Cl **00** *SC* *P* *L* # 12

Bob Grow RMG Consulting

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

Use of acronyms not in 1.5. FW is broadly used in this document, though primarily as part of variable names it is also used as an acronym. DLL is also used in variable names and in clause 30 and 78 text. TLV is in the definitions in 802.3-2012, but it isn?t listed in the acronyms.

SuggestedRemedy

Add to 1.5:
DLL data link layer
FW fast wake
TLV type, length, value

Proposed Response *Response Status* **O**

Cl **00** *SC* **0** *P* *L* # 42

Anslow, Pete Ciena

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

Clauses 92, 93 and 94 all contain a sentence similar to:
"For a complete Physical Layer, this specification is considered to be satisfied by a frame error ratio less than 1.7 × 10^–10 for 64-octet frames with minimum inter-packet gap."

However, this text does not say where in the stack this FER is applied. A common place to do this would be the MAC/PLS service interface, but that is not appropriate as an FER of 1.7E-10 at that point would lead to unacceptable MTTFPA. Most of the errored frames are expected to be marked as bad by the FEC and dropped by the PCS.

Wording that is being proposed in P802.3bm is equivalent to:
"frame error ratio less than 1.7 × 10^–10 at the FEC service interface for 64-octet frames with minimum inter-packet gap when processed according to Clause 91."

SuggestedRemedy

Define the interface that the FER applies to in Clauses 92, 93, and 94 as this cannot be the MAC/PLS service interface due to this causing an unacceptable MTTFPA.

Proposed Response *Response Status* **O**

Cl **00** *SC* **0** *P* *L* # 34

Anslow, Pete Ciena

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

Despite comment 39 against D1.3, not all insert editing instructions say where the insertion should be made.

SuggestedRemedy

Page 60, line 6 change "Insert item LE8a" to "Insert item LE8a after item LE8"
Page 70, line 32 change "Insert 78.5.2" to "Insert 78.5.2 after 78.5.1"
Page 72, line 7 change "Insert a row and change the reserved row of Table 79-1 as shown:" to "Change the reserved row of Table 79-1 and insert a new row above it as shown:"
Page 97, line 7 change "Insert the following row into table 81.4.2.3:" to "Insert the following row at the end of the table in 81.4.2.3:"
Page 118, line 4 change "Insert the following row into table 82.7.3:" to "Insert the following row at the end of the table in 82.7.3:"
Page 121, line 19 change "Insert rows to Table 83-2 ..." to "Insert rows at the end of Table 83-2 ..."
Page 121, line 33 change "Insert rows to Table 83-3 ..." to "Insert rows at the end of Table 83-3 ..."
Page 122, line 4 change "...and insert the LPI row into table 82.7.3:" to "...and insert the *LPI row at the end of the table in 83.7.3:" (note the correction to the subclause number)
Page 123, line 7 change "Insert a row in Table 84-1 for EEE:" to "Insert a row at the end of Table 84-1 for EEE:"
Page 126, line 5 change "Insert the following row into table 84.11.3:" to "Insert the following row at the end of the table in 84.11.3:
Page 126, line 20 change "Insert the following rows into table 84.11.4.1:" to "Insert the following rows at the end of the table in 84.11.4.1:"
Page 126, line 36 change "Insert the following rows into table 84.11.4.3:" to "Insert the following rows at the end of the table in 84.11.4.3:"
Page 127, line 7 change "Insert a row in Table 85-1 for EEE:" to "Insert a row at the end of Table 85-1 for EEE:"
Page 129, line 6 change "Insert the following row in Table 85-5 in 85.8.3:" to "Insert the following row immediately above the row for Amplitude peak-to-peak (max) in Table 85-5:"
Page 130, line 5 change "Insert the following row into table 85.13.3:" to "Insert the following row at the end of the table in 85.13.3:"
Page 130, line 19 change "Insert the following rows into table 85.13.4.1:" to "Insert the following rows at the end of the table in 85.13.4.1:"
Page 130, line 36 change "Insert the following rows into table 85.13.4.3:" to "Insert the following rows at the end of the table in 85.13.4.3:"
Page 302, line 5 change "Insert the following row into table 83A.7.3:" to "Insert the following row at the end of the table in 83A.7.3:"
Page 302, line 17 change "Insert rows in 83A.7.4:" to "Insert rows at the end of the table in 83A.7.4:"
Page 302, line 31 change "Insert rows in 83A.7.5:" to "Insert rows at the end of the table in 83A.7.5:"

Proposed Response *Response Status* **O**

Cl **00** *SC* **0** *P* **1** *L* **1** # 239

Dawe, Piers — IPtronics

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

It's time for the project to move to the next stage. Now that we have a near-complete proposal based on viewgraphs and simulations, it needs to be validated as a specification based on reality. Here's an example from P802.3ae:
To demonstrate a BER of 10^-12 over the rated distance; shown to be interoperable between PMD of at least two vendors for each PMD type.
Path to full compliance is explained credibly.

Other bodies such as OIF and InfiniBand report on test fests or interoperability demonstrations. I don't believe 802.3 needs to organise such events if vendors will show off their products anyway.
Also, there has been very little reported on 100GBASE-CR4 to the current draft, even in simulation.

SuggestedRemedy

Assess the 100GBASE-CR4 draft by simulation.
For each PHY type, before starting Sponsor Ballot, demonstrate the specified error performance over the worst specified channels with interoperation between PHYs of at least two vendors for each PHY type. Explain credibly the path to full compliance.

Proposed Response *Response Status* **O**

Cl **01** *SC* **1.4.50a** *P* **22** *L* **5** # 36

Anslow, Pete — Ciena

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

The draft P802.3bk amendment (currently in Sponsor Ballot) has deleted subclause 1.4.27, which has the effect of renumbering all of the subsequent subclauses. Assuming that the P802.3bk draft is approved before P802.3bj, this will have to be accounted for.

SuggestedRemedy

Change the numbering of the inserted subclauses accordingly.
Change the editing instructions to include the renumbering information, e.g. the first editing instruction would become:
"Insert the following definition after 1.4.49 (10GBASE-X renumbered from 1.4.50 by the deletion of 1.4.27 by IEEE Std P802.3bk-201x) as follows:"

Proposed Response *Response Status* **O**

Cl **01** *SC* **1.4.50a** *P* **22** *L* **8** # 178

Booth, Brad — Dell

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

There is only one 100GBASE-P port type in the document; therefore, it can be covered by the 100GBASE-KP4 definition. There isn't a new sublayer (other than the PMD) so this really isn't needed.

SuggestedRemedy

Delete definition.

Proposed Response *Response Status* **O**

Cl **01** *SC* **1.4.51a** *P* **22** *L* **14** # 179

Booth, Brad — Dell

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

Definition contains more information than is required. The clause specifies what is required and the reach capabilities.

SuggestedRemedy

Change to read:
IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding over four lanes of shielded balanced copper cabling. (See IEEE Std 802.3, Clause 92.)

Proposed Response *Response Status* **O**

Cl **01** *SC* **1.4.53a** *P* **22** *L* **20** # 180

Booth, Brad — Dell

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

Definition contains more information than required.

SuggestedRemedy

Change to read:
IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding and 4-level pulse amplitude modulation over four lanes of an electrical backplane. (See IEEE Std 802.3, Clause 94.)

Proposed Response *Response Status* **O**

Cl **01** *SC* **1.4.53b** *P* **22** *L* **24** # 181

Booth, Brad — Dell

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

Definition contains more information than required.

SuggestedRemedy

Change to read:
IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding and 2-level pulse amplitude modulation over four lanes of an electrical backplane. (See IEEE Std 802.3, Clause 93.)

Proposed Response *Response Status* **O**

Cl **30** *SC* **30.3.2.1.2** *P* **23** *L* **46** # 120

Slavick, Jeff — Avago Technologies

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

Removing the 64B/66B from the 100GBASE-* definintions removes information about the encoding of the PCS lanes that is present for all others in the list.

SuggestedRemedy

Have the text read:
100GBASE-R Clause 82 100 Gb/s multi-PCS lane 64B/66B using 2-level PAM
100GBASE-P Clause 82 100 Gb/s multi-PCS lane 64B/66B using > 2-level PAM

Make same change in 30.3.2.1.3

Proposed Response *Response Status* **W**

<Editor changed subclause from 3.2.1.2 to 30.3.2.1.2.>

Cl **30** *SC* **30.3.2.1.3** *P* **23** *L* **46** # 7

Bob Grow — RMG Consulting

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

Formatting does not match 802.3-2012.

SuggestedRemedy

Match formatting (More white space on left, no visible tab between the PCS type listed).
Same problem p.34, l.2

Proposed Response *Response Status* **O**

Cl **30** *SC* **30.5.1.1.11** *P* **00** *L* **0** # 137

Slavick, Jeff — Avago Technologies

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

Clause 91 also optinally provides BIP counters.

SuggestedRemedy

Added the list of BIP error counters to include 45.2.1.92h and change "MDIO Interface to the PCS" to "MDIO Interface to the PHY"

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.1.1.11 to 30.5.1.1.11.>

Cl **30** *SC* **30.5.1.1.11** *P* **00** *L* **0** # 121

Slavick, Jeff — Avago Technologies

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

aBIPErrorCount states "For 40/100GBASE-R PHYs, an array of BIP error counters." We have added the definintion for 100GBASE-P PHYs as well.

SuggestedRemedy

Add 100GBASE-P as a valid PHY type for providing this field.
Make the same change to 30.5.1.1.2

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.1.1.11 to 30.5.1.1.11.>

Cl **30** *SC* **30.5.1.1.12** *P* **00** *L* **0** # 122

Slavick, Jeff — Avago Technologies

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

aLaneMapping needs to include the clause 91 MDIO registers

SuggestedRemedy

Added the list of Lane mapping registers to include 45.2.1.92j and change "MDIO Interface to the PCS" to "MDIO Interface to the PHY"

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.1.1.12 to 30.5.1.1.12.>

Cl **30** *SC* **30.5.1.1.15** *P* **24** *L* **44** # 132

Slavick, Jeff — Avago Technologies

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

Clause 91 defines the mandatory RS-FEC

SuggestedRemedy

Change "Clause 91 mandatory FEC" to "Clause 91 mandatory RS-FEC"

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.1.1.15 to 30.5.1.1.15.>

Cl **30** *SC* **30.5.1.1.15** *P* **24** *L* **46** # 216

Law, David — HP

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

The optional MDIO Interface is defined for individual MDIO Manageable Devices (see subclause 45.2) such as PCS and PMA/PMD. As such there is no requirement to support the MDIO Interface defined for a PHY and it is permissible to have an implementation that support the optional Clause 45 MDIO Interface to a subset of MMDs within a PHY. Based on this I don't think a MIB attribute can have text that is predicated on 'Clause 45 MDIO Interface to the PHY is present'. If the MDIO Interface is present on the PCS MMD then this mapping is true.

SuggestedRemedy

Suggest that the text ' If a Clause 45 MDIO Interface to the PHY is present ..' be restored to read 'If a Clause 45 MDIO Interface to the PCS is present ..' here and in elsewhere in the Clause 30 changes.

Proposed Response *Response Status* **O**

Cl **30** *SC* **30.5.1.1.16** *P* **25** *L* **13** # 123

Slavick, Jeff — Avago Technologies

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

We do have the ability to disable the RS-FEC correction capability by setting 1.200.0 to a 1. It's status should read through aFECmode.

SuggestedRemedy

Change: "When Clause 73 Auto-Negotiation is enabled for a PHY supporting Clause 74 FEC a SET operation is not allowed and a GET operation maps to the variable FEC_enabled in Clause 74."
to:
"When Clause 73 Auto-Negotiation is enabled for a PHY supporting Clause 74 FEC or Clause 91 RS-FEC a SET operation is not allowed and a GET operation maps to the variable FEC_enabled in Clause 74 or the inverse of FEC_bypass_correction_enable in Clause 91."

and add 45.2.1.92a to the list of MDIO registers accessed.

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.1.1.16 to 30.5.1.1.16.>

Cl **30** *SC* **30.5.1.1.2** *P* **24** *L* **11** # 8

Bob Grow — RMG Consulting

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

Formatting problem here (and in 802.3-2012). It appears in the 2012 merge some insertions have the enumeration outdented as is the case for each enumeration here.

SuggestedRemedy

Remove outdents per 802.3-2008 enumerations.

Proposed Response *Response Status* **O**

Cl **30** *SC* **30.5.1.1.2** *P* **24** *L* **11** # 215

Law, David HP

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

The existing enumeration '100GBASE-R' is to support the case of a pluggable PMDs port where no PMD is plugged in, or where the PMD is plugged in but does not support optional management. In these cases all that can be reported in the PCS type. As such the enumeration '100GBASE-R' can't be defined in reference to the PMD type, if the PMD type is known the correct enumeration such as '100GBASE-KR4' has to be returned, and the 100GBASE-P enumeration can't be added, again if the PMD type is known '100GBASE-KP4' has to be returned. All that can be returned when the PMD type is not known is '100GBASE-R'. This is another issue caused by the trying to encode both the PCS and PMD modulation in the letter 'P' and redefining the letter 'R' to also include modulation.

SuggestedRemedy

Suggest that:

[1] The enumeration '100GBASE-R' be restored to read 'Multi-lane PCS as specified in Clause 82 over undefined PMA/PMD'.
[2] The enumeration '100GBASE-P' be deleted.
[3] Change the text '.. 40GBASE-R, 100GBASE-R, and 100GBASE-P shall only be returned if the underlying PMD type is unknown.' to read '.. 40GBASE-R, and 100GBASE-R shall only be returned if the underlying PMD type is unknown.'.

Proposed Response *Response Status* **O**

Cl **30** *SC* **30.5.1.1.2** *P* **24** *L* **14** # 16

Hajduczenia, Marek ZTE Corporation

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

There are three new added copper PHY types, i.e., 100GBASE-KP4, 100GBASE-KR4, and 100GBASE-CR4. Now they are defined in order of Clause 94, 93, and 92.

SuggestedRemedy

Change the order of PHY names to follow Clause order, i.e. 100GBASE-CR4, 100GBASE-KR4, and 100GBASE-KP4. Once done, the order will correspond closely to the order of PHY types included in 30.6.1.1.5
Similar change would be suggested in Table 73-4 to keep it consistent with teh listing of individual PHYs and order of their Clauses. Similar change in the listing order in 73.10.7.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.12** *P* **34** *L* **5** # 17

Hajduczenia, Marek ZTE Corporation

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

"Insert the following rows into Table 45–15in place of the row currently reserved:"
Original Table 45-15 in 802.3-2012 contains two rows with reserved values. Please indicate clearly which one of these is being replaced.

SuggestedRemedy

Suggest to change the editing instruction to read: "Insert the following rows into Table 45–15 in place of the reserved row for bits 1.13.14:12:"

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.6** *P* **32** *L* **1** # 29

Hajduczenia, Marek ZTE Corporation

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

P802.3bk introduced new register settings as well, namely:
0 1 1 1 1 1 = 10/1GBASE-PRX-U4
0 1 1 1 1 0 = 10GBASE-PR-U4
0 1 1 1 0 1 = 10/1GBASE-PRX-D4
0 1 1 1 0 0 = 10GBASE-PR-D4
and the reserved range
0 1 1 1 x x = reserved
is now gone.

SuggestedRemedy

No action is needed in the draft, just making sure that thsi range is not used in 802.3bj for any purpose.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.6.a** *P* **31** *L* **28** # 49

Anslow, Pete — Ciena

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

The form of: "If the PMA does not support EEE capability or is not able to stop the ingress direction AUI signaling (see 1.1.9) ..." would indicate a reference to subclause 1.1.9, but this is bit 1.1.9 in 45.2.1.2.a.

Similar issue in 45.2.1.6.b

SuggestedRemedy

Change "see 1.1.9" to "see 45.2.1.2.a"
In 45.2.1.6.b, change "see 1.1.8" to "see 45.2.1.2.b"
Make both cross-references links.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.80** *P* **34** *L* **47** # 18

Hajduczenia, Marek — ZTE Corporation

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

Missing comma before the newly added 'or'

SuggestedRemedy

Is "in Clause 72, Clause 84, Clause 85, Clause 92, Clause 93 or Clause 94." and should be "in Clause 72, Clause 84, Clause 85, Clause 92, Clause 93, or Clause 94."
Similar issue in newly added text in 45.2.1.81, 45.2.1.82, 45.2.1.83, and 45.2.1.84.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.92a** *P* **37** *L* **19** # 30

Hajduczenia, Marek — ZTE Corporation

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

I think it would be better if we explictly said what is being detected and corrected. I assume it is errors we are really referencing.

SuggestedRemedy

Modify description for register 1.200.0 as follows:

1 = FEC decoder performs error detection without error correction
0 = FEC decoder performs error detection and error correction

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.92a** *P* **37** *L* **8** # 54

Anslow, Pete — Ciena

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

Table 45–72c seems to be the first table that has been inserted after Table 45-72

SuggestedRemedy

Renumber Tables 45-72c through 45-72j to be Tables 45-72a through 45-72h

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.92a.1** *P* **37** *L* **26** # 31

Hajduczenia, Marek — ZTE Corporation

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

"When this variable is set to one ..." - but it is a bit in the register we are talkign about.

SuggestedRemedy

Make sure descriptions of all modified registers use the same terminology i.e., "When this bit is set to one/zero ... "
Changes are needed in (at least) 45.2.1.92a.1, 45.2.1.92b.1, 45.2.1.92b.2

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.92a.2** *P* **37** *L* **34** # 19

Hajduczenia, Marek — ZTE Corporation

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

"When written as a one, this bit enables bypass of the error indication. When written as zero, errors are indicated to the PCS through the sync bits." - we typically speak of setting a bit to one/zero
There are also inconsistencies with the use of "a" before the bit value (zero/one).

SuggestedRemedy

Change the text to read:
"When set to a one, this bit enables bypass of the error indication. When set to a zero, errors are indicated to the PCS through the sync bits."

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.92b** *P* **37** *L* **48** # 1

Barrass, Hugh Cisco

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

There is a need for an align status bit in the Tx direction (so that it can validate 45.2.1.92j RS-FEC PCS lane 0 mapping register - Register 1.250).

SuggestedRemedy

Add Register bit 15, PCS_align_status

Definition:

When read as a one, bit 1.201.15 indicates that the RS-FEC described in Clause 91 has locked and aligned all transmit PCS lanes. When read as a zero, bit 1.201.15 indicates that the RS-FEC has not locked and aligned all transmit PCS lanes.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.92b** *P* **37** *L* **50** # 20

Hajduczenia, Marek ZTE Corporation

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

Inconsistent terminology in Table 45–72d. If for bit 1.201.1 we describe the value of 1 as "FEC decoder has ability to bypass error indication", it is only expected that for the value of 0 the description will read "FEC decoder does not have the ability to bypass error indication" Simialr issue for bit 1.201.2

SuggestedRemedy

Change description for bit 1.201.1 to read:
1 = FEC decoder has the ability to bypass error indication
0 = FEC decoder does not have the ability to bypass error indication
Change description for bit 1.202.2 to read:
1 = FEC decoder has the ability to bypass error correction
0 = FEC decoder does not have the ability to bypass error correction

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.92b.2** *P* **38** *L* **11** # 208

Law, David HP

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

typo.

SuggestedRemedy

Suggets that 'FEC bypass correction ability (1.201.1)' should read 'FEC bypass indication ability (1.201.1)'.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.92b.2** *P* **38** *L* **11** # 40

Anslow, Pete Ciena

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

The title of 45.2.1.92b.2 should be "FEC bypass indication ability (1.201.1)

SuggestedRemedy

Change the title from:
"FEC bypass correction ability (1.201.1)" to:
"FEC bypass indication ability (1.201.1)"

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.92e** *P* **39** *L* **31** # 46

Anslow, Pete Ciena

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

In Table 45-72g, the row for 1.206.15 has "RS_FEC" rather than "RS-FEC"

SuggestedRemedy

Change "RS_FEC" to "RS-FEC"

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.92j** *P* **40** *L* **53** # 2

Barrass, Hugh Cisco

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

Assuming that an align status bit is defined for all PCS lanes, this subclause needs to be changed to reflect that.

SuggestedRemedy

Change:

The contents of the Lane 0 mapping register is valid when the transmit PCS lane alignment status bit (register 1.201.15) is set to one and is invalid otherwise (see 45.2.1.92b).

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.92j** *P* **41** *L* **5** # 9

Bob Grow RMG Consulting

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

We have not done a good job on Reserved bits/registers. This draft includes two of the four Descriptions we have in 802.3-2012. These two reflect the two different perspectives: the implementation of the bits/registers and management (perhaps remotely) looking at the bits/registers.

For the implementation, ?Value always 0, writes ignored is acceptable?. The ?Ignore on read? is the management perspective. We are specifying the implementation (per the PICS), so the former Description should be used.

(Per the PICS, an implementation is to return a 0 (better then always 0) and not be affected by (ignore) a write. What we do not state is that management should ignore reserved bits on read and write reserved bits as 0.)

SuggestedRemedy

Replace multiple occurrences of ?Ignore on read? with ?Value always 0, writes ignored?.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.9** *P* **43** *L* **3** # 21

Hajduczenia, Marek ZTE Corporation

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

Editorial instruction is unclear as to what happens with bits 3.20.6 through 3.20.1, which are not shown right now in thsi table

SuggestedRemedy

Either explicitly show bits 3.20.6 through 3.20.1 as not changed from base standard, or modify the editorial instructions to indicate clearly what is being done, i.e.:
- replacing the reserved row for bits 3.20.15:7 as shown in the table
- replace the reserver row for bit 3.20.0 as shwon in the table

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.9.7** *P* **44** *L* **19** # 110

Trowbridge, Steve Alcatel-Lucent

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

The sense of the variable seems reversed: every PHY >=40 Gb/s that supports EEE supports Fast Wake. Not every PHY >=40 Gb/s that supports EEE supports deep sleep.

SuggestedRemedy

Consider renaming the variable from LPI_FW to LPI_DS. Additional changes in clause 82 if this change is accepted.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.9.a** *P* **43** *L* **40** # 22

Hajduczenia, Marek ZTE Corporation

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

"If the device only supports fast wake for LPI operation as defined in 78.5, this bit shall be set to one. If the device supports both fast wake and deep sleep for LPI operation, this bit shall be set to zero."
In other subclauses describing the setting for bits, you use "a one" and "a zero" It should be consistent in here as well

SuggestedRemedy

Either insert article "a" every time you call "one" or "zero" in this set of registers, ot remove them elsewhere where they are already used in this draft. Right now it is very inconsistent and highly arbitrary (at least that is the way it seems).

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.9.b** *P* **43** *L* **47** # 32

Hajduczenia, Marek ZTE Corporation

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

Is there any way for 100GBASE-CR4 and 100GBASE-KR4 not support EEE? Similar question for 100GBASE-KP4, 100GBASE-CR10, 40GBASE-CR4, and 40GBASE-KR4, where you only describe the value of "1" (supported). However, the associated table Table 45–105 provides also indication that the given bit may be set to "0", which is not covered in the text.

SuggestedRemedy

Add description of the value "0" for all subclauses associated with Table 45-105

Proposed Response *Response Status* **O**

Cl **69** *SC* **69.1.1** *P* **51** *L* **12** # 195

D'Ambrosia, John Dell

Comment Type **ER** *Comment Status* **X**

Inconsistency in manner in which PHYs are described. In addition, the description of 100GBASE-KP4 is inconsistent with the definition of 1.4 that implies that 100GBASE-P is another family of devices (which uses a 100GBASE-R encoding, but does not state it is a member of the 100GBASE-R family)

SuggestedRemedy

1. add "operates over 4 lanes" to the description of the 100GBASE-R / 100GBASE-P family.
2. Replace definition of 100GBASE-P in 1.4 to:

An IEEE 802.3 family of Physical Layer devices that is a subset of the 100GBASE-R family of devices that uses 100GBASE-R encoding in combination with a physical medium dependent sublayer that employs pulse amplitude modulation with more than 2 levels for 100 Gb/s operation. (See IEEE Std 802.3 Clause 94.)

Proposed Response *Response Status* **O**

Cl **69** *SC* **69.1.2** *P* **51** *L* **17** # 173

Booth, Brad Dell

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

Amendments generally are intended to "do no harm" to previous work that has been documented. Completely eliminating the objectives and converting them to BER objectives is breaking the "do no harm" rule. The previous objectives should not be stricken, especially considering that 802.3-2012 was just ratified and published.

SuggestedRemedy

If the task force does not agree with the objectives in 802.3-2012, then they should provide a means to differentiate the objectives based on data rate or some other means.

Proposed Response *Response Status* **O**

Cl **69** *SC* **69.1.3** *P* **53** *L* **39** # 43

Anslow, Pete Ciena

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

The editing instruction says "Change item f)".
The entirety of the text of item f) in the base standard is shown as deleted and then a new sentence is shown in normal font. This should be in underline font as it is being added.

The text says "as specified in Annex 83A or Annex 83B" but Annex 83B is not an option for any backplane PMD

Also, the added text discusses XLAUI, but there is no text for CAUI as included in Table 69-1a for KR4 and KP4

SuggestedRemedy

Show the new text in item f) in underline font
Remove "or Annex 83B" from the addition
Add a reference to CAUI either in item f) or an additional item.

Proposed Response *Response Status* **O**

Cl **69** *SC* **69.1.3** *P* **53** *L* **42** # 23

Hajduczenia, Marek ZTE Corporation

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

Item g) is a new text, added under this project and should be marked accordingly.

SuggestedRemedy

Underline the content of item g). The new text in item f) should also be marked with underline.

Proposed Response *Response Status* **O**

Cl **69** *SC* **69.2.4** *P* **54** *L* **1** # 48

Anslow, Pete Ciena

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

In the base standard "Physical Layer signaling systems" is 69.2.3

SuggestedRemedy

change 69.2.4 to 69.2.3

Proposed Response *Response Status* **O**

Cl **69** *SC* **69.2.4** *P* **54** *L* **22** # 24

Hajduczenia, Marek — ZTE Corporation

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

Editorial instructions associated with Table 69–1 could be clearer - it takes a while to realize what the actual change was.

SuggestedRemedy

Change the editorial instruction in line 22 to read as follows: "Replace Table 69–1 (moving 40GBASE-KR4 to Table 69-1a) and insert Table 69–1a as shown:"

Proposed Response *Response Status* **O**

Cl **73** *SC* *P* **56** *L* **5** # 251

Geoff Thompson — GraCaSI S.A.

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

The normative text starts with the word "Note", yet this portion of the text is not a note. The use of this terminology is unnecessary.

SuggestedRemedy

Delete the words "Note that although" at the beginning of the sentence and capitalize the "t" in "the". The resulting text will not be confused with a note.

Proposed Response *Response Status* **W**

Cl **73** *SC* **73.5.1** *P* **56** *L* **25** # 248

Law, David — HP

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

The existing text refences the lane-by-lane transmit disable in subclauses 71.6.7, 84.7.7, and 85.7.7 as does the 100GBASE-KR4 refernce (93.77) yet the global transmit disable is refernce in 100GBASE-CR4 (92.7.6) and 100GBASE-KP4 (94.3.6.6). Suggest that the refernce here should always be to the lane-by-lane transmit disable.

SuggestedRemedy

Suggest that the text '.. 92.7.6, 93.7.7, or 94.3.6.6.' should be changed to read '.. 92.7.7, 93.7.7, or 94.3.6.7.'.

Proposed Response *Response Status* **O**

Cl **74** *SC* **74.7.4.8** *P* **556** *L* # 107

Keeley, James — LSI Corperation

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

With the addtion of Rapid Alignment Markers in Clause 82 it was decided that the FEC in Clause 74 would still use the deterministic FEC blocks for Rapid FEC lock.

The wording in 74.7.4.8 suggest that there are only 2 types of determinstic FEC blocks which is true for a Clause 49 Type PCS, but is not the case for a Clause 82 type PCS to a Clause 74 FEC. When EEE is enabled for a clause 82 PCS and CL74 FEC is enabled the Rapid Alignamnet Markers would replace every 1 of 16 64-bit CL74 FEC words words as shown in Annex 74A for 40G and 1 of 8 64-bit CL74 FEC words as shwon in Annex 74A technically making the clause 74 FEC not 100% determinsitic.

SuggestedRemedy

Replace: PCS sublayer will be encoding /I/ during the wake
state and /LI/ during the refresh state, which produces the two types of deterministic FEC blocks.

With: A PCS sublayer of clause 49 will be encoding /I/ during the wake
state and /LI/ during the refresh state, which produces the two types of deterministic FEC blocks.

Add: A PCS sublayer of clause 82 will also be encoding /I/ during the wake
state and /LI/ during the refresh state, but in addtion inserting Rapid Alignment Markers into each of the PCS Lanes according to 82.2.8a. This causes the two types of determinitic FEC blocks to have a number of 65-bit words within the deterministic FEC block to be replaced with Rapid Alignment Markers thus not matching the two deterministic patterns as shown in Tables 74A-5 and 74A-6. The locations of the Rapid Alignment Marker though consistant for each Rapid FEC block for each entry into the wake or refresh states can be different for each entry. This modifcation to the two determininsitc patterns needs to be taken into account by the Rapid FEC Lock implmentation.

Proposed Response *Response Status* **W**

<Editor changed subclause from 7.4.8 to 74.7.4.8.>

Cl **78** *SC* **78.1** *P* **61** *L* **18** # 50

Anslow, Pete — Ciena

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

The IEEE 802.3 working group guidelines at:
http://www.ieee802.org/3/WG_tools/editorial/requirements/words.html
says use "sublayer" not "sub-layer"

SuggestedRemedy

Change "sub-layer" to "sublayer"

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1.3.3** *P* **61** *L* **51** # 192

Bennett, Michael LBNL

Comment Type **ER** *Comment Status* **X**

The definition of "fast-wake" is somewhat confusing. Fast wake refers to the mode for which the transmitter continues to transmit signals during the fast wake state (between the sleep and wake states) so that the receiver can resume operation with a shorter wake time. This definition can be clarified by changing the term "fast wake" to quiescent.

SuggestedRemedy

Replace "fast wake" with "quiescent" throughout the document. Replace acronym referring to "fast wake" (FW) with (Q).

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1.3.3.1** *P* **61** *L* **49** # 189

Bennett, Michael LBNL

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

parenthesis around the phrase (that implement EEE) is not needed.

SuggestedRemedy

Remove the parenthesis. Its in a section titled PHY LPI transit operation - actually the phrase could be removed. If you want to be explicit, use the phrase "for PHYs that implement the optional EEE capability"

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1.3.3.1** *P* **61** *L* **52** # 51

Anslow, Pete Ciena

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

In the text:
"Fast wake refers to the mode for which the transmitter continues to transmit signals during the fast wake state (between the sleep and wake states) so that the receiver can resume operation with a shorter wake time ..."

The text "(between the sleep and wake states)" is confusing. When looking at Figure 78-3a, there are no sleep and wake states. It would have to be between active and idle states.

SuggestedRemedy

Either change to "(between the active and idle states)" or delete this.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1.3.3.1** *P* **62** *L* **17** # 10

Bob Grow RMG Consulting

Comment Type **ER** *Comment Status* **X**

Warning is inappropriate: From the IEEE Standards Style Manual, 17.4: ?Warnings call attention to the use of materials, processes, methods, procedures, or limits that have to be followed precisely to avoid injury or death.? I don?t think this even raises to the level of a Caution: ?Cautions call attention to methods and procedures that have to be followed to avoid damage to equipment.

SuggestedRemedy

Convert to a NOTE.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.2** *P* **63** *L* **23** # 11

Bob Grow RMG Consulting

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

Editing instruction could be improved. (Inserted rows include 40 Gb/s.

SuggestedRemedy

Change table title and column heading and insert the following rows at the bottom of Table 78-2.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.2** *P* **63** *L* **24** # 55

Anslow, Pete Ciena

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

The editing instruction says "to for 100Gb/s Ethernet" which has a spurious "to" and rows have been added for 40 Gb/s Ethernet also.

SuggestedRemedy

Delete "to for 100Gb/s Ethernet"

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.2** *P* **63** *L* **30** # 25

Hajduczenia, Marek — ZTE Corporation

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

Table 78-2 does not show with underline rows which were inserted.

SuggestedRemedy

Mark the rows in Table 78-2 which were inserted in this amendment.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.4.2.3** *P* **65** *L* **15** # 37

Anslow, Pete — Ciena

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

The editing instruction just says "Insert the following rows into Table 78-3", but it not clear what the resulting Table 78-3 would look like - should the new rows stay together, or be interleaved through the table?

If they stay together, should they be at the top or the bottom?

Since the Entity and Object class entries in the two left hand columns appear to be the same as in the base table, it seems better to interleave the new rows, but in what order?

SuggestedRemedy

If the new rows are to stay together, amend the editing instruction to say where they should go.
If the new rows are to be interleaved with existing rows, it seems better to make the editing instruction "Change" rather than "Insert" and show the complete table with the new rows in underline font.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.4.24** *P* **65** *L* **38** # 133

Slavick, Jeff — Avago Technologies

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

Poor wording:

examine_TxFW_change
This function decides if the new value of FW_enable
that the local transmit system can support when there is an updated request from the remote system or if local system conditions require a change in the value of the presently supported FW_enable.

SuggestedRemedy

examine_TxFW_change
This function decides if the new value of FW_enable
is supported by the local transmit system when there is an updated request from the remote system or if local system conditions require a change in the value of the presently supported FW_enable.

Proposed Response *Response Status* **W**

<Editor changed subclause from 4.24 to 78.4.24.>

Cl **79** *SC* **79.3.5** *P* **72** *L* **17** # 111

Trowbridge, Steve — Alcatel-Lucent

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

Clarify that TLV subtype=5 is not sent for >=40 Gb/s PHYs that do not support "deep sleep" operation.

SuggestedRemedy

Add: This message is exchanged between EEE-capable PHYs operating at rates <=10 Gb/s, or between EEE-capable PHYs operating at rates >=40 Gb/s where both the PHY and its link partner are capable of Deep Sleep operation as determined by the PHY type and the results of auto-negotiation.

Proposed Response *Response Status* **O**

Cl **79** *SC* **79.3.6** *P* **72** *L* **22** # 112

Trowbridge, Steve — Alcatel-Lucent

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

Clarify that Transmit FW and Receive FW must be true unless both the PHY and its link partner (as determined by auto-negotiation) support "deep sleep" operation.

SuggestedRemedy

Add: Transmit FW and Receive FW are set to TRUE unless the PHY and its link partner are capable of Deep Sleep operation as determined by the PHY type and the results of auto negotiation.

Proposed Response *Response Status* **O**

Cl **79** *SC* **79.3.6** *P* **72** *L* **22** # 56

Anslow, Pete — Ciena

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

Comment #53 against D1.3 has not been implemented:
Figure 79-6a is inserted after Figure 79-6 which is the last figure in Clause 79. This means that it should be numbered Figure 79-7

SuggestedRemedy

Change the figure number to 79-7

Proposed Response *Response Status* **O**

Cl **79** *SC* **79.3.6.1** *P* **72** *L* **50** # 26

Hajduczenia, Marek — ZTE Corporation

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

The use of the word "will" should be limited only to the statements of the fact.

Excerpt from the Style Manual: "NOTE—The use of the word mustis deprecated and shall not be used when stating mandatory requirements; must is used only to describe unavoidable situations. The use of the word will is deprecated and shall not be used when stating mandatory requirements; will is only used in statements of fact."

SuggestedRemedy

Suggest to change the sentences written in future simple into present simple tense and avoid discussion on whether they are indieed statements of a fact (or not) altogether.

Proposed Response *Response Status* **O**

Cl **79** *SC* **79.3.6.3** *P* **73** *L* **11** # 27

Hajduczenia, Marek — ZTE Corporation

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

Missing comma after "When a local link partner receives its echoed values from the remote link partner"
Similarly, missing comma on page 73, line 25, after "The cross-references between the EEE TLV, the EEE FW TLV" (serial comma)
Similarly, missing comma on page 80, line 5, after "The terms 40GBASE-R, and100GBASE-R" (serial comma)
Similarly, missing comma on page 80, line 35, after "The 40GBASE-R, and100GBASE-R" (serial comma)

SuggestedRemedy

Insert missing comma

Proposed Response *Response Status* **O**

Cl **79** *SC* **79.3.6.3** *P* **73** *L* **8** # 13

Bob Grow — RMG Consulting

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

I think the title is referring to the echo of two fields within the TLV value, so proper field names should be used. Not sure if it should be Echo of Transmit FW and Receive FW or per Table 79-9 Echo Transmit FW and Echo Receive FW?

SuggestedRemedy

I believe it should be: Echo of Transmit FW and Receive FW

Proposed Response *Response Status* **O**

Cl **79** *SC* **79.4.2** *P* **73** *L* **36** # 14

Bob Grow — RMG Consulting

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

SuggestedRemedy

EEE FW (delete the extra FW).

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.2** *P* **76** *L* **5** # 174

Booth, Brad — Dell

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

Amendments generally are intended to "do no harm" to previous work that has been documented. Completely eliminating the objectives and converting them to BER objectives is breaking the "do no harm" rule. The previous objectives should not be stricken, especially considering that 802.3-2012 was just ratified and published.

SuggestedRemedy

If the task force does not agree with the objectives in 802.3-2012, then they should provide a means to differentiate the objectives based on data rate or some other means.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.3** *P* **76** *L* **35** # 33

Hajduczenia, Marek — ZTE Corporation

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

Not sure why the text "in Clause 84 for 40GBASE-KR4" was struck, given that MDI for 40GBASE-LR4 is still specified in Clause 84. Figure 84–1 was not modified and MDI is still within the scope of Clause 84.

SuggestedRemedy

Revert the text or clearly explain in editorial note why it is removed.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.3** *P* **76** *L* **41** # 152

Marris, Arthur — Cadence Design Syste

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

80.1.3 says:
"While this specification defines interfaces in terms of bits, octets, and frames, implementations may choose other data-path widths for implementation convenience. The only exceptions are as follows:

j) There is no electrical or mechanical specification of the MDI for backplane Physical Layers."

Item j does not seem relevant in this context.

SuggestedRemedy

Change item j) to read:

j: The PMDs as specificied in Clause 84 for 40GBASE-KR4, in Clause 93 for 100GBASE-KR4 and in Clause 94 for 100GBASE-KP4 all use a 4 lane data path.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.3** *P* **77** *L* **13** # 108

Mitsuru, Iwaoka — Yokogawa Electric Cor

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

In Figure 80-1, 100GBASE-P is missing.

SuggestedRemedy

Add 100GBASE-P to Figure 80-1.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.3** *P* **77** *L* **23** # 113

Slavick, Jeff — Avago Technologies

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

100GBASE-P is not listed as one of the stack ups.

SuggestedRemedy

Add 100GBASE-P to the figures as a valid PHY type with a CGMII interface.
Also change 82-1

Proposed Response *Response Status* **W**

<Editor changed subclause from 80-4 to 80.1.3.>

Cl **80** *SC* **80.1.4** *P* **77** *L* **45** # 196

D'Ambrosia, John Dell

Comment Type **ER** *Comment Status* **X**

there is inconsistentency in the way definitions are given. In 1.4, CR4/ KP4 / KR4 refer to using 100GBASE-R encoding, while the 100GBASE-P family refers to using "physical coding sublayer defined in Clause 82." In the cited text here references made to Clause 82 PCS, but this is defined as 100GBASE-R encoding

SuggestedRemedy

changes references to Clause 82 Physical COding Sublayer to either 40GBASE-R or 100GBASE-R encoding as appropriate

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.4** *P* **77** *L* **45** # 209

Law, David HP

Comment Type **ER** *Comment Status* **X**

Subclause 80.1.4 'Nomenclature' states that '40GBASE-R or 100GBASE-R represents a family of Physical Layer devices using the Clause 82 Physical Coding Sublayer ... and a PMD implementing 2-level pulse amplitude modulation (PAM).', however subclause 1.4.53a (see page 22, line 20) '100GBASE-KP4' states that 'IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding ... and 4-level pulse amplitude modulation ...'. If, as subclause 80.1.4 states, 100GBASE-R represents a PMD implementing 2-level PAM, then 100GBASE-KP4 can't be defined as using 100GBASE-R.

Further, IEEE Std 802.3-2012 subclause 1.4.51 defines '100GBASE-R' as 'An IEEE 802.3 family of Physical Layer devices using the physical coding sublayer defined in Clause 82 for 100 Gb/s operation. (See IEEE Std 802.3, Clause 82.).' and does not mention the modulation used, further subclause 1.4.50a defines '100GBASE-P' as 'An IEEE 802.3 family of Physical Layer devices using the physical coding sublayer defined in Clause 82 and .. pulse amplitude modulation with more than 2 levels for 100 Gb/s operation.' so avoids the reference to 100GBASE-R encoding through a direct reference to Clause 82.

Table 80-1 '40 Gb/s and 100 Gb/s PHYs' however states in the 100GBASE-KP4 entry that it is a '100 Gb/s PHY using 100GBASE-P encoding ..' while, as noted above, subclause 1.4.53a states that 100GBASE-KP4 is a 'IEEE 802.3 Physical Layer specification for 100 Gb/s using 100GBASE-R encoding ..'.

I think the problem is that we are trying to encode both the PCS and PMD modulation in the letter 'P' in 100GBASE-P and now add a PMD modulation meaning to 100GBASE-R through these changes. I therefore suggest that if we are to continue to use this approach we should define a new term 100GBASE-R encoding, which is the 64B66B 100Gb/s encoding defined in Clause 82, separate from a 100GBASE-R PHY, which is a PHY that uses 100GBASE-R encoding with 2-level PAM PMD.

We will also need to make a similar change to the definition of 40GBASE-R since 80.1.4 is being changed to define both 40GBASE-R or 100GBASE-R as a family of PHYs implementing 2-level PAM. Fortunately I note that all the definitions for 40GBASE-R and 100GBASE-R PHYs in IEEE Std 802.3-2012 subclause 1.4, and IEEE P802.3bj changes to subclause 1.4, reference either '40GBASE-R encoding' or '100GBASE-R encoding' already and so will need no change.

A 100GBASE-P PHY would then be a PHY that uses 100GBASE-R encoding with a more than 2-level PAM PMD, although this still leaves the issue of 4 meaning 4 levels or 4 lanes in the case of 100GBASE-KP4. Personally, for consistency, I believe the 4 should mean 4 lanes with R now meaning 2-level PAM and P meaning 4-level PAM, and if another modulation scheme is selected in the future a new letter should be selected.

SuggestedRemedy

Based on my comment, suggest that:

[1] Change IEEE Std 802.3-2012 subclause 1.4.51 '100GBASE-R' to read An IEEE 802.3 family of Physical Layer devices using 100GBASE-R encoding and a PMD that employs 2-level pulse amplitude modulation. (See IEEE Std 802.3, Clause 80.)

[2] Add new subclause 1.4.51a that reads '100GBASE-R encoding: The physical coding sublayer encoding defined in Clause 82 for 100 Gb/s operation. (See IEEE Std 802.3, Clause 82.)'
[3] Change IEEE Std 802.3-2012 subclause 1.4.60 '40GBASE-R' to read 'An IEEE 802.3 family of Physical Layer devices using 40GBASE-R encoding and a PMD that employs 2-level pulse amplitude modulation. (See IEEE Std 802.3, Clause 80.)
[4] Add new subclause 1.4.60a that reads '40GBASE-R encoding: The physical coding sublayer encoding defined in Clause 82 for 40 Gb/s operation. (See IEEE Std 802.3, Clause 82.)'
[5] Subclause 1.4.50a '100GBASE-P' should be changed to read 'An IEEE 802.3 family of Physical Layer devices using 100GBASE-R encoding and a PMD that employs 4-level pulse amplitude modulation. (See IEEE Std 802.3, Clause 80.)
[6] Change the 100GBASE-P entry in subclause 30.3.2.1.2 'aPhyType' and 30.3.2.1.3 'aPhyTypeList' to read 'Clause 82 100 Gb/s multi-PCS lane 64B/66B using 4-level PAM'.
[7] Change the end of the first sentence of the 4th paragraph of subclause 80.1.4 to read '.. a PMD implementing 4-level pulse amplitude modulation (PAM).'.
[8] Change the start of the description entry for 100GBASE-KP4 in table 80-1 from '100 Gb/s PHY using 100GBASE-P encoding ..' to read '100 Gb/s PHY using 100GBASE-R encoding ..'.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.4** *P* **78** *L* **13** # 197

D'Ambrosia, John Dell

Comment Type **ER** *Comment Status* **X**

reference to 100GBASE-KP4 using 100GBASE-P encoding. 100GBASE-P is a family of specifications that uses 100GBASE-R encoding

SuggestedRemedy

change 100GBASE-P to 100GBASE-R

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.4** *P* **78** *L* **14** # 194

D'Ambrosia, John Dell

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

reference to 4-level pulse amplitude modulation. Other places pointing to clause 94 refer to greater than 2 levels modulation

SuggestedRemedy

use consistent terminology in reference to clause 94. It seems that any references to Clause 94 should use 4-level pulse amplitude modulation, as that is what is specified in that clause.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.5** *P* **78** *L* **26** # 15

Bob Grow RMG Consulting

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

Their isn?t a 40 Gb/s MAC or a 100 Gb/s MAC, there is only one MAC with various operating speeds. One also for example can?t mix 40 Gb/s operation with a 100GBASE PHY as the second sentence arguably (though not logically) allows. This is also rather late in the clause to define 40 Gb/s and 100 Gb/s Ethernet. (Should have caught this on p802.3ba -- so a service to humanity.

SuggestedRemedy

Delete the second sentence. And replace 80.1.1 first paragraph with:

This clause describes the general requirements for 40 Gigabit and 100 Gigabit Ethernet. 40 Gigabit Ethernet uses the IEEE 802.3 MAC sublayer operating at a data rate of 40 Gb/s, connected through the 40 Gb/s Media Independent Interface to a 40 Gb/s Physical Layer implementation. 100 Gigabit Ethernet uses the IEEE 802.3 MAC sublayer operating at a data rate of 100 Gb/s, connected through the 100 Gb/s Media Independent Interface to a 100 Gb/s Physical Layer implementation.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.5** *P* **79** *L* **43** # 38

Anslow, Pete Ciena

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

Table 80-2a shows CAUI as per Annex 83B (chip to module) as optional for KR4 and CR4, but Tables 92-1, 93-1 and 94-1 show CAUI as per Annex 83A as optional

SuggestedRemedy

Change Table 80-2a to be consistent with Tables 92-1, 93-1 and 94-1 to show CAUI as per Annex 83A as optional

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.5** *P* **79** *L* **44** # 198

D'Ambrosia, John Dell

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

No indication for KP4 regarding Clause 83 PMA, which is optional per Clause 94 (For CAUI Implementation)

SuggestedRemedy

Make Clause 83 PMA optional for KP4.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.2.3** *P* **80** *L* # 149

Marris, Arthur — Cadence Design Syste

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

Use of the words "most" and "certain" is too vague and not accurate enough. The y could be replaced with "some" and "other" but please consider proposed remedy below.

SuggestedRemedy

Change first paragraph to read:
"A Forward Error Correction sublayer is available for all 40GBASE-R and 100GBASE-R copper and backplane PHYs. It is optional for 40GBASE-KR4, 40GBASE-CR4 and 100GBASE-CR10 PHYs and mandatory for 100GBASE-CR4, 100GBASE-KR4 and 100GBASE-KP4 PHYs. The FEC sublayer can be placed in between the PCS and PMA sublayers or between two PMA sublayers."

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.2.4** *P* **80** *L* **28** # 199

D'Ambrosia, John — Dell

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

The statement "the PMA for 100GBASE-KP4 is specified in Clause 94" as any instantiation of the CAUI Interface will require the Clause 83 PMA

SuggestedRemedy

add text that states "Instantiations of the CAUI interface will require at least one instance of the PMA specified in Clause 83.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.3** *P* **00** *L* **0** # 134

Slavick, Jeff — Avago Technologies

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

Introduction paragraph of section 80.3 refers to 40GBASE-R and 100GBASE-R Physical Layers, but not 100GBASE-P.

SuggestedRemedy

Add 100GBASE-P to the list of Physical layers in 80.3 and 80.3.2

Proposed Response *Response Status* **W**

<Editor changed subclause from 3 to 80.3.>

Cl **80** *SC* **80.3.2** *P* **81** *L* **17** # 109

Mitsuru, Iwaoka — Yokogawa Electric Cor

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

p.81 line 17 says "Examples of inter-sublayer service interfaces for 40GBASE-R and 100GBASE-R with their corresponding instance names are illustrated in Figure 80-2, Figure 80-3, Figure 80-3a and Figure 80-3b". Though, in Figure 80.3a and Figure 80.3b, a 100GBASE-P is noted under the "MEDIUM" box.

SuggestedRemedy

Modify the sentence to "Examples of inter-sublayer service interfaces for 40GBASE-R, 100GBASE-R and 100GBASE-P with their corresponding instance names are illustrated in Figure 80-2, Figure 80-3, Figure 80-3a and Figure 80-3b" and add "100GBASE-P" to the title of Figure 80-3a.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.3.2** *P* **83** *L* **11** # 200

D'Ambrosia, John — Dell

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

The flexibility of the 802.3ba architecture is based on the assumption that the service interface is the same for all layers. This appears to have been broken by the diagram in 80-3b. The PMA above and below FEC sublayer has different service interfaces.

SuggestedRemedy

It is not clear to me how to fix this - one could argue that it is an optional mode, so not an issue. At a minimum some type of warning should be noted in the text regarding this issue.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.5** *P* **87** *L* **15** # 201

D'Ambrosia, John — Dell

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

Directly below the RS-FEC sublayer - there is a PMA sublayer, but this is not noted as a CAUI, this is noted as PMD service interface. THerefore, there should be no PMA sublayer directly under the RS-FEC

SuggestedRemedy

Delete PMA directly adjacent and below to the RS-FEC.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.5** *P* **88** *L* **27** # 136

Slavick, Jeff — Avago Technologies

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

The RS-FEC receive logic runs on 4 lanes not 20. So the UI duration used to estimate the Maximum Skew for 100GBASE-R lane should be based on 25.78125GBd signaling rate.

SuggestedRemedy

Change the estimated UI count for "At RS-FEC recieve" to 4641. Add a footnote attached to this number denoting that 1 UI is based on a 25.78125GBd signaling rate.

Proposed Response *Response Status* **W**

<Editor changed subclause from 80-4 to 80.5.>

Cl **81** *SC* **81.1.7** *P* **91** *L* **26** # 28

Hajduczenia, Marek — ZTE Corporation

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

Missing space after "to the XLGMII/CGMII." and before the newly inserted text.

SuggestedRemedy

Insert the missing space

Proposed Response *Response Status* **O**

Cl **81** *SC* **81.3a.3.1** *P* **96** *L* **35** # 67

Anslow, Pete — Ciena

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

The heading "Considerations for transmit system behavior" is 81.3a.3, but "Considerations for receive system behavior" is 81.3a.3.1 which is one layer down in the heading heierachy. Surely these should be at the same level.

SuggestedRemedy

Change 81.3a.3.1 to be 81.3a.4 so that the receive section is not part of the transmit section.

Proposed Response *Response Status* **O**

Cl **82** *SC* *P* **100** *L* **42** # 190

Bennett, Michael — LBNL

Comment Type **ER** *Comment Status* **X**

The in the phrase RAM insertion - optional EEE function, the word function should be changed to capability to be consistent with the rest of the use of "the optional EEE capability" in the document

SuggestedRemedy

replace function with capability

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.1.5** *P* **99** *L* **31** # 202

D'Ambrosia, John — Dell

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

Optional support for EEE has created service interfaces that differ from each other that will impact the flexibility of the architecture

SuggestedRemedy

add cautionary warning for all service interfaces that are now different that 802.3ba defined service interfaces.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.11.1** *P* **00** *L* **0** # 114

Slavick, Jeff — Avago Technologies

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

100GBASE-P is a Physical Layer that uses the clause 82 PCS.

SuggestedRemedy

Added 100GBASE-P Physical layer to the list of Physical Layers in 82.1.1

Proposed Response *Response Status* **W**

<Editor changed subclause from 1.1 to 82.1.1.>

Cl **82** *SC* **82.2.12** *P* **103** *L* **23** # 115

Slavick, Jeff — Avago Technologies

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

We have only 100GBASE-R PCS, but have 100GBASE-R and 100GBASE-P Physical Layers. Table 82-5 Column header is PCS, so remove -P/

SuggestedRemedy

Remove the -P/ from the PCS type entry

Proposed Response *Response Status* **W**

<Editor changed subclause from 82-5 to 82.2.12.>

Cl **82** *SC* **82.2.18.2.2** *P* **103** *L* **42** # 105

Keeley, James — LSI Corperation

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

The variable down_count_done is not defined

SuggestedRemedy

Add definition for down_count_down to 82.2.18.2.2

Proposed Response *Response Status* **W**

<Editor changed subclause from 2.18.2.2 to 82.2.18.2.2.>

Cl **82** *SC* **82.2.18.3.1** *P* **116** *L* **24** # 95

Barrass, Hugh — Cisco

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

Assuming that the changes to the recieve LPI state diagram described in barrass_3bj_02_0513 (or equivalent) are made, some of the function of the transmit LPI state diagram are redundant.

SuggestedRemedy

Make the changes to the receive LPI state diagram as shown in submission barrass_3bj_03_0513.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.3.1** *P* **117** *L* **23** # 96

Barrass, Hugh — Cisco

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

The receive LPI state diagram uses variable "received_tx_mode" when LPI_FW is TRUE, however there are no RAMs transmitted in that case, so the variable is unknown.

SuggestedRemedy

Various options were discussed to resolve this issue. Some of these are captured in the submission barrass_3bj_01_0513.pdf

The changes described as option #2 were considered preferable.

Make the changes to the receive LPI state diagram as shown in submission barrass_3bj_02_0513.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.8a** *P* **100** *L* **45** # 127

Slavick, Jeff — Avago Technologies

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

RAMs should be added when the Tx LPI State machine is NOT in TX_ACTIVE, or TX_FW.

SuggestedRemedy

Change "LPI transmit state other than TX_ACTIVE, LPI_FW = FALSE and down_count_done = FALSE."
to:
"LPI transmit state other than TX_ACTIVE or TX_FW."
and
Change the transition into to TX_FW to come from TX_ACTIVE when LPI_FW & TX_RAW = LI and change the transition from TX_ACTIVE to TX_SLEEP to occur when !LPI_FW & TX_RAW = LI

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.8a** *P* **101** *L* **50** # 135

Slavick, Jeff — Avago Technologies

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

BIP statitics are only updated when in RX_ACTIVE, and turn on after receiving the first normal. In FW mode, we never send RAMs.

SuggestedRemedy

Turning off BIP statistics is a way to save power so change
"The BIP statistics will be first updated after transitioning from RAMs to normal AMs on the first received normal AM."
to
The BIP statistics will be first updated after transitioning from RAMs to normal AMs on the first received normal AM when LPI_FW is FALSE and on the second received AM when LPI_FW is TRUE.

Proposed Response *Response Status* **W**

<Editor changes subclause from 2.8a to 82.2.8a.>

Cl **82** *SC* **82.6** *P* **110** *L* **41** # 191

Bennett, Michael — LBNL

Comment Type **ER** *Comment Status* **X**

The note is truncated in Figure 82–10—Block lock state diagram.

SuggestedRemedy

replace the truncated text with the entire text

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.6** *P* **117** *L* **20** # 70

Ran, Adee — Intel

Comment Type **ER** *Comment Status* **X**

in Figure 82–17, two transitions (from RX_SLEEP to RX_ACTIVE, and from RX_WAKE to RX_ACTIVE) include the condition "R_TYPE(rx_coded) = IDLE".

But IDLE is not one of the values defined for R_TYPE (neither in 82.2.18.2.3 nor in 49.2.13.2.3).

SuggestedRemedy

Change IDLE in this figure to one of the values defined for R_TYPE in 82.2.18.2.3 (C?)

Alternatively, add the definition of IDLE to the R_TYPE value list.

Consider correcting Figure 49–13 as well (perhaps in maintenance).

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.6** *P* **117** *L* **22** # 151

Marris, Arthur — Cadence Design Syste

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

Cannot determine the state of received_tx_mode in Figure 82–17 LPI Receive state diagram.

SuggestedRemedy

I understand that Hugh Barrass is proposing a remedy for this.

Proposed Response *Response Status* **O**

Cl **83** *SC* **83.1.1** *P* **120** *L* **19** # 249

Law, David — HP

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

This subclause states that 'The 100GBASE-R PMA(s) can support any of the 100 Gb/s PMDs in Table 80-2a, except 100GBASE-KP4 (Clause 94).'. Is this correct, Table 94-1 lists the Clause 83 PMA as optional and wouldn't it be required for an implementation that used CAUI between the 100GBASE-R PCS and the RS-FEC (see figure 83C-2b). Isn't the restriction that the PMA that provides the PMD services interface in a 100GBASE-KP PHY can't be a Clause 83 PMA.

SuggestedRemedy

Either change the text in this subclause 83.1.1 to clarify the restriction or remove Clause 83 as an option in Table 94-1.

Proposed Response *Response Status* **O**

Cl **83** *SC* **83.5.3.1** *P* **00** *L* **0** # 116

Slavick, Jeff — Avago Technologies

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

We have added SP0 to the stack up in Figure 80-5a, but Clause 83 doesn't have a section for it in 83.5.3 (Skew and Skew Variation).

SuggestedRemedy

Change the titles of 83.5.3.1 and 83.5.3.2 to include SP0 and SP7
Add a references to Figure 80-5a to the text of both sections
Update the text add in SP0 and SP7 and account for SP7 being the opposite direction of data flow from SP1.

Proposed Response *Response Status* **W**

<Editor changes subclause from 5.3.1 to 83.5.3.1.>

Cl **83A** *SC* **83A.3.2a** *P* **300** *L* **16** # 160

Healey, Adam — LSI Corporation

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

A physical instance of XLAUI or CAUI does not provide a means to communicate the primitives required for correct operation of the optional EEE deep sleep capability.

SuggestedRemedy

A contribution will be submitted with a suggested remedy.

Proposed Response *Response Status* **O**

Cl **83C** *SC* **83C.1a** *P* **305** *L* **1** # 47

Anslow, Pete — Ciena

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

Clause 83C uses "RS FEC" rather than "RS-FEC" in 7 places
Also, the abbreviation RS-FEC is not included in the Figure abbreviation expansions

SuggestedRemedy

Change "RS FEC" to "RS-FEC" in 7 places (including figures) and add RS-FEC to the abbreviation expansions in figures 83C-2a and 83C-2b

Proposed Response *Response Status* **O**

Cl **83C** *SC* **83C.1a.2** *P* **305** *L* **54** # 39

Anslow, Pete — Ciena

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

The title of Figure 83C-2b says "XLAUI/CAUI", but is specific to 100G

SuggestedRemedy

Change "single XLAUI/CAUI" to "single CAUI"

Proposed Response *Response Status* **O**

Cl **85** *SC* **85.13.4.1** *P* **130** *L* **27** # 35

Anslow, Pete — Ciena

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

The PICS items in the base standard end at PF18, so the next item should be PF19 not PF20

SuggestedRemedy

Renumber PF20 through PF22 to PF19 through PF21

Proposed Response *Response Status* **O**

Cl **85** *SC* **85.8.3.3** *P* *L* # 93

Moore, Charles Avago Technologies

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

Method given for computing coefficients c(-1), c(0), and c(1) can give different values for the coefficients for the same transmitter at the same equalization setting if different channel are interposed between the transmitter and the measurement. The coefficient value are supposed to measure the transmitter independent of the channel. I think that the problem comes because the 50% zero crossing measured in step 4 changes depending on the rise time of the signal and the amount of equalization.

SuggestedRemedy

Possible fixes could be:

1.

Take three pulses of the shape of the linear fit pulse response but beginning at times tr-1*UI, tr, and tr=1*UI. Weight them with coefficients d(-1), d(0), d(1) respectively. Sum them and adjust t0, d(-1), d(0), and d(1) to give the best LMS fit the equalized linear fit pulse response. Use the peak of the tr pulse as t0 in the sampling process in step 5.

2.

Like the first part of 1 but do not re-sample, just use c(-1)=d(-1), c(0)=d(0), and c(1)=d(1).

3. Possibly some other.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.3** *P* **133** *L* **33** # 203

D'Ambrosia, John Dell

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

PMA compatibility states that the PMA service interface upstream and downstream must be set to 4 lanes. However, there was supposed to be something added that stated a CAUI(-10) could not be instantiated below the RS-FEC sublayer. I thought this was going to be addressed by Annex 83C, but the diagram only shows the proper CAUI above the RS-FEC sublayer, and i could not find any text that prevents this.

SuggestedRemedy

add text that prevents implementation of a CAUI-10 below the RS-FEC sublayer.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.5.1** *P* **135** *L* **47** # 147

Brown, Matthew APM

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

In Figure 91-2, the note "optional for eee implemention" is incorrect or at least misleading. These signals are required when EEE has been implemented and negotiated and otherwise are not required. See terminology used in 82.2.3.4.

SuggestedRemedy

Change note to "Optional when EEE is negotiated."

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.5.2.6** *P* **138** *L* **3** # 153

Gustlin, Mark Xilinx

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

Currently each FEC lane has a unique Alingment Marker pattern consisting of 5 regular AMs per FEC lane. On the receive side, where you don't know which FEC lane you are locking to, and if you are trying to quickly lock by doing a parallel search, you have to replicate the search logic x4. This can be very expensive, especially when you have to quickly lock, such as for EEE.

SuggestedRemedy

Implement a single pattern that is constant across the FEC lanes, along with a unique patterns in order to identify the given FEC lane. This will allow a recevier to lock first to a single pattern independent of the FEC lane, and then look at a unique pattern to identify the lane. This will significantly reduce the logic especially for a fast lock case.
A presentation will be made to detail the proposed solution.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.5.2.6** *P* **138** *L* **41** # 128

Slavick, Jeff Avago Technologies

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

Add the missing s to the word trancoding to make it transcoding. (after the 64B/66B to 256/257B)

SuggestedRemedy

See comment.

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.2.6 to 91.5.2.6.>

Cl **91** *SC* **91.5.2.7** *P* **139** *L* **21** # 45

Anslow, Pete — Ciena

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

The draft is not consistent as to whether there is a space after the comma in "RS(x,y)" or not.

Since it is used mostly without the space, remove the space from those instances that have it.

SuggestedRemedy

remove the space from:
Page 139, line 21 in RS(n, k)
Page 139, line 24 in RS(528, 514)
Page 139, line 24 in RS(544, 514)
Page 308, line 50 in RS(528, 514)
Page 309, line 3 in RS(544, 514)

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.5.2.8** *P* **141** *L* **8** # 129

Slavick, Jeff — Avago Technologies

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

Missing reference "(refer to)"

SuggestedRemedy

Add link to 94.2.1.1.1

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.2.8 to 91.5.2.8.>

Cl **91** *SC* **91.5.3.3** *P* **143** *L* **20** # 241

Law, David — HP

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

Suggest that '.. or contains errors but was not corrected .. should read '.. or contains errors that were not corrected ..'.

SuggestedRemedy

See comment.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.5.3.3** *P* **143** *L* **35** # 106

Keeley, James — LSI Corperation

Comment Type **ER** *Comment Status* **X**

It is ambiguous on when the counting of the 8192 codeword sampling window for the measurement of total symbol errors is started. The current wording allows for different sampling windows that though correct make it difficult to verify an implmentation complies with 91.5.3.3

SuggestedRemedy

Start the the sampling window when the first codeword with a symbol error count > zero is detected. The symbol error count is cleared to zero when either the number of received codewords reaches 8192 or the number of symbol erros exceeds K

Change: If the number of symbol errors in a block of 8192 codewords exceeds
K
To: When the number of symbol errors withing a codeword sampling window exceeds K

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.3.3 to 91.5.3.3.>

Cl **91** *SC* **91.5.3.3** *P* **143** *L* **38** # 119

Slavick, Jeff — Avago Technologies

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

Change the If to a When so that immediately upon exceeding the threshold the 60-75ms of sync header corruption begins. With the If it means you could do it immediately or wait for the 8192 codewords duration to complete and then evaluate and do the corruption period.

SuggestedRemedy

Per comment.

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.3.3 to 91.5.3.3.>

Cl **91** *SC* **91.5.3.3** *P* **143** *L* **40** # 124

Slavick, Jeff — Avago Technologies

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

The FEC_bypass_indication error monitoring logic will cause the link to go down.

SuggestedRemedy

Add a MDIO status register that indicates when this logic caused constant invalid sync headers to occur. This will assist in debug of why link downs occur. Should probably be a LH bit that defaults 0.

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.3.3 to 91.5.3.3.>

Cl **91** *SC* **91.5.3.3** *P* **143** *L* **41** # 125

Slavick, Jeff — Avago Technologies

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

What happens if FEC_bypass_indication_enable error monitor fires and we're hooked to a Optical module and AN isn't present, or AN is disabled. Then we'll cause a HI_BER to occur, but will the link go down?

SuggestedRemedy

Assuming that a MDIO register to flag that bypass_indication error monitor fired and caused a HI_BER situation has been added. We could add that flag to the qualfication to enable bypass_indication. Along with qualifying that using or not using error_indication is set when fec_align_status transitions to true. Then you'd have to induce restart_lock => true and reboot the RS-FEC with error_indication turned on (because the flag is set).

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.3.3 to 91.5.3.3.>

Cl **91** *SC* **91.5.3.3** *P* **35143** *L* **35** # 126

Slavick, Jeff — Avago Technologies

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

The FEC_bypass_indication_enable error monitor should be disabled while rx_lpi_active = true.

SuggestedRemedy

Add "while rx_lpi_active = false" to the end of the 2nd sentence. And add "When rx_lpi_active transitions from true to false the error monitor will begin counting a new block of 8192 codewords."

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.3.3 to 91.5.3.3.>

Cl **91** *SC* **91.5.3.6** *P* **145** *L* **21** # 88

Szczepanek, Andre — Inphi

Comment Type **ER** *Comment Status* **X**

There is no explicit link between the Block Distribution process of codewords (in 91.5.3.6), and Alignment Marker (re)insertion.
Block Distribution is Round-Robin, whereas Marker insertion is in parallel every 4096 RS-codewords.
Note the only constraint on AM insertion in the current text is on the repetition rate, there is no constraint on where they are inserted in the codeword stream.
So specifying this way does NOT require that AMs are re-inserted at their original locations.
However for end-to-end opertaion of AM BIPs they must be re-inserted at their original location.

SuggestedRemedy

Instead of defining the repetion rate of AM insertion, define AM insertion relative to the FEC block boundary from which the FEC-AMs were removed. This ensures that they are re-inserted at the their original location.

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.3.6 to 91.5.3.6.>

Cl **91** *SC* **91.5.4.2.1** *P* **148** *L* **17** # 117

Slavick, Jeff — Avago Technologies

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

In the variable section the variable is called "fec_lane" while in the rest of the Clause it's called "fec_lane_mapping".

SuggestedRemedy

Change fec_lane to fec_lane_mapping<x>

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.4.2.1 to 91.5.4.2.1.>

Cl **91** *SC* **91.5.4.2.1** *P* **148** *L* **17** # 118

Slavick, Jeff — Avago Technologies

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

fec_lane/fec_lane_mapping state should be qualified with amps_lock<x>

SuggestedRemedy

Change "for lane x"
to "for lane x when amps_lock<x> = true"

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.4.2.1 to 91.5.4.2.1.>

Cl **91** *SC* **91.5.4.2.1** *P* **148** *L* **20** # 86

Szczepanek, Andre Inphi

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

fec_lpi_fw is included as part of the non-EEE variables.
Shouldn't it be listed instead with the other "optional EEE capability" variables listed at the bottom of page 148 ?

SuggestedRemedy

Move fec_lpi_fw into list of optional EEE capability variables.

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.4.2.1 to 91.5.4.2.1.>

Cl **91** *SC* **91.5.4.2.1** *P* **148** *L* **28** # 84

Szczepanek, Andre Inphi

Comment Type **ER** *Comment Status* **X**

"reset
Boolean variablethat controls resetting of the FEC ... during power on, and when MDIO has put the PCS into low-power mode."

The RS-FEC sublayer may not be in the same device as the PCS.
Replace "PCS" with "PHY".

SuggestedRemedy

"reset
Boolean variablethat controls resetting of the FEC ... during power on, and when MDIO has put the PHY into low-power mode."

Proposed Response *Response Status* **W**

<Editor changed subclause from 5.4.2.1 to 91.5.4.2.1.>

Cl **91** *SC* **91.5.4.3** *P* **151** *L* **43** # 130

Slavick, Jeff Avago Technologies

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

The variable name is fec_lane_mapping not FEC_lane_mapping

SuggestedRemedy

Downcase FEC in the 2_GOOD state.

Proposed Response *Response Status* **W**

<Editor changed subclause from 91-8 to 91.5.4.3.>

Cl **91** *SC* **91.5.4.3** *P* **152** *L* **15** # 131

Slavick, Jeff Avago Technologies

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

deskew_done is Boolean, no need to compare to "TRUE"

SuggestedRemedy

Change the 2 instances of "deskew_done = true" to deskew_done

Proposed Response *Response Status* **W**

<Editor changed subclause from 91-9 to 91.5.4.3.>

Cl **91** *SC* **91.6** *P* **154** *L* **52** # 87

Szczepanek, Andre Inphi

Comment Type **ER** *Comment Status* **X**

The optional RS-FEC MDIO capability does not comprehend the difference between integrated and seperated FEC sub-layers. It requires the same set of MDIO registers (via a "shall" statement) for both use cases.
In particular the implementation of BIP error counters and PCS lane mapping registers is totally redundant if the PCS and FEC layers are integrated together. As currently worded these registers must be implemented whenever an MDIO is implemented.

SuggestedRemedy

change
"The optional MDIO capability described in Clause45 defines several variables that provide control and status information for and about the RS-FEC. If MDIO is implemented, it shall map MDIO control variables to RS-FEC control variables as shown in Table 91–2, and MDIO status variables to RS-FEC status variables as
shown in Table 91–3."
to
"The optional MDIO capability described in Clause45 defines several variables that provide control and status information for and about the RS-FEC. If MDIO is implemented, it shall map MDIO control variables to RS-FEC control variables as shown in Table 91–2, MDIO status variables to RS-FEC status variables as
shown in Table 91–3, and if the FEC Service interface is connected to a PMA layer it should also map MDIO status variables to RS-FEC status variables as
shown in Table 91–3a."

Remove BIP error and PCS lane mapping rows from Table 91-3, and put them in a new table "Table 91-3a". This table should also hold block and AM lock registers - see my previous comment.

Proposed Response *Response Status* **W**

<Editor changed subclause from 6 to 91.6.>

Cl **91** *SC* **91.6** *P* **155** *L* **27** # 3

Barrass, Hugh Cisco

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

The FEC align status bit is missing

SuggestedRemedy

Add a row for FEC align status:

FEC align status | FEC lane mapping register | 1.206.15 | FEC_align_status

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.6** *P* **155** *L* **33** # 4

Barrass, Hugh Cisco

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

There needs to be a PCS lane alignment status bit - also missing in Clause 45

SuggestedRemedy

Add a row for PCS align status:

PCS align status | RS-FEC status register | 1.201.15 | PCS_align_status

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.6** *P* **156** *L* **27** # 85

Szczepanek, Andre Inphi

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

The FEC sublayer adds two sets of PCSL related MDIO registers to the clause 45 PMA/PMD register set : "FEC_lane_mapping<x>" and "BIP_error_counter_i". Both only have relevance to a seperated FEC layer. They are redundant if FEC encoding is implemented as part of a MAC/PCS device.

These registers have been added to support implementations of seperated FEC sublayer devices. But where are the "Block x lock", "Lane x aligned" & "Lane alignment status" registers also needed by such implementations ?

The Clause 82 PCS layer has all these registers (and lane mapping and BIP error counters) defined for PCSL receive in Clause 45.2.3. The FEC sub-layer (where implemented) needs equivalent capability.

SuggestedRemedy

Add "Block x lock", "Lane x aligned" & "Lane alignment status" registers to Clause 91.6 and Clause 45.2.1

Proposed Response *Response Status* **W**

<Editor changed subclause from 6 to 91.6.>

Cl **91** *SC* **91.6.2** *P* **155** *L* **43** # 52

Anslow, Pete Ciena

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

The fact that this variable (FEC_bypass_indication_enable) has no effect if FEC_bypass_correction_enable is asserted is contained in 91.5.3.3 (referred to by 91.6.2). However, it would be helpful to repeat that information here.

SuggestedRemedy

Add: "This bit shall have no effect (the decoder shall not bypass error indication) if FEC bypass correction enable (1.200.0) is set to one."

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.6.4** *P* **156** *L* **1** # 242

Law, David HP

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

Typo.

SuggestedRemedy

Suggest that 'FEC bypass indication ability' should read 'FEC_bypass_indication_ability'.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.6.4** *P* **156** *L* **1** # 204

D'Ambrosia, John Dell

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

FEC is necessary to meet the stated BER requirement. If it is bypassed, it would seem that the user is taking a risk in meeting stated BER requirements based on insertion loss channel recommendations.

SuggestedRemedy

Add warning that when FEC is bypassed, the ability to meet stated BER requirements is channel dependent, and that stated channel recommendations require FEC.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10** *P* **183** *L* **45** # 188

Dudek, Mike QLogic

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

The cable specifications in subclause 92.10 are not a good predictor of system performance as indicated using the Channel Operating Margin (COM). In particular a number of cables that have good COM when simulated with additional host traces fail the existing cable specifications. A presentation will be made Dudek_3bj_02_0513 describing the problem.

SuggestedRemedy

Replace the specification for the Insertion Loss Deviation, Integrated Crosstalk Noise, and fitted insertion loss coefficients with a single modified COM specification. The modification to the COM code would be to concatenate additional host trace loss on each end of the cable S parameters for this Cable test.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10.2** *P* **184** *L* **19** # 229

Dawe, Piers IPtronics

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

I was reading 93A.3 and had difficulty finding the values for fmax.
92.10.2, Cable assembly insertion loss, doesn't use the terms fmin or fmax.

93.8.2.3, Receiver interference tolerance, mentions them in the text.

In 93.9.1, Table 93–9, Channel operating margin parameters, has an fmin that's probably a different one.

94.3.13.3, Receiver interference tolerance, mentions them in a footnote to Table 94-17, but I can't find that fmax by searching the pdf.

94.4.2, Channel insertion loss, eqn 94-19, has a conflicting fmax.

SuggestedRemedy

Explicitly name fmin and fmax in 92.10.2, e.g. with entries in Table 92–12, Maximum and minimum cable assembly insertion loss characteristics.
Use a more consistent layout in the three clauses.
Write fmax the same way each time so Acrobat sees them as the same.
Resolve the discrepancy between 94.3.13.3 and 94.4.2, and between 93.8.2.3 and Table 93–9 e.g. by renaming one of each fmax and fmin.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10.2** *P* **186** *L* **6** # 219

Dawe, Piers IPtronics

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

Putting related information in separate graphs makes it harder for the reader to follow what's going on as well as adding to the bulk of the document.

SuggestedRemedy

Please combine Figure 92-9, Example maximum cable assembly insertion loss and Figure 92-10, Minimum cable assembly insertion loss.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10.3** *P* **186** *L* **40** # 233

Dawe, Piers IPtronics

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

The ILD limit is near to double the 40GBASE-CR4 limit (scaled for signalling rate). I don't believe this draft spec works, even with FEC, unless the ICs are much better than needed for 100GBASE-KR4. Those who want a 100GBASE-CR4 need to do their homework to see whether this is viable.

SuggestedRemedy

Do the analysis of this draft spec and tighten ILD or reflection or maximum loss specs to make it work with KR4 grade ICs.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10.4** *P* **187** *L* **31** # 224

Dawe, Piers IPtronics

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

Because of the (through) loss of the MCB, this return loss limit is ineffective at high frequencies: the cable itself behind the MCB can get away with somewhere around 1 dB at 18 to 19 GHz. We know from plugfests that cables do better than that. Although a minimum host loss (which is less than 2 dB) will damp down echoes from the host IC, echoes are still a significant concern and there is no cost saving to leave such a weakness in the overall spec.

SuggestedRemedy

Tighten the limit at high frequencies by up to twice the MCB trace loss.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.11** *P* **191** *L* **51** # 237

Dawe, Piers IPtronics

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

Are the 100GBASE-CR4 HCB, MCB PCB losses achievable in practice?

SuggestedRemedy

If not, make adjustments, keeping consistency with the OIF/InfiniBand EDR specifications.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.11.1** *P* **191** *L* **10** # 222

Dawe, Piers IPtronics

Comment Type **ER** *Comment Status* **X**

Use well-established, recognizable names for things. This "TP2 or TP3 Test fixture" is the familiar Host Compliance Board.
Also, using its usual name would reduce confusion with the other two or three test fixtures in this project.

SuggestedRemedy

Change "TP2 or TP3 Test fixture" or "test fixture" when referring to this test fixture not the TP1/TP4 or TP0a/TP5a test fixtures, to "Host Compliance Board".

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.11.3** *P* **196** *L* **22** # 236

Dawe, Piers IPtronics

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

We need mated compliance board Sdc11, Sdc22, Scd11, Scd22 specs that are at least 2.5 to 3 dB better than the host receiver differential to common-mode input return loss spec in 92.8.4.2. At the moment we have just through conversion: Sdc21, Sdc12, Scd21, Scd12 (or some of them - not clear what "common-mode conversion loss" means exactly).

SuggestedRemedy

Add mated compliance board Sdc11, Sdc22, Scd11, Scd22 specs that are at least 2.5 to 3 dB better than the host receiver differential to common-mode input return loss spec.
Expect a presentation.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.11.3.4** *P* **196** *L* **29** # 44

Anslow, Pete Ciena

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

As stated in 1.2.6, "Unless otherwise stated, numerical limits in this standard are to be taken as exact, with the number of significant digits and trailing zeros having no significance." Consequently, trailing zeros should not be shown in Equation 92-30

SuggestedRemedy

Change "1.0" to "1" in equation 92-30 (2 instances)

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.14.4.4** *P* **209** *L* **6** # 168

Petrilla, John — Avago Technologies

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

Since RC1 is written for 92.11.1.1 but the relevant equation is in 92.11.3.2, it would be helpful to include the equation # in the Value/Comment field. Also it seems RC1 is redundant with CA9 (see page 210).

SuggestedRemedy

Change "Meets equation constraints" to "Meets equation (92-28) constraints"

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.14.4.5** *P* **210** *L* **19** # 170

Petrilla, John — Avago Technologies

Comment Type **ER** *Comment Status* **X**

CA6 references subclause 92.11.2 but there is no shall statement in 92.11.2.

SuggestedRemedy

Either add a shall statement into 92.11.2 or delete CA6

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.14.4.5** *P* **210** *L* **22** # 171

Petrilla, John — Avago Technologies

Comment Type **ER** *Comment Status* **X**

CA7 appears to have an incorrect reference 92.11.3.1 instead of 92.11.3

SuggestedRemedy

Change the reference from 92.11.3.1 to 92.11.3

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.14.4.5** *P* **210** *L* **43** # 69

Ran, Adee — Intel

Comment Type **ER** *Comment Status* **X**

Items CA14 and CA16 have empty status.

SuggestedRemedy

Change status of CA14 to CAST1:M, and status of CA16 to CAST2:M.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.7.1** *P* **167** *L* **45** # 182

Dudek, Mike — QLogic

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

The wording implies a mandatory requirement is in the subclause while it is actually a recommendation.

SuggestedRemedy

Change "The maximum insertion loss" to "The recommended maximum insertion loss"

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.7.12** *P* **170** *L* # 162

Slavick, Jeff — Avago Technologies

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

Label "Seed, S10 to S0" is backwards and should be "S0 to S10".

SuggestedRemedy

Per comment.

Proposed Response *Response Status* **W**

<Editor changed subclause from 92-5 to 92.7.12.>

Cl **92** *SC* **92.7.12** *P* **170** *L* **11** # 102

Ran, Adee Intel

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

The control function defined in 72.6.10 does not require a received coefficient update request to be handled in any limited time. An implementation can sample the incoming requests at any slow rate and be compliant.

The result of a slow response is to consume time allocated for the update procedure and possibly limit the number of requests that a receiver can make within the link_fail_inhibit_timer period (500 ms).

It is suggested that, when frame_lock is TRUE, the delay between reception of a request frame to execution of the request and returning updated status be limited to a maximum of 2 ms. That would likely allow at least 100 request-response cycles to be passed between the link partners, even if reaching frame lock state requires as long as 100 ms.

Current implementations of 10GBASE-KR known to me are capable or replying within a maximum of 1 ms.

Comment also applies to clause 93.7.12 (a refererence to clause 92 is probably sufficient) and to clause 94 (94.3.10.12).

SuggestedRemedy

Add the following text in clause 92.7.12 (with editorial license):

"When frame_lock is true for a lane, the following requirements apply for that lane: The period from presenting at the receiver input a training frame which has a new request (coefficient update field different from the one in the previous training frame), to responding to that request by an appropriate change of the status report field in the transmitted training frame, and if needed, applying changes to the transmit output waveform, shall be less than two milliesconds."

Apply similarly to the corresponding text in clauses 93 and 94.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.7.12** *P* **170** *L* **18** # 161

Slavick, Jeff Avago Technologies

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

This text changes the PRBS sequence used in the PMD training pattern for 100G-KR4 and 100G-CR4 to be a unqiue constant repeating PRBS sequence for each lane. In systems you can have multiple PMDs coming from the same source and you will have the existance of Lane 0 routed by Lane 0 from two different PMDs, both of which can be running training at the same time. Those two lanes will now be running PMD training with highly correlated noise for the entirety of training. The purpose for changing this from how 40G works is to reduce the correleated noise.

This is also the only modification we've done for PMD training in Clause 92/93 (other then rate scaling).

SuggestedRemedy

Remove the text changing the PRBS sequences used during PMD trainig for Clause 92&93.

Proposed Response *Response Status* **W**

<Editor changed subclause from 7.12 to 92.7.12.>

Cl **92** *SC* **92.7.12** *P* **170** *L* **29** # 75

Ran, Adee Intel

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

The values of "Initial output" column do not match the seed data. They do match if the seed is interpreted as "S0 to S10" instead of "S10 to S0". That is, the leftmost bit should correspond to S0, matching the order in figure 92-3.

SuggestedRemedy

Change heading of the third column from "Seed, S10 to S0" to "Seed bits (MSB in S0)". Alternatively, flip all seeds left to right.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.7.12** *P* **170** *L* **31** # 163

Slavick, Jeff — Avago Technologies

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

The start of the training pattern within the PMD training frame does not force a delineation of the Control Channel to the PRBS sequences. The currently selected seeds that are used at the start of every PRBS training pattern begin with a run of ones.

SuggestedRemedy

Advance each of the 4 initial seeds by 5 states to cause the Initial Output to begin with a 01. To induce a transition early in the sequence.

S0 -> S10 Initial Output
Lane 0 : 11111101011 : 7e3967d4
Lane 1 : 11111110010 : 763ccca8
Lane 2 : 01111011111 : b4fe7fb5
Lane 3 : 01111111101 : 5ff48d68

Proposed Response *Response Status* **W**

<Editor changed subclause from 92-5 to 92.7.12.>

Cl **92** *SC* **92.7.5** *P* **168** *L* **36** # 183

Dudek, Mike — QLogic

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

This sentence is contradicting the following paragraph for the situation where EEE is supported as PMD_signal_detect_i needs to be set to zero at some times.

SuggestedRemedy

Change the sentence to "If training is disabled by management, and EEE is not supported, PMD_signal_detect_i shall be set to one for i=0 to 3.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8** *P* **171** *L* **8** # 230

Dawe, Piers — IPtronics

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

The following items are needed for a viable spec (technical completeness):
Host common-mode output return loss
Absorbs common-mode energy
Host mixed-mode output return loss or termination mismatch
Limits conversion of reflected common-mode signal into interfering differential signal
Cable common-mode return loss
Absorbs common-mode energy
Integrated Common-Mode Conversion Noise or differential to common mode through loss
Limits conversion into common mode that would otherwise exceed the AC common-mode output voltage spec and the AC common-mode tolerance of the receiver, and could cause EMI - relevant to low loss cables in particular
These items are present in the InfiniBand FDR spec. Comparison with 40GBASE-CR4 and 100GBASE-CR10 may be interesting but does not justify gaps in this spec.

SuggestedRemedy

Add specs:
Host common-mode output return loss, -2 dB, 50 MHz to 20 GHz
Host common mode to differential output return loss, 16-1.22f, 50 MHz to 20 GHz
Cable common-mode return loss, -2 dB, 50 MHz to 20 GHz
Integrated Common-mode Conversion Noise, 40 mV.
Integrated Common-mode Conversion Noise is defined analogously to Integrated Crosstalk Noise. If that isn't clear enough, see the InfiniBand FDR spec, part of InfiniBand Architecture Specification Volume 2 Release 1.3.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **172** *L* **15** # 186

Dudek, Mike — QLogic

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

There is a potential source of interfering signal that could cause high error rates that is not controlled. There is an allowed common mode output amplitude from the Tx. Also the cable is allowed to convert an uncontrolled amount of differential energy into common mode energy. The Rx has no common mode return loss specification so 100% of the energy can be reflected to the Tx, where 100% of this reflected common mode energy can be converted to interfering differential energy.

SuggestedRemedy

Add a cable specification for differential to common mode conversion (SCD21) of 10dB to section 92.10. Also add a specification for Common mode to differential conversion reflection for the Tx output (SDC22) to table 92-6 and a subsection to describe it. Suggested limit would be 3dB more relaxed than equation 92-6.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **172** *L* **16** # 221

Dawe, Piers IPtronics

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

Wrong reference for Transition time.

SuggestedRemedy

Change 92.8.3.4 to 92.8.3.3.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.3** *P* **173** *L* **53** # 220

Dawe, Piers IPtronics

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

This says "Transmit equalization may be disabled by asserting the preset control defined in Table 45–60 and 45.2.1.81.3." but neither of those define what disabled transmit equalization means. Same problem with Table 92-6. It seems the punch line is actually in 72.6.10.2.3.1: "a state where equalization is turned off ... the pre-cursor (k = –1) and post-cursor (k = +1) coefficients shall be set to a zero value and the main (k = 0) coefficient shall be set to its maximum value".

SuggestedRemedy

Refer to 72.6.10.2.3.1, e.g. here "when transmit equalization is disabled (see 72.6.10.2.3.1). Transmit equalization may..."
and Table 92-6 note b "Transmit equalization may be disabled (see 72.6.10.2.3.1) by asserting the preset control defined in Table 45–60 and 45.2.1.81.3."

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.3** *P* **173** *L* **53** # 226

Dawe, Piers IPtronics

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

The transition times (per 92.8.3, at TP2 with the HCB of 92.11.1 and a fourth-order Bessel-Thomson low-pass response with 33 GHz 3 dB bandwidth) shall be greater than or equal to 8 ps when transmit equalization is disabled.
72.6.10.2.3.1 says "where equalization is turned off... the pre-cursor (k = –1) and post-cursor (k = +1) coefficients shall be set to a zero value and the main (k = 0) coefficient shall be set to its maximum value". This appears to be at TP0. Notice that KR4 has an 8 ps limit, at TP0a. For a host with significant PCB loss, the signal at TP0 can be as fast as it likes and the signal at TP2 will always exceed 8 ps - so this spec has effect only for hosts with very little loss and non-KR4-compliant ICs. It might help with NEXT for those hosts but does nothing for FEXT. Is this what's intended?

SuggestedRemedy

Options:
Try to constrain the transition time at TP0 - not feasible?
Delete this spec, as ineffective.
Tighten this spec (more ps), to what an 8 ps IC behind a minimum-loss host PCB, good connector and HCB would deliver at TP2.
Leave this spec - probably harmless.
Other?

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.4** *P* **174** *L* **8** # 53

Anslow, Pete Ciena

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

"20 dB" is split across two lines.
Use a non-breaking space to prevent this.

SuggestedRemedy

Make the space in "20 dB" non-breaking (ctrl-space)

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.6** *P* **177** *L* **19** # 164

Moore, Charles — Avago Technologies

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

This clause states incorrectly that Transmitter tests are made at TP2 or TP3. No Tx test are done at TP3 although Tx noise is measured at TP4.

SuggestedRemedy

Change:
"Transmitter measurements and tests defined in Table 92-6 are made at TP2 or TP3 using the test fixture of Figure 92-14, or its equivalent."

to

Transmitter measurements and tests defined in Table 92-6, except Tx Noise measurement, are made at TP2 using the test fixture of Figure 92-14, or its equivalent.. Similarly, Receiver test are largely made at TP3."

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.7** *P* **178** *L* **20** # 227

Dawe, Piers — IPtronics

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

These jitter metrics must be met regardless of the transmit equalization setting. For a maximum host channel with the transmitter at Preset, this might be challenging because the eye at TP2 is pretty closed up, but this is not relevant to real-world use with an equalizer.

SuggestedRemedy

Consider if "regardless of the transmit equalization setting" is too wide, and the specifications should apply above some threshold of emphasis.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.7** *P* **178** *L* **20** # 228

Dawe, Piers — IPtronics

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

This spec assumes that DDJ is harmless, and constrains the difference between TJ and DDJ, and the difference between effective DJ and DDJ. However, the jitter specs allow the DDJ to contain large amounts of true DCD (imbalance between ones and zeros), which consumes SNR, has to be corrected in the receiver, and for a differential driver output, is not necessary. Is this true DCD constrained enough by the max RMS normalized error (linear fit) spec?

SuggestedRemedy

If not, add a true DCD spec. True DCD is easily measured: from an eye, by selecting the scope menu item called "DCD", or from the DDJ method by comparing rising and falling edges.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.7.2** *P* **178** *L* **27** # 231

Dawe, Piers — IPtronics

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

TJ, DDJ and ERJ as used in this project are all proper nouns because they have definitions that are not the obvious meaning of the phrases: TJ is not all the jitter there is, DDJ is not all the data-dependent jitter, ERJ could contain any fraction that's random, EDJ is probably far from all the deterministic jitter. Other clauses may have used similar but uncapitalized terms without definition (making them common nouns, if technically unsatisfactory), or may have simply ignored the rules on proper nouns in Merriam-Webster. But we aren't required to repeat or correct those problems: this clause has definitions (good!) Jitter terminology can be confusing enough without erroneous typesetting - let's do it right to help our readers.

SuggestedRemedy

Use Total Jitter, Data Dependent Jitter, Effective Random Jitter (ERJ) and Effective Deterministic Jitter (EDJ) (all with capitals) as these are undeniably proper nouns.
Also, Even-odd Jitter can be treated as a proper noun because it has a definition, although its definition agrees with the meaning of the words.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.7.2** *P* **178** *L* **27** # 165

Moore, Charles — Avago Technologies

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

I have a several problems with the way jitter is specified, including:

1. The way TJ is defined is either unclear or it fails to use the definition of Jn given 92.8.3.7.4 and is likely to be too difficult to measure.
2. Measuring Q9 is overkill for a system which only needs a BER of about 1e-5.
3. Data dependent jitter is treated as being a form of deterministic jitter but actually behaves a lot like RJ.

SuggestedRemedy

A presentation will be made on this subject

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.7.2** *P* **178** *L* **29** # 223

Dawe, Piers — IPtronics

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

This spec uses FEC so a BER of 10^–12 is irrelevant. Generally TJ at 10^-12 isn't truly measured anyway but found by extrapolation (92.8.3.7.4 gives an example method), so we might as well cut out the back-and-forth and specify something more relevant and more measurable.

SuggestedRemedy

Replace the spec for TJ-DDJ with one for J4-DDJ (most relevant and measurable) or J5-DDJ or J9-DDJ (because we need J5 and J9 anyway to find ERJ).

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4** *P* **179** *L* **22** # 232

Dawe, Piers — IPtronics

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

This incorporates the overload spec in 72.7.2.4 which says "shall accept differential input signal peak-to-peak amplitudes produced by compliant transmitters connected without attenuation to the receiver, and still meet the BER requirement specified in 72.7.2.1." but that's not appropriate because:
1. There is a minimum loss for the cable and a recommended minimum loss for the host PCB traces - signals from less loss than that don't need to be supported;
2. In 72, training is not actually required; here I understand that it is, and
3. The BER in 72.7.2.1 is 1e-12.
In a scenario where training must be available, what the receiver has to do with an overload challenge is train it to what it likes THEN receive it.

SuggestedRemedy

We don't need to write a separate overload section.
Delete this row in Table 92-8.
In Table 92-9, add a column for another test, with parameters for a minimum-loss cable and host channel (same as Test 1, I believe). Simplify the noise and jitter parameters for this new column if appropriate. Add a row for (initial and maximum) peak-to-peak voltage. For tests 1 and 2, 800 mV: refer to this row from 92.8.4.3.4. For the new column, the peak-to-peak voltage is 1200 mV at Initialize as attenuated by the minimum-loss cable, i.e. something less than 1000 mV (to be calculated).

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4** *P* **179** *L* **25** # 184

Dudek, Mike — QLogic

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

There is a contradiction in the document. The summary table 92-8 has different values for the Differential to Common-mode input return loss than the referenced subsection 92.8.4.2.

SuggestedRemedy

Change the value to "(Equation 92-6)

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4.2** *P* **180** *L* **2** # 238

Dawe, Piers — IPtronics

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

The receiver differential to common-mode input return loss spec in eqn 92-6 doesn't agree with Table 92-8, Receiver characteristics at TP3 summary.

SuggestedRemedy

Correct whichever one is wrong.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4.2** *P* **180** *L* **3** # 187

Dudek, Mike — QLogic

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

There is no specification for the mated compliance board common mode to differential return loss despite there being a specification for this for the receiver. With a realistic specification (that adopted by OIF VSR) at high frequencies the host product specification for the common mode to differential conversion is too close to that of the mated compliance boards making the specification almost impossible to meet. I will bring a presentation showing the effect to the Victoria meeting.

SuggestedRemedy

Add a specification for the mated compliance board common mode to differential return loss. Specification to be minimimum 30-5/7*f dB for 0.01<f<14 GHz and 25-5/14*f dB for 14<f<25 GHz. Change the product specification in equation 92-6 above 12.89Ghz from 12dB flat to -18 + 6/25.78*f which matches the specification OIF adopted for VSR at their last meeting.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4.3** *P* **180** *L* **34** # 83

Ran, Adee — Intel

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

The applied SJ frequency in this test, 15 MHz, may be well within the tracking bandwidth of a CDR. It is too low.

Compare to the corresponding KR4 test (table 93-7) which requires frequency "greater than 100 MHz". This value matches the guideline of Annex 69A which requires "sinusoidal jitter at a frequency no less than 1/250 of signaling speed".

SuggestedRemedy

In comment (a) of table 92-9, change 15 MHz to 100 MHz.

Proposed Response *Response Status* **O**

Cl **92A** *SC* **92A.5** *P* **313** *L* **19** # 77

Ran, Adee — Intel

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

f should be in GHz, otherwise Equation 92A-4 yields unreasonable values.

Also applies to line 32 (equation 92A-5).

SuggestedRemedy

Change "in MHz" to "in GHz", in both places.

Proposed Response *Response Status* **O**

Cl **92A** *SC* **92A.5** *P* **313** *L* **19** # 41

Anslow, Pete — Ciena

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

In the "where" section of Equation 92A-4 it says:
"f is the frequency in MHz"
This means that the insertion loss at 1 GHz (1000 MHz) is 0.1148*(sqrt(1000)) + 0.278*1000 = 281.6 dB

Similarly, for equation 92A-5, since the equations referred to in the where section have f in GHz, f should be in GHz here too.

SuggestedRemedy

Change "f is the frequency in MHz" to "f is the frequency in GHz" in the where sections of both equations 92A-4 and 92A-5

Proposed Response *Response Status* **O**

Cl **92A** *SC* **92A.5** *P* **313** *L* **4** # 185

Dudek, Mike — QLogic

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

The value of ILcamax5m is not based on the maximum allowed values of the coefficients because as noted one cannot have all the maximum values simultaneously.

SuggestedRemedy

Change the definition to "is the maximum 5 m cable assembly insertion loss given in Table 92–12 for the maximum insertion loss at 12.8906 GHz."

Proposed Response *Response Status* **O**

Cl **92A** *SC* **92A.7** *P* **314** *L* **44** # 100

Ben-Artsi, Liav — Marvell

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

The required channel operating margin is currently 3dB and should be increased to properly account for Rx imperfections and implementation limitations as well as transmitter equalizer coefficients

SuggestedRemedy

Will be supplied by the presentation submission due date

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.1** *P* **213** *L* **37** # 212

Law, David — HP

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

Subclause 93.1 states in the 5th paragraph that 'Differential signals received at the MDI from a transmitter that meets the requirements of 93.8.1 and have passed through the channel specified in 93.9 are received with a BER less than 10-5. When the receive path of the RS-FEC sublayer is configured to bypass error correction (see 91.5.3.3), differential signals received at the MDI from a transmitter that meets the requirements of 93.8.1 and have passed through a channel with better performance than the worst-case specifications in 93.9 are received with a BER less than 10-12.'

Reading the first paragraph it seems to state that with a PMD TX that meets 93.8.1 and a channel that meets 93.9, with no mention of the configuration of the RS-FEC, the BER is less than 10-5. Reading the second paragraph it seems to state that with a PMD TX that meets 93.8.1 and a channel 'with better performance than' 93.9 (which could be 0.0001% better), with the RS-FEC in bypass error correction, the BER is 10-12. That doesn't seem correct, and I understand that this isn't really the intent of the text, instead I believe the intent is to state that:

[1] If FEC is not bypassed, the link may operate at up to BER of 1E-5.
[2] If FEC is bypassed, the link has to operate at a BER of at least 1E-12.

SuggestedRemedy

Change the text to state that to meet the frame error ratio, if FEC is not bypassed, the link may has to operate at BER of 1E-5 or better, if FEC is bypassed, the link has to operate at a BER of 1E-12 or better.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.1** *P* **213** *L* **38** # 159

Healey, Adam — LSI Corporation

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

The second sentence states that the receiver bit error ratio is less than 1E-12 when signals from a compliant transmitter are received through "a channel with better performance than the worst-case specifications in 93.9."

"Better performance" is not sufficiently quantified. Channel specifications that enable a 1E-12 bit error ratio should be added.

SuggestedRemedy

Define parameter values for the calculation of COM that correspond to the case where the RS-FEC sublayer is configured to bypass error correction. The only parameter to change from the case where error correction is not bypassed is the target detector error ratio (1E-12 when error correction is bypassed).

Revise the paragraph in 93.1 to reference the added channel specification.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.11.4.1** *P* **236** *L* **10** # 213

Law, David — HP

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

The Value/Comment field of item FS2 states 'Positive output voltage of corresponds to tx_bit = one', a positive output voltage of what?

SuggestedRemedy

Suggest this be changed to read either 'Positive differential output voltage corresponds to tx_bit = one' or 'Positive differential output voltage (SLi<p> minus SLi<n>) corresponds to tx_bit = one'. A similar change should be made to item FS5.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.11.4.2** *P* **238** *L* **31** # 245

Law, David — HP

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

As items TC11, TC12 and TC12 are mandatory predicated on EEE the support column should be 'Yes [ ] N/A [ ]'.

SuggestedRemedy

Change the support column to read 'Yes [ ] N/A [ ]' for items TC11, TC12 and TC12.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.11.4.2** *P* **238** *L* **45** # 246

Law, David HP

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

The support column is missing a value for TC15.

SuggestedRemedy

Add 'Yes [ ]' to the TC15 support column.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.11.4.2** *P* **238** *L* **48** # 247

Law, David HP

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

Subclause 93.8.1.4 specifies Transmitter output return loss.

SuggestedRemedy

Suggest that the feature column of item TC16 be changed from 'Common-mode input return loss' to read 'Common-mode output return loss'.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.11.4.2** *P* **238** *L* **6** # 148

Brown, Matthew APM

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

capitalization

SuggestedRemedy

"GHz"

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.11.4.4** *P* **240** *L* **34** # 99

Ben-Artsi, Liav Marvell

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

The required channel operating margin is currently 3dB and should be increased to properly account for Rx imperfections and implementation limitations as well as transmitter equalizer coefficients.

SuggestedRemedy

Will be supplied by the presentation submission due date

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.6** *P* **215** *L* **15** # 243

Law, David HP

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

Clause 45 defines registers.

SuggestedRemedy

Suggest the text 'The optional MDIO capability described in Clause 45 defines several variables that ..' should read 'The optional MDIO capability described in Clause 45 defines several regsiters that ..'.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.7.5** *P* **218** *L* **9** # 250

Law, David HP

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

Suggest a cross reference to how management disables training.

SuggestedRemedy

Suggest that text 'If training is disabled by management, ..' be changed to read 'If training is disabled by management variable mr_training_enable (see 93.6), ..'.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.7.8** *P* **219** *L* **4** # 214

Law, David HP

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

The third paragraph states that 'Control of the loopback function is specified in 45.2.1.1.5' but this is only correct if the optional PMA/PMD control 1 register described in subclause 45.2.1.1 is implemented. If this option is not implemented then equivalent management capabilities are required, as stated in subclause 93.1, '... and to the management functions that are optionally accessible through the management interface defined in Clause 45, or equivalent.'. Based on this I suggest that the approach used for other control registers be used here, map the bit to a variable in Table 93-2, and reference the variable in the text, not the register.

SuggestedRemedy

[1] Add entry to Table 93-2 that reads: PMA local loopback; PMA/PMD control 1; 1.0.0; PMA_local_loopback
[2] Change the second sentence of subclause 93.7.8 to read 'When the PMA_local_loopback variable is set to one, transmission requests passed to each transmitter are sent directly to the corresponding receiver, overriding any signal detected by each receiver on its attached link.'.
[3] Delete the second paragraph that currently reads 'Control of the loopback function is specified in 45.2.1.1.5.'.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.1** *P* **220** *L* **48** # 235

Dawe, Piers IPtronics

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

Obviously, a 100GBASE-KR4 port must be able to transmit and receive simultaneously and overcome its own FEXT and NEXT. Testing this would be impractical with separate transmitter and receiver test fixtures, as well as adding the expense of another test fixture.

SuggestedRemedy

Combine the two test fixtures. Specify test fixture NEXT and FEXT if it helps.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.1** *P* **220** *L* **49** # 244

Law, David HP

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

Suggest reference to TP0a be added in this paragraph.

SuggestedRemedy

Suggest '.. are made at the output of a test fixture as shown ..' should be changed to read '.. are made at the output of a test fixture (TP0a) as shown ..'.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.4** *P* **222** *L* **47** # 240

Dawe, Piers IPtronics

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

The S-parameter specs go only as far as 19 GHz, implying that energy above 19 GHz is non-existent or harmless, yet time-domain signals are defined in a 33 GHz bandwidth, implying that energy between 19 GHz and 33 GHz could be present and important. These are not consistent. This issue applies more to KR4 than CR4, where one could always use thinner cables if too much high frequency energy were an issue.
As the S-parameter specs are frequency-aware limits, there is no particular reason to stop at 19 GHz. Do some instruments stop at 20 GHz?
For scopes: a 33 GHz bandwidth allows in frequencies and noise that a real receiver wouldn't, so it's not optimal. Worse, it probably costs more than a slower scope! Some slow scopes might degrade peak-to-peak and jitter measurements but the Bessel-Thomson response with its excellent phase response was chosen to avoid this while filtering irrelevant noise and so on.
This is a TR comment because it may take a while for people to assure themselves of the consequences of either a change or no change.

SuggestedRemedy

Change 19 GHz to 20 GHz for S-parameter ("loss") specs throughout (it may be fine to leave it at 19 for insertion loss fitting). Consider changing 33 GHz to 25 GHz for scope response, throughout except for transition time. For comparison, an optical signal would be measured in~19 GHz (3/4 of signalling rate).

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.2.3** *P* **228** *L* **25** # 90

Moore, Charles Avago Technologies

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

100GBASE_KR4 receiver test is tied to Tx specs through jitter and rise time but there is a gap between interference tolerance spec and COM used to specify channel. Use COM to calibrate interference tolerance as is done for 100GBASE_KP4. This will "close" the spec.

SuggestedRemedy

A presentation will be provided detailing how this should be done.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.2.3** *P* **228** *L* **28** # 234

Dawe, Piers IPtronics

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

92.8.4.3.5, 100GBASE-CR4 Receiver interference tolerance test procedure, says: During the tests, the disturbers transmit... and all of the transmitters in the device under test transmit ...

This is normal practice, seen in many PMD clauses.

93.8.2.3, 100GBASE-KR4 Receiver interference tolerance, refers to Annex 69A, which says "The interfering signal can come from ... NEXT" but then forgets to require that the other input lanes and the output lanes of the port under test be active during BER measurement.

SuggestedRemedy

Explain that there are three FEXT disturbers, and add (at the end of the subclause?): During the tests, the disturbers transmit at their calibrated level and all of the transmitters in the device under test transmit either scrambled idle or PRBS31, with the maximum compliant amplitude and equalization turned off (preset condition).

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.2.3** *P* **228** *L* **40** # 94

Moore, Charles Avago Technologies

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

Values for a0, a1, a2, a4 are scaled for Hz, Napier, and gain rather than GHz, dB, and loss as used in annex 93A.3. Change scaling and sign of inequalities.

SuggestedRemedy

use values:

	Test 1	Test2	Test3	Test 4	Units
a0	0.9	0.9	0.9	0.0	dB
a1	3.3	3.3	3.3	3.3	dB Hz^-1/2
a2	--	--	--	--	dB Hz^-1
a4	0.022	0.030	0.030	0.043	db Hz^-2

change all "minimum" applying to a0, a1, a2, and a4 to maximum, "min" to "max", and "maximum" to "minimum" in table 93-7 and associated note "a"

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.9.1** *P* **230** *L* **15** # 218

Dawe, Piers IPtronics

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

Give a specific reference.

SuggestedRemedy

Change "the procedure in Annex 93A" to "the procedure in Annex 93A.1".

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.9.1** *P* **230** *L* **15** # 103

Ran, Adee Intel

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

The minimum COM value of 3 dB accounts for receiver implementation penalty. Several components that consume this margin are discussed in an accompanying presentation.

The proposed updates to COM procedure yield a result of over 4 dB for a channel with 35 dB loss, which is the objective of the 100GBASE-KR4 PHY. It is proposed that this channel be regarded as the limit, and that a 4 dB margin be reserved for receiver implementation; this can enable more design freedom that can result in power saving.

SuggestedRemedy

Change the minimal COM required for 100GBASE-KR4 channels from 3 dB to 4 dB.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.9.1** *P* **230** *L* **15** # 98

Ben-Artsi, Liav Marvell

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

The required channel operating margin is currently 3dB and should be increased to properly account for Rx imperfections and implementation limitations as well as transmitter equalizer coefficients

SuggestedRemedy

Will be supplied by the presentation submission due date

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.9.1** *P* **231** *L* **44** # 81

Ran, Adee Intel

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

A_DD should represent half of the peak-to-peak DJ (excluding DDJ) allowed from a transmitter - specified in table 93-4 as 0.15 UI.

The value in table 93-9, 0.07, doesn't match.

SuggestedRemedy

Change A_DD from 0.07 to 0.075.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.9.1** *P* **231** *L* **48** # 58

Farhoodfar, Arash Cortina-Systems

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

In table 93-9, "DER0" is specified at 10E-5. The actual value should be a funcion of DFE profile in COM. This can result in incorrect COM value as a function of the channel.

SuggestedRemedy

Make "DER0" a function of the DFE profile.
Remove "bmax" limitation from the table.

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A** *P* **315** *L* **6** # 217

Dawe, Piers IPtronics

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

I was looking for the COM spec and I found "Characteristics of electrical backplanes" but that sounded like advice about how to make backplanes, or recommendations like Annex 69B - "informative" stuff, and I was looking for a normative specification. This annex needs a more assertive title that does justice to its contents.

SuggestedRemedy

Specification methods for electrical backplanes

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1** *P* **315** *L* **24** # 57

Farhoodfar, Arash — Cortina-Systems

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

Equation 93A-1 defines COM as 20log10(As/An) where "As" is the signal amplitude and "An" is the noise amplitude as defined in 93A.1.7. The "An" term includes ALL interference and noise terms including residual-ISI.
COM equalizer consists of a CTLE and a DFE. The COM timing recovery is a fixed zero-crossing timing recovery with no phase optimization capability. This is most often not complex enough an equalizer/timing-recovery and results in sub-optimal Equalization/Noise-Enhancement. The sub-optimality of COM is then scaled according "As/An" ratio resulting in a number that is grossly mis-leading.
For the KR4, misleading COM values are reported for longer/harder-to-equalize channels. It's particularly egregious to multiply ISI, since KP4 seems to be particularly hurt by lack of FFE.

SuggestedRemedy

Define COM as

The number of multiples of the baseline 'noise' (excluding ISI and xTalk) that you could add to the input of the receiver and still maintain BER < 1e-12

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1** *P* **315** *L* **24** # 252

Farhoodfar, Arash — Cortina-Systems

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

TX SNDR is not modeled in COM. TX SNDR is defined in 94.3.12.9 for PAM4 but not modeled in COM.

SuggestedRemedy

Shoul ad TX noise as a new noise PDF to the COM. Need to resolve the issue of how to combine this with Dual-dirac Jitter model.

Proposed Response *Response Status* **W**

<This comment was received after the ballot closed. Since the comment is late and is non-binding, the editor changed the comment type from TR to T.>

Cl **93A** *SC* **93A.1** *P* **316** *L* **1** # 140

Brown, Matthew — APM

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

As a service to future readers, make Table 93A-1 more readable by providing references to the subclause that defines each parameter set.

SuggestedRemedy

For each parameter set (or row) provide a reference to the sub-clause that defines the paratmeter(s).

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.1** *P* **315** *L* **53** # 138

Brown, Matthew — APM

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

Reference to TP0 and TP5 should be WRT to a system diagram.

SuggestedRemedy

Change "TP0 to TP5" to "TP0 to TP5 (see Figure 93B-1)"

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.1** *P* **316** *L* **1** # 143

Brown, Matthew — APM

Comment Type **ER** *Comment Status* **X**

References to several components is not totally clear. A system diagram showing the device resister/capacitor, package txline/capacitor, etc., would be helpful. It would be further helpful to include start and end points for the various channel responses such as victim path and agressor paths.

SuggestedRemedy

Add a system diagram showing each of the elements specified in Table 93A-1 and showing the start and end points of the victim and agressor channels.

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.1** *P* **316** *L* **51** # 144

Brown, Matthew APM

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

"time step" should be "frequency step"

SuggestedRemedy

Change "time step" to "frequency step".

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.2.3** *P* **318** *L* **13** # 97

Ben-Artsi, Liav Marvell

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

The parameter Zp (package trace length) is missing

SuggestedRemedy

Add the parameter Zp to table 93A-2 with a value of 12 (no units, as this is a multiplication of 1mm section)

Proposed Response *Response Status* **W**

<Editor changed subclause from "Table 93A-2" to 93A.1.2.3.>

Cl **93A** *SC* **93A.1.2.3** *P* **318** *L* **14** # 172

Petrilla, John Avago Technologies

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

In Table 93A-2, the values given for "rho 0" and "gamma 0" are such that s-parameters will have non-zero imaginary components at DC.

SuggestedRemedy

In Table 93A-2, adjust values given for "rho 0" and "gamma 0" such that s-parameters will not have non-zero imaginary components at DC.

Proposed Response *Response Status* **W**

<Editor changes subclause from 83A.1.2.3 to 93A.1.2.3.>

Cl **93A** *SC* **93A.1.2.3** *P* **318** *L* **1422** # 101

Ben-Artsi, Liav Marvell

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

Rho0 and Gamma0 has imaginary parts which is not physical

SuggestedRemedy

Will be supplied by the presentation submission due date

Proposed Response *Response Status* **W**

<Editor changed subclause from "Table 93A-2" to 93A.1.2.3.>

Cl **93A** *SC* **93A.1.2.3** *P* **318** *L* **35** # 145

Brown, Matthew APM

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

In equation 93A-11, the summation is for integer i from integer 1 to length value z_p. z_p is not technically an integer and is equal to N_p*1_mm.

SuggestedRemedy

Change "zp is an integer multiple of 1 mm" to "zp is an integer multiple, N_p, of 1mm". Change Eq. 93A-11 summation upper limit to N_p.

Alternately, define length as being z_p*1_mm, where z_p is an integer. Change "whose length zp is an integer multiple of 1 mm" to "whose length is an integer multiple, zp, of 1 mm".

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.2.4** *P* **318** *L* **47** # 146

Brown, Matthew APM

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

I would consider "device" to be the "package plus die", where "device" here refers specifically to the die.

SuggestedRemedy

Change "device" to "die".

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.3** *P* **319** *L* **11** # 155

Healey, Adam LSI Corporation

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

The equation for reflection coefficient is incorrect. It should be -1 when Rd is 0.

SuggestedRemedy

Change the equation to:
GAMMA1(f) = GAMMA2(f) = (Rd-R0)/(Rd+R0)

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.4** *P* **319** *L* **34** # 139

Brown, Matthew APM

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

Need hyphen.

SuggestedRemedy

Change "single bit response" to "single-bit response".
Fix multiple similar instances in 93A.

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.5** *P* **320** *L* **13** # 156

Healey, Adam LSI Corporation

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

The factor of 1/(L-1) in Equation (93A-21) accounts for the loss of separation between levels for PAM-L modulation. As a result, the reduction is built into the single-bit response and consequently As.

However, this causes the separation loss to be double-counted in a number of instances.

1. Equation (93A-26) includes the level separation loss and the value of ISI variance given by Equation (93A-25) is incorrectly reduced.

2. Equation (93A-30) includes the level separation loss. The ISI and crosstalk amplitude distributions are computed incorrectly e.g. the amplitude is scaled by 1/(L-1)).

3. The variance of the voltage error due to random jitter (As*sigma_RJ)^2 in Equation (93A-27) and Equation (93A-32) incorrectly includes the loss in level separation.

4. The distribution of the voltage error due to dual-Dirac jitter in Equation (93A-34) is also incorrect as it includes the level separation loss.

SuggestedRemedy

Remove the factor of 1/(L-1) from Equation (93A-21).
Define As to be h^(0)(0)/(L-1).
Scale sigma_RJ and A_DD by h^(0)(0) rather than As.

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.6** *P* **320** *L* **39** # 141

Brown, Matthew APM

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

Procedure here uses lettered list while procedures in 94 use number number lists.

SuggestedRemedy

In 93A, used numbered lists for procedures.

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.6** *P* **320** *L* **41** # 158

Healey, Adam — LSI Corporation

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

It appears that the choice of the sampling time ts is based on the Mueller and Muller phase detector algorithm with the assumption that the decision feedback equalizer almost completely cancels the first post-cursor ISI contribution.

However, the magnitude of the first equalizer coefficient is limited by bmax and complete cancellation cannot be assured.

The sampling time should satisfy the equation:

h^(0)(ts-T) = h^(0)(ts+T)-min(h^(0)(ts+T), bmax*h^(0)(ts))

SuggestedRemedy

Change the definition of ts per the comment.

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.6** *P* **321** *L* **1** # 80

Ran, Adee — Intel

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

Equation 93A-24 enables limiting the ISI cancellation capability using the parameter b_max. The intent was to protect against error propagation in a DFE implementation, especially in 100GBASE-KP4.

Currently the same b_max is used to limit all values of h(0)(n). However, 100GBASE-KP4 includes 1/(1+D) precoding that mitigates error propagation due to the first postcursor. In fact, some solutions presented to the task force rely on having the postcursor as large as the cursor.

Removing the first postcursor constraint enables better performance, and makes several submitted channels achieve the required COM, including channels with 33 dB loss at 7 GHz, which is one of our objectives. Error propagation analysis provided by Dariush Dabiri shows that error propagation effect does not increase if this constraint is removed.

It is proposed that b_max limitation for the 1st postcursor be relaxed or removed.

A presentation will be supplied to illustrate the effect of this change.

SuggestedRemedy

Change equation 93A-24 in either of the following (equivalent) ways:

(option 1)
Split the second case into two cases, n=1 and 2<=n<=N_b
For n=1, use 1 instead of b_max
For 2<=n<=N_b, use the existing equation.

(option 2)
Change the first case to be 0<=n<=1, and the second case to be 2<=n<=N_b.

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.6** *P* **321** *L* **16** # 74

Ran, Adee Intel

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

Calculation of FOM uses ISI, sigma_r and the contribution of RJ as noise sources. Later, when COM is calculated, the PDFs of the same noise sources are used, with additional crosstalk and DJ contributions.

Thus, FOM assumes lower noise than COM, which creates a bias in equalization selection; COM may be higher if another set of equalization parameters is selected instead.

SuggestedRemedy

Add a crosstalk RMS term to FOM, calculated as in eq. 93A-37, with max RMS phase selected per crosstalk source. This term will be calculated at each iteration, with TXFFE and CTF applied to FEXT sources, and CTF to FEXT sources.

Add a DJ noise term to FOM, calculated as (A_S*A_DD)^2.

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.6** *P* **321** *L* **16** # 73

Ran, Adee Intel

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

According to the original COM proposal (mellitz_01_0712, slide 7), sigma_r represents noise at the receiver input, before the CTLE. It should be affected by the H_ctf transfer function, but in the current procedure it is not.

By the definition of H_rx as a noise filter (93A.1.4.1), it should be understood that sigma_r is the RMS noise at this filter's output, before applying the CTLE effect. COM should use a value after applying the CTLE effect.

Reduction of noise power due to CTLE can lead to significant improvement in COM results for long channels, and enable meeting the 33 dB loss objective of 100GBASE-KP4.

Presentation with more information will be supplied.

SuggestedRemedy

Define a CTF-adjusted version of sigma_r:

sigma_r_effective^2 = sigma_r^2/f_r * integral from 0 to f_r |H_ctf(f)|^2 df

In equations 93A–27, 93A–32, and 93A–42, use sigma_r_effective instead of sigma_r.

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.7.2** *P* **322** *L* **22** # 157

Healey, Adam LSI Corporation

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

The approximation used to derive the amplitude error resulting from timing jitter is too coarse.

A better estimate employs the first derivative of the single-bit response. The improved estimate is readily incorporated into the computation of FOM Equation (93A-27) and the computation of the noise amplitude distribution 93A.1.7.2.

SuggestedRemedy

A contribution will be submitted with the suggested equations.

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A.1.7.3** *P* **323** *L* **9** # 142

Brown, Matthew APM

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

word error

SuggestedRemedy

Change "index a i" to "index as i".

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A1.2.2** *P* **317** *L* **41** # 91

Moore, Charles Avago Technologies

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

In the interests of worst casing crosstalk, the NEXT transmitter should have a faster transition time than the victim transmitter. Since we assume that Tx transition time is due to the package, we should model the NEXT transmitter with a faster package than the victim channel.

SuggestedRemedy

Add to the end of clause 93A.1.2.2: "Values for C_d and C_p are specified for each PMD type. These values are used for the receiver package and the transmitter package for the victim and far end crosstalk channels. The transmitter package for any near end crosstalk channel should 0.5 times the specified value.

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A1.2.2** *P* **317** *L* **51** # 89

Moore, Charles — Avago Technologies

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

Capacitor on opposite end of package trace from device should not be called "package-side capacitance" since there is no package side of the package.

SuggestedRemedy

Call capacitor on other end of package trace from device "board side Capacitor" and use C_b, and S^(b) to represent the value in equations.

Proposed Response *Response Status* **O**

Cl **93A** *SC* **93A1.2.3** *P* **318** *L* **14** # 92

Moore, Charles — Avago Technologies

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

The values of rho_0 and gamma_0 given in Table 93A-2 have imaginary parts which are not integer multiples of pi. This means that according to equations 93A-9 and 93A-10, S_11 and S_21 will have non-zero imaginary parts at DC, which is non-physical

SuggestedRemedy

Choose a set of rho and gamma values for Table 93A-2 which give rho_0 and gamma_0 values which have imaginary parts which are integer multiples of pi. I suggest just zeroing the imaginary parts of rho_0 and gamma_0 currently in Table 93A-2 and making no other change, but i will accept any reasonable alternative.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94** *P* **241** *L* **1** # 225

Dawe, Piers — IPtronics

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

I haven't noticed any 100GBASE-KP4 silicon. Does 100GBASE-KP4 now have Broad Market Potential (multiple vendors and numerous users) or is 100GBASE-KR4 the de facto standard?

SuggestedRemedy

Show Broad Market Potential (commitment from multiple vendors and numerous users) or remove the clause.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.1** *P* **241** *L* **8** # 150

Marris, Arthur — Cadence Design Syste

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

Change "physical" to "Physical Layer"

SuggestedRemedy

Change "physical" to "Physical Layer"

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.1** *P* **241** *L* **8** # 211

Law, David — HP

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

The first paragraph of the overview isn't of the usual format (see IEEE St 802.3-2012 subclause 84.1 and 85.1 as well as IEEE P802.3bj subclause 93.1), for example doesn't include the usual text that Clause 45 registers or equivalent should be supplied, has a typo in the statement in respect to how to form a PHY ('.. 100GBASE-KP4 physical shall ..'), and has self-references to the PMA and PMD in Table 94-1.

SuggestedRemedy

Suggets that:

[1] Delete the text 'A 100GBASE-KP4 physical shall include the required sublayers and may include the optional sublayers specified in Table 94–1.'.
[2] Add a new second paragraph that reads 'When forming a complete Physical Layer, a PMD and PMA shall be connected to the appropriate PMA or RS-FEC as shown in Table 94-1, to the medium through the MDI and to the management functions that are optionally accessible through the management interface defined in Clause 45, or equivalent.'.
[3] Delete the entries '94-PMA Required' and '94-PMD Required' from Table 94-1.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.2.1.1.1** *P* **243** *L* **32** # 206

Law, David — HP

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

Typo.

SuggestedRemedy

The full stop in '(tx_bit.start)' should be a comma '(tx_bit,start)'.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.2.2.4** *P* **248** *L* **24** # 60

Lusted, Kent — Intel

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

Spec states "
Upon the transition from the last training frame to the first PMA frame the PRBS13 generator used during training advances without re-seeding (see 94.3.10.7.2) and the output is used to generate the termination bits. The PRBS13 generator continues to advance without re-seeding and without inversion."

But it isn't 100% clear that the PRBS13 is not inverted in the PMA frame (see lusted_3bj_01_1112.pdf slide 9)

SuggestedRemedy

consider changing to "
Upon the transition from the last training frame to the first PMA frame the PRBS13 generator used during training advances without re-seeding (see 94.3.10.7.2), without inversion and the output is used to generate the termination bits."

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.10.7** *P* **264** *L* **23** # 72

Ran, Adee — Intel

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

The "status report" field has two different definitions - tables 94-10 and 94-13. There are several issues with these definitions :

1. The countdown sub-fields in training and EEE modes are at different locations. This sub-field is used in both modes for the same purpose, but requires different decoding for each case.

2. PMA alignment offset is used in table 94-10, although it is not defined yet (and not required if this table is only for training mode).

3. Bit 6 is assigned twice in both table 94-10 and 94-13, and bit 14 is not assigned in table 94-13.

4. In EEE mode there are three separate "reserved" subfields, which is cumbersome and less useful for future usage.

The suggested remedy is aimed at making the definitions consistent, and avoid repetition of almost-identical text.

SuggestedRemedy

Change bit assignments in table 94-10 as below. Table 94-13 should have similar bit assignment, with possibly different descriptions for some fields.

Move 94.3.11.1.7 (PAO definition) to be a subclause of 94.3.10.7; specify that it must be zero for training frames (per 94.3.10.9 and figure 94-7).

Consider deleting table 94-13 and subclauses 94.3.11.1.4-94.3.11.8, and referring to table 94-10 instead.

Updated table 94-10:

Cell - Name (add to description)
---
19 - Parity
18 - Mode (0: training, 1: EEE)
17:16 - Countdown (same meaning for training and EEE)
15:13 - PMA alignment offset (always 000 for training)
12: 7 - Reserved
6 - Receiver ready (always 1 for EEE)
5: 4 - Coefficient (+1) status (always 00 for EEE)
3: 2 - Coefficient (0) status (always 00 for EEE)
1: 0 - Coefficient (-1) status (always 00 for EEE)

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.10.8** *P* **266** *L* **27** # 76

Ran, Adee Intel

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

The values of "Initial 16 bits" column do not match the seed data. They do match if the seeds are interpreted as "MSB in S0" instead of "MSB in S12". That is, the leftmost bit should correspond to S0, matching the order in figure 94-6.

SuggestedRemedy

Change heading of the second column from "Seed bits (MSB in S12)" to "Seed bits (MSB in S0)".
Alternatively, flip all seeds left to right.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.10.9** *P* **268** *L* **1** # 65

Lusted, Kent Intel

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

Figure 94-7 shows the sequence for Lane 0. Other lanes will be different.

SuggestedRemedy

Add note related to Figure 94-7 such as: "The values for the PRBS13 are specific to a transition on Lane 0 and a PAO of zero. The values will be different for other lane numbers and different PAO values."

Proposed Response *Response Status* **W**

<Editor changes subclause from "Figure 94-7" to 94.3.10.9.>

Cl **94** *SC* **94.3.10.9** *P* **268** *L* **1** # 63

Lusted, Kent Intel

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

The vertical alignment of the structure and PRBS13 blocks in the diagram are not aligned. It distorts the graphic in pdf format.

SuggestedRemedy

fix

Proposed Response *Response Status* **W**

<Editor changes subclause from "Figure 94-7" to 94.3.10.9.>

Cl **94** *SC* **94.3.10.9** *P* **268** *L* **1** # 66

Lusted, Kent Intel

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

Figure 94-7 shows the sequence for Lane 0 and a PAO = 0. Add details for Lanes 1:3

SuggestedRemedy

See future presentation.

Proposed Response *Response Status* **W**

<Editor changes subclause from "Figure 94-7" to 94.3.10.9.>

Cl **94** *SC* **94.3.11.1.9** *P* **271** *L* **6** # 64

Lusted, Kent Intel

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

Figure 94-7 shows the sequence for Lane 0 and a PAO = 0. Add details for Lanes 1:3

SuggestedRemedy

See future presentation.

Proposed Response *Response Status* **W**

<Editor changes subclause from "Figure 94-9" to 94.3.11.1.9.>

Cl **94** *SC* **94.3.11.1.9** *P* **271** *L* **6** # 61

Lusted, Kent Intel

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

Figure is hidden on the next page and occurs in the next section (94.3.12)

SuggestedRemedy

Move to previous page and associate with 94.3.11.1.9

Proposed Response *Response Status* **W**

<Editor changes subclause from "Figure 94-9" to 94.3.11.1.9.>

Cl **94** *SC* **94.3.11.1.9** *P* **271** *L* **6** # 62

Lusted, Kent — Intel

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

The vertical alignment of the structure and PRBS13 blocks in the diagram are not aligned. It distorts the graphic in pdf format.

SuggestedRemedy

fix

Proposed Response *Response Status* **W**

<Editor changes subclause from "Figure 94-9" to 94.3.11.1.9.>

Cl **94** *SC* **94.3.12.6.2** *P* **276** *L* **4** # 169

Petrilla, John — Avago Technologies

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

There appears to be a space missing between vf and is.

SuggestedRemedy

Replace "vfis" with "vf is"

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.13.3** *P* **280** *L* **10** # 79

Ran, Adee — Intel

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

Insertion loss is defined with equal "Min" and "Max" values, implying zero tolerance. Creating a test fixture which has this insertion loss exactly is impossible in practice, so this test cannot be conducted as written (see also clause 1.2.6).

In addition, it is unclear whether the table defines a minimum stress required to make the test valid (as done in Annex 69A) or requires that a DUT must pass any test performed with these parameters (as often suggested).

The suggested remedy aims at making the test practical and following the spirit of Annex 69A, which defines minimum stress values.

The minimum stress for a short channel (test 1) defined by a maximum IL, and for a long channel (test 2), it is a minimum IL.

SuggestedRemedy

For test 1, change the insertion loss MAXIMUM value to 15.4 dB, and remove the minimum. For test 2, change the insertion loss minimum value to 33 dB, and remove the MAXIMUM.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.13.3** *P* **280** *L* **10** # 71

Ran, Adee — Intel

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

The objective that 100GBASE-KP4 is aimed at is "Define a 4 lane PHY... insertion loss of <=33 dB at 7.0 GHz".

Defining the test for the same loss at a lower frequency creates an excessive stress.

SuggestedRemedy

Change the parameter "Insertion loss at 6.875 GHz" to "Insertion loss at 7 GHz".

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.13.3** *P* **280** *L* **17** # 68

Ran, Adee — Intel

Comment Type **ER** *Comment Status* **X**

The links with the text "see Figure 94-18", in both comment b and comment c, point to _table_ 94-18 instead. In fact, the figure pertinent to these comments is 94-17, which describes the full path from TP0 to TP5.

SuggestedRemedy

Change "Figure 94-18" to "Figure 94-17" (twice), and correct the links.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.13.3** *P* **280** *L* **9** # 78

Ran, Adee Intel

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

If the channel is required to have COM of at least 3 dB, then a receiver which passes with any 3 dB COM channel, and any compliant transmitter (including worst case), should be compliant (with at least zero margin).

Requiring worse channel conditions (COM=1.5 dB, below the 3 dB requirement) over-stresses the receiver. This over-stress was not justified anywhere. Providing margin is the responsibility of each RX vendor; different vendors may aim to different margins, and may validate their margin in various ways. But the normative test should not require more than the worst case conditions; this "margin on the table" has a cost on each and every deployed system.

In addition, table 94-17 defines a "Max" value for COM which is equal to the "Min" value, implying zero tolerance. Calibrating this value of COM exactly is impossible in practice, so this test cannot be conducted as written (see also clause 1.2.6).

In addition, it is unclear whether the table defines a minimum stress required to make the test valid (as done in Annex 69A) or requires that a DUT must pass any test performed with these parameters (as often suggested).

The suggested remedy aims at making the test practical and following the spirit of Annex 69A, which defines minimum stress values.

SuggestedRemedy

1. Change the Max COM values in both tests to 3 dB (defining the minimum stress).
2. Remove the Min COM requirement.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.13.3** *P* **280** *L* **9** # 166

Moore, Charles Avago Technologies

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

Receiver interference tolerance test for 100GBASE_KP4 could be "gamed" by using a channel with a large amount of ISI which can be equalized by the DUT but is not equalized by COM reference channel, so no added broadband noise is needed. This would allow receivers with no actual margin for crosstalk to pass.

SuggestedRemedy

In Table 94-17 add a line "COM before adding effects of broadband noise minimum" and set values to 4dB. A value greater that the nominal 3dB for channel spec is recommended since test channel has no crosstalk.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.13.3.1** *P* **282** *L* **1** # 167

Moore, Charles Avago Technologies

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

Intent of specifying frequency variation in NSD used in ITOL test is to insure

1. Somewhat realistic broadband interference
2. No one "games" the measurement by having a relatively high average NSD while at high frequencies, where the COM CTLE is peaked, NSD is lower, reducing the actual effect of the noise.

Having a lower bound on NSD which decreases with frequencies, as equation 94.16 and Figure 94-16 do, runs counter to point 2 and is doubtless due to a typo in the comment which generated this clause.

SuggestedRemedy

Either:

1. Explicitly include noise generator frequency dependent NSD in the COM calibration of BBN and use fairly loose, flat NSD vs frequency spec.

or

2. Specify:

10*log_10(NSD(f)/NSD_average) > -3 *(1-1.2*f/fb)

and re-draw or delete Figure 94-16.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.4.1** *P* **285** *L* **47** # 104

Ran, Adee Intel

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

The minimum COM value of 3 dB accounts for receiver implementation penalty. Several components that consume this margin are discussed in an accompanying presentation.

PAM-4 receivers are likely more complex than NRZ receivers, and may need higher margins. For example, analog front end linearity and detector sensitivity are more critical for PAM-4 receiver than for NRZ. It is therefore reasonable to allocate a higher margin for these receivers.

The proposed updates to COM procedure yield a result of over 5 dB for a channel with 33 dB loss, which is the objective of the 100GBASE-KP4 PHY. It is proposed that this channel be regarded as the limit, and that a 5 dB margin be reserved for receiver implementation; this can enable more design freedom that can result in power saving.

SuggestedRemedy

Change the minimal COM required for 100GBASE-KP4 channels from 3 dB to 5 dB.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.4.1** *P* **286** *L* **21** # 154

Healey, Adam LSI Corporation

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

The rows for "Transmitter 3 dB bandwidth" were to be removed with the inclusion of an transmitter device and package model. These parameters are no longer used for the calculation of COM.

SuggestedRemedy

Remove the row.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.4.1** *P* **286** *L* **46** # 82

Ran, Adee Intel

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

A_DD should represent half of the peak-to-peak CDJ allowed from a transmitter - specified in table 94-14 as 0.05 UI.

The value in table 93-9 is also 0.05 (though it is peak, not PTP).

In a few cases that were checked, the effect of this increased CDJ level is~0.2 dB degradation in COM.

SuggestedRemedy

Change A_DD to 0.025.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.4.1** *P* **286** *L* **49** # 59

Farhoodfar, Arash Cortina-Systems

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

In table 94-19, "DER0" is specified at 3x10E-4. The actual value should be a funcion of DFE profile in COM. This can result in incorrect COM valu as a function of the channel.

SuggestedRemedy

Make "DER0" a function of the DFE profile.
Remove "bmax" limitation from the table.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.6.3** *P* **291** *L* **10** # 205

Law, David HP

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

Since the status of item RS-FEC is M, since Table 94-1 lists Clause 94 RS-FEC as required, the support should be just Yes [].

SuggestedRemedy

Change 'Yes [ ] No [ ]' to read 'Yes [ ]'.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.6.3** *P* **291** *L* **12** # 210

Law, David HP

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

According to Table 94-1 the Clause 83 PMA is optional and the Clause 94 PMA is Mandatory yet there is only one entry in the PICS, item PMA, and this has the status of M.

SuggestedRemedy

Suggest that:

[1] In Table 94-1 change '83-PMA' to read '83-PMA for 100GBASE-R'.
[2] In Table 94-1 change '94-PMA' to read '94-PMA for 100GBASE-KP'.
[3] In subclause 94.6.3 change the status of PMA to read 'O' and the support to read 'Yes [ ] No [ ]'

Note: I have submitted another comment that would delete the '94-PMA' entry from Table 94-1, I've include item [2] in case that comment is not accepted.

Proposed Response *Response Status* **O**

Cl **99** *SC* *P* **1** *L* **36** # 5

Bob Grow RMG Consulting

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

Needs copyright year

SuggestedRemedy

201X -> 2013

Proposed Response *Response Status* **O**

Cl **99** *SC* *P* **4** *L* **30** # 6

Bob Grow RMG Consulting

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

The front matter should include a mention of IEEE Std 802.3.1.

SuggestedRemedy

A companion document IEEE Std 802.3.1 describes Ethernet management information base (MIB) modules for use with the Simple Network Management Protocol (SNMP). IEEE Std 802.3.1 is updated to add management capability for enhancements to IEEE Std 802.3 after approval of the enhancements.

Proposed Response *Response Status* **O**

Cl **99** *SC* *P* **6** *L* **13** # 193

D'Ambrosia, John Dell

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

Listing of Task Force Chairs needs to be modified, as D'Ambrosia is no longer Task Force Chair, and at May meeting it is anticipated that Mr. Healey will be chair and Matt Brown will be Editor-in-Chief.

SuggestedRemedy

List John D'Ambrosia as Task Force Chair, Phase 1
List Adam Healey (assumed confirmation) as Task Force Chair, Phase 2
List Adam Healey as Task Force Editor-in-Chief, Phase 1
List Matt Brown as Task Force Editor-in-Chief, Phase 2

Proposed Response *Response Status* **O**

Cl **99** *SC* *P* **6** *L* **13** # 207

Law, David HP

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

Please update the participant list based on the officer changes and the Working Group membership at the start of the ballot.

SuggestedRemedy

[1] Update Task Force officers list to read as follows, add other Task Force officers as required:

John D'Ambrosia, IEEE P802.3bj Task Force Chair, Phase 1
Adam Healey, IEEE P802.3bj Task Force Chair, Phase 2
Adam Healey, IEEE P802.3bj Task Force Editor-in-Chief, Phase 1
Matt Brown, IEEE P802.3bj Task Force Editor-in-Chief, Phase 2

[2] Include the voter list supplied by the IEEE 802.3 Working Group Chair.

Proposed Response *Response Status* **O**

Cl **99** *SC* **99** *P* **1** *L* **10** # 176

Booth, Brad Dell

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

Shows this as Amendment X whereas line 13 on page 3 indicates it is Amendment 1.

SuggestedRemedy

Change title on page 1 to be Amendment 2.

Same change for page 3 and 21.

Proposed Response *Response Status* **O**

Cl **99** *SC* **99** *P* **1** *L* **2** # 175

Booth, Brad Dell

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

First use of IEEE Std 802.3-2012 should have a trademark.

SuggestedRemedy

Change to read: IEEE Std 802.3TM-2012

Proposed Response *Response Status* **O**

Cl **99** *SC* **99** *P* **6** *L* **13** # 177

Booth, Brad Dell

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

Chair and editor-in-chief information needs to be updated.

SuggestedRemedy

See comment.

Proposed Response *Response Status* **O**