”

“1.4.54 100GBASE-LR4: IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over four WDM lanes on single-mode fiber, with reach up to at least 10 km. (See IEEE Std 802.3, Clause 88.)”

These definitions are structured to describe the Physical Layer in terms of the encoding used and the medium supported. Compare these examples to the definition of 100GBASE-KR4 in IEEE P802.3bj.

“1.4.52b 100GBASE-KR4: IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding, Clause 91 RS-FEC, and 2-level pulse amplitude modulation over four lanes of an electrical backplane, with a total insertion loss up to 35 dB at 12.9 GHz. (See IEEE Std 802.3, Clause 93.)”

This definition also describes the Physical Layer in terms of the encoding and supported medium. It is intended to be descriptive, identify the purpose of this Physical Layer, and highlight how it is distinct from similar Physical Layers. The major difference between this definition and the previous examples is how the medium is defined. For connections between boxes, the emphasis is on length because the reader is more likely interested in how far the two boxes can be separated within an equipment room or across a campus. For “inside the box” connections, length is a consideration but the reader (one who wishes to build a system utilizing Ethernet over backplane links) is expected to be more interested in the loss that can be supported. After much deliberation, it was concluded that loss was the best way to define this particular medium.

Defining the medium in these terms then allows us to clarify the distinction between 100GBASE-KR4 and 100GBASE-KP4 since both are 100 Gb/s Physical Layer specifications that operate over four lanes of an electrical backplane. For reference, the informative channel insertion losses may be found in 93.9.2 and 94.4.2, respectively.

Cl **83** *SC* **83.3** *P* **158** *L* **36** # r01-21

Marris, Arthur — Cadence Design Syst

Comment Type **T** *Comment Status* **A** *xref fix*

Deep sleep mode is actually described in 78.1.3.3.1 rather than 78.3.

SuggestedRemedy

Change cross reference from 78.3 to 78.1.3.3.1.
Page 158 line 36 (or just reference Clause 78 here); also
Page 158 line 54
Page 101 line 38 (Clause 80)
Page 158 line 36, 54 (Clause 83)
Page 166 line 29 (Clause 84)
Page 170 line 30 (Clause 85)
Page 315 line 1 (Clause 94)
Page 379 line 15(Annex 83A)
Page 166 line 29 (Clause 84)

Response *Response Status* **C**

ACCEPT.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot. However, the comment addresses an error in cross-references that escaped notice in previous drafts.

Cl **80** *SC* **80.3.1** *P* **111** *L* **52** # r01-22

Marris, Arthur — Cadence Design Syst

Comment Type **TR** *Comment Status* **A** *FEC name*

Clause 74 is the BASE-R FEC

SuggestedRemedy

Change:
RS-FEC (see Clause 74)
To:
BASE-R FEC (see Clause 74)

Response *Response Status* **W**

ACCEPT.

See also comment #3

Cl **92** *SC* **92.7.12** *P* **197** *L* **22** # r01-23

Healey, Adam — LSI Corporation

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

The requirement corresponding to the first line of item b) could be stated more clearly.

SuggestedRemedy

Replace the first sentence of item b) with the following. "In addition to the coefficient update process specified in 72.6.10.2.5, the period from receiving a new request to responding to that request shall be less than 2 ms, except during the first 50 ms following the beginning the start-up protocol. The beginning of the start-up protocol is defined to be entry to the AN_GOOD_CHECK state in Figure 73-11." A similar change is needed in 93.7.12 and 94.3.10.7.5.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In 92.7.12 and 93.7.12, use the suggested remedy.

In 94.3.10.7.5, replace the sentence on page 294 line 9 with:
"In addition, the period from receiving a new request to responding to that request shall be less than 2 ms, except during the first 50 ms following the beginning the start-up protocol. The beginning of the start-up protocol is defined to be entry to the AN_GOOD_CHECK state in Figure 73-11."

Cl **93A** *SC* **93A.4** *P* **420** *L* **33** # r01-24

Healey, Adam — LSI Corporation

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

There is only one rise and fall time.

SuggestedRemedy

Change "...20% to 80% rise and fall times, T_t." to "...20% and 80% rise and fall time, T_t."

Response *Response Status* **C**

ACCEPT.

Cl **93A** *SC* **93A.4** *P* **420** *L* **26** # r01-25

Healey, Adam — LSI Corporation

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

The equation for ILD_RMS is incorrect.

SuggestedRemedy

Change the equation to sqrt(sum_over_n(W(f_n)*ILD(f_n)^2)/N).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See http://www.ieee802.org/3/bj/public/mar14/healey_3bj_02_0314.pdf

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Cl **92** *SC* **92.11.3.1** *P* **264** *L* **40** # r01-26

Healey, Adam — LSI Corporation

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

The definition of RMS insertion loss deviation is incomplete. The frequency range for the fitted insertion loss must also be defined.

SuggestedRemedy

Change the second paragraph of 92.11.3.1 to the following. "The RMS insertion loss deviation, ILD_RMS, is calculated according to 93A.4 with f_b=25.78125 GHz, T_t=9.6 ps, and f_r=0.75 x f_b. The fitted insertion loss is computed over the range f_min=0.01 GHz to f_max=25 GHz. ILD_RMS shall be less than 0.13 dB."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Comment r01-56 changes the name of the term from “ILD_RMS” to “FOM_ILD”.

Change the second paragraph of 92.11.3.1 to the following. "FOM_ILD is calculated according to 93A.4 with f_b=25.78125 GHz, T_t=9.6 ps, and f_r=0.75 x f_b. The fitted insertion loss and insertion loss deviation are computed over the range f_min=0.01 GHz to f_max=25 GHz. FOM_ILD shall be less than 0.13 dB."

Cl **93A** *SC* **93A.1.2.3** *P* **411** *L* **38** # r01-27

Healey, Adam LSI Corporation

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

The transmission line model defined in this Annex is not causal and erroneously uses an f^2 term to model insertion loss deviation. The equations for cascading X 1 mm sections to yield a X mm tranmission line are also inaccurate, especially for shorter, lower loss tranmission lines. These inaccuracies impair the ability of COM to differentiate between acceptable and unacceptable channels.

SuggestedRemedy

Replace the equations in 93A.1.2.3 with equations more grounded in transmission line theory that are causal by construction. Supporting material will be provided that defines a such a model that is a function of 5 real-valued parameters. Replace the parameters and values in Table 93A-3 and Table 92-12 (to be provided as part of the supporting material).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement with editorial license the changes described in http://www.ieee802.org/3/bj/public/mar14/healey_3bj_02_0314.pdf.

In addition, specify that the units of z_p are mm.

Cl **93A** *SC* **93A.1.6** *P* **415** *L* **42** # r01-28

Healey, Adam LSI Corporation

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

The parameter SNR_TX is set to the minimum SNDR required from compliant transmitters. The value of SNR_TX is used to define a noise source with variance sigma_TX^2 which presumably accounts for the degradation in performance due to minimum SNDR. However, the expression for sigma_TX^2 includes factors of sigma_X^2 and (A_s/R_LM) = h(0)(t_s)/(L-1). The definition of SNDR is 10*log10(p_max^2/(sigma_e^2+sigma_n^2)). If we take sigma_e ~ 0 and p_max ~ h(0)(t_s) then we find the effective SNDR for the COM transmitter to be about 10*log10((L-1)^2/sigma_X^2)+SNR_TX. For 100GBASE-CR4 and 100GBASE-KR4, L = 2 and the SNDR of the COM transmitter is SNR_TX as expected. For 100GBASE-KP4, the SNDR of the COM transmitter is 12 dB better than SNR_TX. This seems inconsistent with the notion of representing worst-case impairments.

SuggestedRemedy

Remove the extraneous factors and change Equation (93A-28) to sigma_TX^2 = h(0)(t_s)^2*10^(-SNR_TX/10). Adjust the SNDR limit for 100GBASE-KP4 transmitter and corresponding value for SNR_TX as necessary.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot. However, this technical issue should be addressed.

Implement the suggested remedy. Also change the 100GBASE-KP4 SNDR limit (94.3.12.7, Table 94-13, PICS item TC28) and the SNR_TX value (Table 94-17) to 31 dB.

See http://www.ieee802.org/3/bj/public/mar14/mellitz_3bj_01a_0314.pdf.

In addition, change the caption of Table 94-17 to “COM parameter values”.

Cl **93A** *SC* **93A.1.2.3** *P* **346** *L* **51** # r01-29

Moore, Charles — Avago Technologies

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

Equation 93A-10 gives a transfer characteristic which is non-causal which will cause difficulties in computing COM. Also equations 93A-11 and 93A-12 are known to be incorrect. We need a new package, and host trace, model.

SuggestedRemedy

A specific proposal will be made in a presentation.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See r01-27.

Cl **82** *SC* **82.2.18.3.1** *P* **154** *L* **19** # r01-30

Marris, Arthur — Cadence Design Syst

Comment Type **T** *Comment Status* **A** *LPI state*

This comment is against Figure 82-17--LPI Receive state diagram.
Consider adding LPI_FW switch to all transitions out of RX_SLEEP state.

SuggestedRemedy

Add "* LPI_FW = FALSE" qualifier to the three transitions out of the RX_SLEEP state that do not already have a LPI_FW qualifier.

Response *Response Status* **C**

ACCEPT.

Cl **78** *SC* **78.1.1** *P* **85** *L* **4** # r01-31

Marris, Arthur — Cadence Design Syst

Comment Type **T** *Comment Status* **A** *service interface*

Alert requests can be sent over XLAUI/CAUI in addition to quiet requests.

SuggestedRemedy

Change:
"transmit quiet requests"
to:
"transmit quiet and alert requests"

Change:
"interfaces infer the quiet request"
To:
"interfaces infer quiet and alert requests"

Add reference to 83.5.11.1 in this paragraph.

Response *Response Status* **C**

ACCEPT.

Cl **93C** *SC* **93C.2** *P* **417** *L* **47** # r01-32

Mellitz, Richard — Intel Corporation

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

The peak voltage of the transmitter should be account for. For a "transmitter with high quality termination" V_f should be set to 0.4V. Otherwise V_a and V_fe should be set to the measured V_f as long as it is > 0.4V. The COM calculation is somewhat insensitive to V_f in a normal sense. However for calibration there would be and impact on the applied noise.

SuggestedRemedy

Change
The procedure is based on the calculation of COM which uses the parameters defined in the COM parameter table in the PMD clause that invokes this method with the following exceptions. The value of sigma_RJ and ADD are set based on a transformation of measured parameters as specified in the PMD clause that invokes this method. The value of SNRTX is set based on a transformation of the measured parameters specified in the PMD clause that invokes this method. In the COM computation the transmitter package model is included only if a compliant transmitter with a similar termination is used. If a transmitter with high quality termination is used, in the COM calculation, the termination is modeled as ideal and a Gaussian low pass filter is added to Equation (93A-17) which has the same 20%-80% transition time as the transmitter measured at TP0a.
To:
The procedure is based on the calculation of COM which uses the parameters defined in the COM parameter table in the PMD clause that invokes this method with the following exceptions. The value of sigma_RJ, ADD, V_f are set based on a transformation of measured parameters as specified in the PMD clause that invokes this method. The value of SNRTX and V_f is set based on a transformation of the measured parameters specified in these PMD clause that invokes this method. In the COM computation the transmitter package model is included only if a compliant transmitter with a similar termination is used. If a transmitter with high quality termination is used, in the COM calculation, the termination is modeled as ideal and a Gaussian low pass filter is added to Equation (93A-17) which has the same 20%-80% transition time as the transmitter measured at TP0a and V_f is adjusted in the transmitter to the V_f parameter specified in this PMD clause that invokes this method. If V_f is not adjustable it must within the range for the V_f parameter specified in this PMD clause that invokes this method. In this case the parameters V_a and V_fe defined in the COM parameter table are set to the measured value fo V_f.
Alternatively:
The procedure is based on the calculation of COM which uses the parameters defined in the COM parameter table in the PMD clause that invokes this method with the following exceptions. The value of sigma_RJ and ADD are set based on a transformation of measured parameters as specified in the PMD clause that invokes this method. The value of SNRTX is set based on a transformation of the measured parameters specified in the PMD clause that invokes this method. In the COM computation the transmitter package model is included only if a compliant transmitter with a similar termination is used. If a transmitter with high quality termination is used, in the COM calculation, the termination is modeled as ideal and a Gaussian low pass filter is added to Equation (93A-17) which has the same 20%-80% transition time as the transmitter measured at TP0a.
The transmitter voltage amplitude is adjusted to the parameter V_f defined in the PMD clause that invokes this method.
Editorial license granted

Response *Response Status* **C**

REJECT.

The comment suggests that an allowance should made be when the test transmitter peak-to-peak differential output voltage exceeds 800 mV. However, this is not necessary since the test transmitter output voltage is constrained (see the 3rd paragraph of 93C.1). Specific constraints are stated in the clause that refers to this method. See, for example, 93.8.2.3:

"The test transmitter is constrained such that for any transmit equalizer setting the differential peak-to-peak voltage (see 93.8.1.3) is less than or equal to 800 mV ."

Cl **93A** *SC* **93A.1.6** *P* **415** *L* **42** # r01-33

Mellitz, Richard — Intel Corporation

Comment Type **GR** *Comment Status* **A**

Equation 98A-28 essentially reduces a to proportion of channel attenuation times (sigma_e+sigma_n) but divided by (L-1). The effect of sigma_e + sigma_n is not affect by levels. The impact it requires a lower sndr level for clause 94.

SuggestedRemedy

In equation 98A-28 change As to As*(L-1)
In table 94-13, page 356 line, 35 change SNDR to 33
And
In table 94-17, p373, line 42change SNR_TX to 33

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot.

See r01-28.

Cl **92** *SC* **92.14.4.5** *P* **273** *L* **24** # r01-34

Palkert, Thomas — Molex Incorporated

Comment Type **GR** *Comment Status* **A**

CA2 references equation 92-25 but the constraints on a1/a2/a4 have been removed so we should not have a PICS related to equation 92-25. Equation 92-28 specifies the ILcmin but does not have PICS.

SuggestedRemedy

In PICS CA2 Change reference from equation '92-25' to equation '92-28'

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Receiver interference tolerance test (92.8.4.4) constrains cable assembly coefficients.

In CA2 add reference to 92.8.4.4.

Add additional PICS for cable assembly min (Eq. 92-28) and max (in Table 92-11).

Add after sentence P214, L25 "The measured insertion loss of the cable assembly shall be less than or equal to the maximum cable insertion loss of 22.48 dB at 12.8906 GHz."

In addition, modify equation 92-10 to yield 9.85 dB at 12.8906 GHz to complete implementation of comment i-122 against Draft 3.0.
Change equation 92-10 coefficients to implement. 0.080+0.570*SQRT(f)+0.599*f 0.1</= f < 14
-19.067+2.119*f 14 </= f </= 19

Cl **93** *SC* **93.9.3** *P* **300** *L* **7** # r01-35

Palkert, Thomas — Molex Incorporated

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

COM results are inconsistent due to VNA resolution at low frequencies and selected DC extrapolation method.

SuggestedRemedy

Change fmin from .05 GHz to .1GHz and specify DC extrapolation method.

Response *Response Status* **W**

REJECT.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot.

The result of a calculation based on measured data is limited by the accuracy of the measurement. COM is a function of measured channel scattering parameters and it is assumed that the measurements are accurate. The draft does not dictate how to make accurate measurements e.g., the method of network analyzer calibration is not defined. Similarly, the draft does not dictate how to determine an accurate DC value. This is left to the [evolving] state of the art.

Inaccurate DC values can result in causality and/or passivity violations. The impact on COM is related to the severity of the violation and can be compounded by post-processing algorithms that enforce causality and/or passivity on the data.

For these reasons, NOTE 1 of 93A.1.5 advises the user that the "the filtered voltage transfer function may need to be extrapolated (both to DC and to one half of the sampling frequency)" and that the "extrapolation method and sampling frequency must be chosen carefully to limit the error in the COM computation."

The suggested remedy does not include a "fool proof" method to accurately determine the DC value for any channel that could be evaluated with COM. If a method is specified that is not broadly applicable and accurate, there is the risk that an otherwise valid channel is limited by errors that are mandated by the standard.

Regarding the value of f_min in Table 93-8, it has not been established that the resolution of network analyzer measurements between 0.05 and 0.1 GHz contributes to significant variability in COM results.

Note that some variability may result from the application of various causality enforcement algorithms to the non-causal package and host tranmission line models defined in 93A.1.2.3 and 92.10.7.1.1 respectively. This issue is addressed in r01-27.

Cl **92** *SC* **92.8.3.2** *P* **223** *L* **18** # r01-36

Dawe, Piers J G — Mellanox Technologie

Comment Type **ER** *Comment Status* **A**

The graphs in this clause and Annex 92A are bitmaps, with their disadvantages. Unlike others e.g. in 72, 85, 93, 86A.

SuggestedRemedy

Replace with vector graphics.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Vector graphics are used in the draft but some graphs were inadvertently rendered as bitmaps when the PDF file was generated. The cause of this issue has been identified and corrected.

Cl **92** *SC* **92.8.3.6.1** *P* **226** *L* **49** # r01-37

Dawe, Piers J G — Mellanox Technologie

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

This says "capture ... per 85.8.3.3.4 with M not less than 32 samples per unit interval." and 85.8.3.3.4, Waveform acquisition, says "The waveform shall be captured with an effective sample rate that is M times the signaling rate of the transmitter under test. The value of M shall be an integer not less than 7." (It's "effective" so that equivalent-time scopes are allowed.)
But there is no need to capture with such high oversampling (nor with integral oversampling): the need is to process the linear fit algorithm with M>=32. Measuring with M=32 with an equivalent-time scope would take longer than needed.

SuggestedRemedy

Change "per 85.8.3.3.4 with M not less than 32 samples per unit interval." to
"per 85.8.3.3.4. The captured waveform is resampled so that M is an integer, not less than 32 samples per unit interval."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change:
"…per 85.8.3.3.4 with M not less than 32 samples per unit interval."

To:
"… per 85.8.3.3.4. In the following calculation, M should be an integer not less than 32. Interpolation of the captured waveform may be used to achieve this."

Cl **92** *SC* **92.8.3.6.1** *P* **226** *L* **49** # r01-38

Dawe, Piers J G — Mellanox Technologie

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

This says "the test pattern PRBS9 as specified in 83.5.10", but 83.5.10, PMA test patterns (optional), is a long subclause that's really about controlling the various test pattern modes, not pattern definition. It does say "a PRBS9 pattern (as defined in Table 68-6)". Let's make the document a little more user friendly.

SuggestedRemedy

Cut out the indirection: change "the test pattern PRBS9 as specified in 83.5.10" to "the PRBS9 pattern (see Table 68-6)".
Similarly in 92.8.3.8.
In 92.8.3.9.2, change "a PRBS9 pattern (see 83.5.10)." to "a PRBS9 pattern (see Table 68-6).

Response *Response Status* **C**

REJECT.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot.

The reference in 92.8.3.6.1 to the PRBS9 definition in subclause 83.5.10 is consistent with similar references in IEEE 802.3-2012 Clauses 86, 87, and 88.

Also, the suggested remedy is not required in order for the definition of PRBS9 to be properly understood.

Additionally, 83.5.10 includes information on the configuration and operation of the PRBS9 pattern that may be similarly relevant to the reader.

Cl **92** *SC* **92.10.2** *P* **238** *L* **8** # r01-39

Dawe, Piers J G — Mellanox Technologie

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

92.10.2, Cable assembly insertion loss, is a confusing section because for over a page it goes through a fitting procedure, then doesn't do anything with the answer, then provides limits - but for measured, not fitted?

SuggestedRemedy

Use subclauses to divide the fitted and non-fitted material. Consider putting the non-fitted material first.

Response *Response Status* **C**

REJECT.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot.

The definitions and specifications are correct and unambiguous as written.

Cl **92** *SC* **92.11.3.1** *P* **254** *L* **46** # r01-40

Dawe, Piers J G — Mellanox Technologie

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

Now that the minimim mated loss has been increased, there is a larger gap between min and max, degrading measurement accuracy, yet at least at the lower frequencies, performance is clearly better than these specs allow, as shown in slide 8 of diminico_3bj_01a_0114.pdf.

SuggestedRemedy

In eq 92-45, low frequency part, reduce the ~f term but add a quadratic term so that the spec remains continuous at 14 GHz.

Response *Response Status* **C**

REJECT.

Commentor has not provided sufficient justification for change suggested in remedy and has not provided sufficient information to implement in the draft.

The shape of the measurements provided should not be used to generate limit lines as they are representative of a limited set of measurements performed on mated test fixtures of the same design.

Cl **92** *SC* **92.8.4.2** *P* **232** *L* **45** # r01-41

Dawe, Piers J G — Mellanox Technologie

Comment Type **ER** *Comment Status* **R**

Equation 92-22, for receiver differential input return loss, is just the same as Equation 92-1 for transmitter differential output return loss. Don't waste the reader's time.

SuggestedRemedy

Change "The differential input return loss, in dB, of the receiver shall meet Equation (92-22)." to "The differential input return loss, in dB, of the receiver shall meet Equation (92-1).". Remove Equation 92-22. The PICS RC4 remains.

Response *Response Status* **C**

REJECT.

This comment is a restatement of comment i-159.

The draft is correct and unambiguous as written.

Also, having the reader refer to another section of the document it could be more difficult for the reader.

Cl **92** *SC* **92.11.1.2** *P* **251** *L* **36** # r01-42

Dawe, Piers J G — Mellanox Technologie

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

The HCB reference insertion loss has been reduced by scaling all three terms. Yet slide 12 of diminico_3bj_01a_0114.pdf shows measurements with a little more curvature than the new reference loss.

SuggestedRemedy

Adjust the three coefficients so that the insertion loss is more curved.

Response *Response Status* **C**

REJECT.

The shape of the measurements provided should not be used to generate limit lines as they are representative of a limited set of measurements performed on mated test fixtures of the same design. Other IL shapes are possible. IL (minimum and maximum) and ILD of the mated test fixtures are specified.

Cl **92** *SC* **92.11.3.3** *P* **254** *L* **6** # r01-43

Dawe, Piers J G — Mellanox Technologie

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

The newly relaxed mixed-mode specs for the compliance boards imply that the mixed-mode specs for CAUI-4 (and OIF VSR) must be relaxed also, possibly degrading useful performance and/or requiring that something else must be tightened up.

SuggestedRemedy

Review what compliance board performance is practicable. Can the mixed-mode specs be returned to the D3.0 limits?

Response *Response Status* **C**

REJECT.

See http://www.ieee802.org/3/bm/public/mar14/dawe_02_0314_optx.pdf.

The mated test fixture specification changes referred to by the commentor were considered on the basis of measurements of mated test fixtures (i.e., practically implemented) given in http://www.ieee802.org/3/bj/public/jan14/diminico_3bj_01a_0114.pdf.

Tightening of the compliance board mixed mode specification requires changes to other specifications.

Cl **93** *SC* **93.8.3** *P* **231** *L* **34** # r01-44

Dawe, Piers J G — Mellanox Technologie

Comment Type **T** *Comment Status* **R** *host jitter*

The limit for effective total uncorrelated jitter, peak-to-peak is the same 0.18 UI here at TP2 as it is in Table 93-4 At TP0a. As the host channel and connector must add some Gaussian jitter, this seems inconsistent.

SuggestedRemedy

Tweak one of the limits to make room for host channel and connector.

Response *Response Status* **C**

REJECT.

The response to r01-57 points out that the test conditions generate correlated crosstalk that will not appear in the uncorrelated jitter measurement. No relaxation of the jitter specification is necessary.

Cl **93A** *SC* **93A.4** *P* **410** *L* **26** # r01-45

Dawe, Piers J G — Mellanox Technologie

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

Why fn? I believe in 40 and 100G Ethernet we have tried to use i as the index. N might be the number of points.

SuggestedRemedy

Change fn to fi (7 places) and n to i under the big sigma.

Response *Response Status* **C**

REJECT.

Lower case "n" is the index to a particular frequency value and upper case "N" is the number of values. This convention is used in a number of places throughout the draft.

Cl **93A** *SC* **93A.4** *P* **410** *L* **26** # r01-46

Dawe, Piers J G — Mellanox Technologie

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

Isn't ILD done in dB space not raw response?

SuggestedRemedy

10^(ILD(fn)/10) should be ILD(fn)^2, I think.

Response *Response Status* **C**

ACCEPT.

See r01-25.

Cl **93A** *SC* **93A.4** *P* **410** *L* **26** # r01-47

Dawe, Piers J G — Mellanox Technologie

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

The ILDrms formula needs a denominator.

SuggestedRemedy

Within the square root, divide by sum(W).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See r01-25. The denominator is chosen to be N to match the definition of a similar term in the Optical Internetworking Forum implementation agreement OIF-CEI-3.1.

The response to r01-56 designates this term as a "figure of merit for a channel that is based on ILD(f)" and names it "FOM_ILD" to distinguish it from the standard deviation.

See http://www.ieee802.org/3/bj/public/mar14/healey_3bj_02_0314.pdf.

Cl **92** *SC* **92.7.12** *P* **197** *L* **23** # r01-48

Dudek, Michael QLogic Corporation

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

It is extremely difficult to understand what is intended here due to poor sentence structure etc. The intent of this comment is not to technically change what is in the draft, but I may have mis-understood the original intent, however the different wording in clause 94 helps.

SuggestedRemedy

Either A - Change the beginning of the section to. "The coefficient update process shall be as specified in 72.6.10.2.5 with the following additional requirements. i) The time to complete the process is 50ms from the beginning of training (as demarcated by the entry to the AN_GOOD_CHECK state in Figure 73-11).
ii) . The period from receiving a new request to responding to that request shall be less than 2ms, where the start of the period is the frame marker of the training frame with the new request and the end of the period is the frame marker of the training frame with the corresponding reponse. A new request occurs when the coefficient update field is different from the coefficient filed in the preceding frame. The response occurs when the coefficient status report field is updated to indicate the corresponding action is complete."
or B - if the intent is that the requirement to respond only starts 50ms after the start of training then delete "In addition to the coefficient update process specified in 72.6.10.25" as it is covered by the first sentence in the section.
Make the same change to 93.7.12 on page 247, and 94.3.10.7.5 on page 340.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See comment r01-23.

Cl **92** *SC* **92.8.3.2** *P* **200** *L* **36** # r01-49

Dudek, Michael QLogic Corporation

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

With an ASIC that just passes the return loss for TP0a/TP5a and a worst case compliance board it is not possible to pass the host return loss specifications. The return loss of the host being used to test the cables in the COM calculation is worse than the effective host return loss so relaxing this specification will not cause a system issue. A presentation will describe this.

SuggestedRemedy

Change the equation 92-1 to 8.5-0.35*f from 0.01 to 8GHZ, and 3.9-7.4*log(f/14) from 8 to 19GHz. Make the same changes to equation 92-22. Make corresponding changes to figure 92-5.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

The original analysis and proposal are provided here…
http://www.ieee802.org/3/bj/public/mar14/dudek_3bj_01_0314.pdf

The final proposal is here…
http://www.ieee802.org/3/bj/public/mar14/dudek_3bj_02_0314.pdf
A graph of the response is shown on slide 14.

Change equations 92-1 and 92-22 to the following:
9.5 - 0.37*f 0.01 ≤ f < 8 GHz
4.75-7.4*LOG10(f/14) 8 ≤ f ≤ 19 GHz

Update the corresponding figures.

Cl **93A** *SC* **93A.1.2.3** *P* **347** *L* **7** # r01-50

Dudek, Michael QLogic Corporation

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

To match the description of the transmission line given on line 32, (and to match the accepted comment i-172), the value of p1 in table 93A-3 needs to be negative not positive.

SuggestedRemedy

Change the value of p1 from "0.106" to "-0.106".

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

The response to comment r01-27 removes the parameter rho_1.

Cl **92** *SC* **92.8.3** *P* **199** *L* **17** # r01-51

Dudek, Michael QLogic Corporation

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

With the specification of Signal-to-noise-and-distortion and the use of this specification in COM to qualify the cables it is no longer necessary to have the far end noise specifications for the Tx.

SuggestedRemedy

Delete the Far-end noise rows and also section 92.8.3.5

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Remove 92.8.3.5.

Remove row with far end transmit output noise parameters in Table 92-6.

Also, remove the related PICS TC23 and TC24.

Cl **92** *SC* **92.8.4.4.3** *P* **211** *L* **5** # r01-52

Dudek, Michael QLogic Corporation

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

Erroneous sentence. The disturbers are to be set to a given amplitude. There can't be 3dB difference between them.

SuggestedRemedy

Delete the sentence "The amplitudes of each of the disturbers should not deviate more than 3dB from the mean of the disturber amplitudes."

Response *Response Status* **C**

ACCEPT.

Cl **92** *SC* **92.10.2** *P* **213** *L* **14** # r01-53

Dudek, Michael QLogic Corporation

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

With the use of COM to specify cables and calibrate the interference tolerance test MDNEXT, MCFEXT, and ICN are only used for the test fixture specifications Note there are no longer any specification numbers for these parameters for the cable.

SuggestedRemedy

Delete the MDNEXT and MDFEXT rows in Table 92-10. Relabel sections 92.10.8, 92.10.9, and 92.9.10 replacing "cable Assembly" with "Test Fixture" and moving them to the end of section 92.11.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Use suggested remedy with editorial license to implement.

Cl **94** *SC* **94.3.12.7** *P* **309** *L* **26** # r01-54

Dudek, Michael QLogic Corporation

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

There is a disconect between the allowed SNDR here and the equivalent TxSNR in the COM code because TxSNR in the COM code is relative to the 1/3 eye height whereas SNDR is related to the full amplitude.

SuggestedRemedy

Change the TX SNDR requirement from 27dB to 36.54dB (or change the meaning of TxSNR in the COM code).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot.

See response to comment r01-28

Cl **93A** *SC* **93A.4** *P* **355** *L* **24** # r01-55

Dudek, Michael — QLogic Corporation

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

The definition for ILDrms here is different from the definition in OIF CEI 3.1, and has multiple issues (eg. The result depends on the number of samples and it will be a large number because 10^(0) is 1.)

SuggestedRemedy

Change the definition to match that in OIF CEI 3.1. That definition has been provided to the editors. It is square root sum((W(fn)*(ILD(f))^2/N)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See r01-25.

Cl **93A** *SC* **93A.4** *P* **355** *L* **19** # r01-56

Dudek, Michael — QLogic Corporation

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

ILDrms isn't technically the RMS of the insertion loss deviation. It is the weighted RMS insertion loss deviation

SuggestedRemedy

Change "The RMS insertion" to "The weighted RMS insertion"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change "The RMS insertion loss deviation ILD_RMS is a figure of merit for a channel that is calculated using Equation (93A-54)."

to:
"A figure of merit for a channel that is based on ILD(f) is given by Equation (93A-54)."

In Equation (93A-54), change "ILD_RMS" to "FOM_ILD".

See http://www.ieee802.org/3/bj/public/mar14/healey_3bj_02_0314.pdf.

Cl **92** *SC* **92.8.3.9.2** *P* **230** *L* **43** # r01-57

Healey, Adam — LSI Corporation

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

This comment is submitted on behalf of Vinu Arumugham.
Noise from switching aggressors need to be included.

SuggestedRemedy

All aggressor lane transmitters shall be transmitting PRBS31 pattern with amplitude set to maximum value.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The pattern configuration variables and corresponding MDIO configuration bits do not allow a PRBS31 pattern on some lanes and PRBS9 on other.

The state of the aggressor transmitters is not explicitly specified for SNDR and jitter. The intent was that all PMD lanes were enabled and transmitting the same pattern.

For both measurements, the text needs to specify the following conditions:
(a) enable transmitter on all PMD lanes,
(b) set pattern to be the same on all PMD lanes, and
© set the transmitter coefficients to same values on all PMD lanes.

The effect of intra-link crosstalk (as opposed to alien crosstalk) will not appear in the jitter and the SNDR noise term (sigma_n) since crosstalk is coherent with the victim signal. The crosstalk effect will appear in the SNDR linear fit error term (sigma_e). It is understood that there is a small possibility if conditions align (e.g., the aggressor and victim signal are aligned within N_P UI) that the linear fit process may reduce the impact of the crosstalk for a particular measurement.

In 92.8.3.8 "Transmitter output noise and distortion":
Change the first paragraph from:
"Signal-to-noise-and-distortion ratio (SNDR) is measured at the transmitter output using the following method":
To:
"Signal-to-noise-and-distortion ratio (SNDR) is measured at the transmitter output using the following method, with transmitters on all PMD lanes enabled and transmitting the same pattern with identical transmit equalizer settings."

In 92.8.3.9 "Transmitter output jitter":
Add a new paragraph after the second paragraph:
"Jitter measurements are performed with transmitters on all PMD lanes enabled and transmitting the same pattern with identical transmit equalizer settings."

In 94.3.12.7 "Transmitter output noise and distortion":
Change the first paragraph from:
"Signal-to-noise-and-distortion ratio (SNDR) is measured at the transmitter output using the

following method"
To:
"Signal-to-noise-and-distortion ratio (SNDR) is measured at the transmitter output using the following method, with transmitters on all PMD lanes enabled and transmitting the same pattern with identical transmit equalizer settings."

In 94.3.12.6 "Transmitter output jitter":
Insert the following text before 94.3.12.6.1:
"Jitter measurements in this subclause are performed with transmitters on all PMD lanes enabled and transmitting the same pattern with identical transmit equalizer settings."

Cl **92** *SC* **92.8.4.5** *P* **236** *L* **45** # r01-58

Healey, Adam LSI Corporation

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

This comment is submitted on behalf of Vinu Arumugham.
The jitter tolerance test is not stressful enough and the SJ spec. is not aligned to Clause

SuggestedRemedy

The test procedure is as described in 92.8.4.4.5 except that during the test the pattern generator sinusoidal jitter frequency and peak-to-peak amplitude are as specified in Table 88-13. In addition, the pattern generator is set to generate 0.05UI BUJ.

Response *Response Status* **C**

REJECT.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot.

The purpose of the receiver jitter tolerance test is to verify the receiver's ability to track low-frequency jitter consistent with the transmitter jitter filter defined in 92.8.3.9. It is not intended to be a comprehensive stress test.

Table 92-9 specifies the jitter tolerance to be 1 UI peak-to-peak at 940 kHz and 5 UI peak-to-peak at 190 kHz. Table 88-13 specifies the jitter tolerance to be 5E5/f UI peak-to-peak for f = 1E5 to 1E7 Hz. This translates to [approximately] 0.53 UI peak-to-peak at 940 kHz and 2.6 UI peak-to-peak at 190 kHz. Table 92-9 requires twice the jitter tolerance at these specific frequency points and in that respect is more stressful.

In addition, the commenter has not provided justification why the requirements for a copper cable PHY should be consistent with the requirements for a PHY that supports up to 10 and 40 km over single-mode fiber.

Cl **93** *SC* **93.8.2.4** *P* **236** *L* **45** # r01-59

Healey, Adam LSI Corporation

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

This comment is submitted on behalf of Vinu Arumugham.
The jitter tolerance test is not stressful enough and the SJ spec. is not aligned to Clause

SuggestedRemedy

Receiver jitter tolerance is verified for jitter frequency and peak-to-peak amplitude values specified in Table 88-13.

Response *Response Status* **C**

REJECT.

The comment is not against a changed portion of the draft, a portion of the draft affected by changes, or a portion of the draft that is the subject of unresolved comments associated with "Disapprove" votes. It is out of the scope of the recirculation ballot.

The purpose of the receiver jitter tolerance test is to verify the receiver's ability to track low-frequency jitter consistent with the transmitter jitter filter defined in 93.8.1.7. It is not intended to be a comprehensive stress test.

Table 93-7 specifies the jitter tolerance to be 1 UI peak-to-peak at 940 kHz and 5 UI peak-to-peak at 190 kHz. Table 88-13 specifies the jitter tolerance to be 5E5/f UI peak-to-peak for f = 1E5 to 1E7 Hz. This translates to [approximately] 0.53 UI peak-to-peak at 940 kHz and 2.6 UI peak-to-peak at 190 kHz. Table 93-7 requires twice the jitter tolerance at these specific frequency points and in that respect is more stressful.

In addition, the commenter has not provided justification why the requirements for a backplane PHY should be consistent with the requirements for a PHY that supports up to 10 and 40 km over single-mode fiber.

Cl **00** *SC* **0** *P* **0** *L* **0** # r01-60

Healey, Adam LSI Corporation

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

This comment is submitted on behalf of Michelle Turner, Managing Editor, Technical Community Content Publishing IEEE Standards Association.
This draft meets all editorial requirements

SuggestedRemedy

Response *Response Status* **C**

ACCEPT.

Thank you.

Cl **80** *SC* **80.3.3.7** *P* **117** *L* **3** # r01-61

Healey, Adam LSI Corporation

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

The primitive IS_ENERGY_DETECT.indicate should be IS_ENERGY_DETECT.indication. Also, in 83A.3.2a, the primitive PMA:IS_UNITDATA_i.indicate should be PMA:IS_UNITDATA_i.indication (2 instances).

SuggestedRemedy

Correct the primitive names as stated in the comment.

Response *Response Status* **C**

ACCEPT.

Cl **93A** *SC* **93A.1** *P* **398** *L* **52** # r01-62

Healey, Adam LSI Corporation

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

Merge this sentence with the preceding paragraph.

SuggestedRemedy

Delete the sentence "The Physical Layer specifications that employ this method are listed in Table 93A-2."
Change the last sentence of the preceding paragraph to "The values assigned to these parameters are defined by the Physical Layer specification that invokes the method (see Table 93A-2)."

Response *Response Status* **C**

ACCEPT.