Cl **00** *SC* **0** *P* *L* # 286

D'Ambrosia, John Dell

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

For channel parameters, "differential insertion loss" and "insertion loss" are both used. Inconsistent use.

SuggestedRemedy

Use "insertion loss" in all instances

Proposed Response *Response Status* **O**

Cl **01** *SC* **1.4** *P* **16** *L* **10** # 277

D'Ambrosia, John Dell

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

No entries in Definitions for 100GBASE-KR4, 100GBASE-KP4, and 100GBASE-CR4

SuggestedRemedy

Add following definitions:

100GBASE-CR4: IEEE 802.3 Phyical Layer specification for 100Gb/s, based on NRZ signaling, using 100GBASE-R encoding over four lanes of shielded balanced copper cabling, with reach up to at least 5 m. (See IEEE Std 802.3, Clause 92.)

100GBASE-KP4: IEEE 802.3 Phyical Layer specification for 100Gb/s, based on PAM-4 signaling, using 100GBASE-R encoding over 4 lanes of an electrical backplane with a total insertion loss of <= 33 dB at 7.0 GHz. (See IEEE Std 802.3bj, Clause 94)

100GBASE-KR4: IEEE 802.3 Phyical Layer specification for 100Gb/s, based on NRZ signaling, using 100GBASE-R encoding over 4 lanes of an electrical backplane with a total insertion loss of <= 35 dB at 12.9 GHz. (See IEEE Std 802.3bj, Clause 93)

Proposed Response *Response Status* **O**

Cl **30** *SC* **30.6.1.1.5** *P* **17** *L* **51** # 287

D'Ambrosia, John Dell

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

Syntax for Reed-Solomon FEC Capable / Requested not present

SuggestedRemedy

Add text

RSFEC Capable Reed-Solomon FEC ability as specified in Clause 73 (see 73.6.5) and Clause 91
RSFEC Requested Reed-Solomon FEC requested as specified in Clause 73 (see 73.6.5) and Clause 91

Proposed Response *Response Status* **O**

Cl **45** *SC* **2.7.13** *P* **20** *L* **11** # 103

Slavick, Jeff Avago Technologies

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

Table 45-190

The number of bits left between 10GBASE-KR EEE and 100GBASE-CR10 EEE is 2. However advertisement Table 45-189 leaves 1 open spot between the two 40GBASE bits locations 100GBASE-CR10. Currently we're adding EEE advertisement bits for each of the 100GBASE PHYS (CR10, KR4, KP4, CR4), so if 40GBASE-CR4 and 40GBASE-KR4 are added to this table we'd no longer have the matching free bit.

SuggestedRemedy

Shift the 100GBASE fields to consume bits 10-13 in Table 45-190 and Table 45-191

Proposed Response *Response Status* **O**

Cl **45** SC **2.7.13** P **20** L **11** # 92

Slavick, Jeff — Avago Technologies

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

Table 45-190

The specification doesn't allow advertisement of both KR4 and CR4 at the same time. So having separate bit fields for EEE advertisement is not necessary.

SuggestedRemedy

Remove the unique 100GBASE-CR4 EEE entry from Table 45-191 and change 100BGASE-KR4 EEE to be

7.60.10 100GBASE-KR4/CR4 EEE 1-Advertise that the 100GBASE-KR4 or 100GBASE-CR4 has EEE capability. 0-Do not advertsie that the 100GBASE-KR4 or 100GBASE-CR4 has EEE capability

Make the same change to Table 45-191

(if accpeted then comment #1 from me can be rejected).

Proposed Response *Response Status* **O**

Cl **45** SC **45.2.7.12.1** P **19** L **1** # 5

Lusted, Kent — Intel

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

Subclause describing the purpose of bit 7.48.4 is not clear if this Clause 74 FEC or the Clause 91 Reed Solomon FEC.

BASE-R FEC

See P802.3bh, draft 3.1, section 4, page 230, line 38

SuggestedRemedy

Add explicit reference to clause 74 by changing text to read as "When the Auto-Negotiation process has completed as indicated by the AN complete bit (7.1.5), bit 7.48.4 indicates that BASE-R Clause 74 FEC operation has been negotiated. This bit is set only if a BASE-R PHY supporting Clause 74 FEC operation has also been negotiated."

Proposed Response *Response Status* **O**

Cl **45** SC **45.2.7.13** P **20** L **12** # 232

Matthew, Brown — Applied Micro

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

Bits in this table should be RW.

SuggestedRemedy

In table 45-190, rows 3-6, column 5, change "RO" to "RW".

Proposed Response *Response Status* **O**

Cl **45** SC **45.2.7.13** P **20** L **23** # 288

D'Ambrosia, John — Dell

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

Bit 7.60.9 calls out EEE for 100GBASE-CR10. However, EEE for 100GBASE-CR10 is not within the scope of this project -

The scope of the PAR for IEEE P802.3bj is as follows:
The scope of this project is to specify additions to and appropriate modifications of IEEE Std 802.3 to add 100 Gb/s 4 lane Physical Layer (PHY) specifications and management parameters for operation on backplanes and twinaxial copper cables.

100GBASE-CR10 is a 10 lane PHY specification PHY

SuggestedRemedy

Change the scope of the PAR so it is inclusive of 100GBASE-CR10. Presentation to be submitted in July proposing how to change the PAR.

Proposed Response *Response Status* **O**

Cl **45** SC **45.2.7.13** P **21** L **1** # 35

Anslow, Pete — Ciena

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

This says: "Insert 45.2.7.13.1 through 45.2.7.13.4 as shown and renumber subsequent subclauses accordingly:"

Renumbering these subclauses in an amendment is not what we usually do as it causes significant issues when other amendments try to modify clause 45 also.

SuggestedRemedy

Change:
"Insert 45.2.7.13.1 through 45.2.7.13.4 as shown and renumber subsequent subclauses accordingly:" to:
"Insert 45.2.7.13.a through 45.2.7.13.d before 45.2.7.13.1 as follows:"
and change the numbering of the text to be inserted accordingly.

Proposed Response *Response Status* **O**

Cl **45** SC **45.2.7.13.1** P **21** L **5** # 231

Matthew, Brown — Applied Micro

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

The "shall" is against the user. Furthermore, "support" implies advertisement or that negotiation is complete (see 78.3); should be "implement". The requirement on the implementation is to advertise support if this bit is one.

SuggestedRemedy

Reword 45.2.7.13.1 as follows:
If the device implements EEE operation for 100GBASE-CR4 as defined in 92.1, support for EEE operation for 100GBASE-CR4 shall be advertised if this bit is set to one.
Reword 45.2.7.13.2:4 in a similar way.

Proposed Response *Response Status* **O**

Cl **69** SC P **24** L **8** # 290

D'Ambrosia, John — Dell

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

Clause 69 is currently empty and text needs to be added.

SuggestedRemedy

July contribution to be made.

Proposed Response *Response Status* **O**

Cl **73** SC **73.5.1** P **25** L **20** # 6

Lusted, Kent — Intel

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

The DME electrical disable of multi-lane PHYs needs references to the 3 new PHY types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf

Exact text is "The transmitters on other lanes should be disabled as specified in 71.6.7, 84.7.7, or 85.7.7."

See P802.3 draft 3.1, section 5, page 507, line 37.

SuggestedRemedy

Change sentence to read as "The transmitters on other lanes should be disabled as specified in 71.6.7, 84.7.7, 85.7.7, 92.7.6, 93.7.7, or 94.3.6.6."

Proposed Response *Response Status* **O**

Cl **73** SC **73.6.4** P **25** L **32** # 190

Sela, Oren — Mellanox Technologies

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

Should either preclude from both 100GBASE-KR4 and 100GBASE-KP4 ability being advertised or change the priority so that 100GABSE-KR4 will have higher priority in the priority resolution (73.7.6)

SuggestedRemedy

Option 1:
Add the folwing text to 73.6.4:
100GBASE-KR4 and 100GBASE-KPr ability shall not be advertised simultaneously.

Option 2:
in Table 73-5 cahnge:
priority 2 - 100GBASE-KR4
Priority 3 - 100GBASE-KP4

Proposed Response *Response Status* **O**

Cl **73** *SC* **73.6.4** *P* **25** *L* **44** # 221

Matthew, Brown — Applied Micro

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

Grammar.

SuggestedRemedy

change
"40GBASE-CR4 and 40GBASE-KR4 shall not be advertised simultaneously and likewise 100GBASE-CR4 and either 100GBASE-KR4 or 100GBASE-KP4 as their physical interfaces are different."
to
40GBASE-CR4 and 40GBASE-KR4 shall not be advertised simultaneously and likewise 100GBASE-CR4 and either 100GBASE-KR4 or 100GBASE-KP4 shall not be advertised simultaneously as their physical interfaces are different.

Proposed Response *Response Status* **O**

Cl **73** *SC* **73.6.4** *P* **25** *L* **44** # 181

Sela, Oren — Mellanox Technologies

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

Need to specify that 40GBASE-CR4 and 100GBASE-KR4, 100GBASE-CR4 and 40GBASE-KR4 are also mutually exclusive

SuggestedRemedy

Change:
40GBASE-CR4 and 40GBASE-KR4 shall not be advertised simultaneously and likewise 100GBASE-CR4 and either 100GBASE-KR4 or 100GBASE-KP4 as their physical interfaces are different
To:
Either 40GBASE-CR4 or 100GBASE-CR4 shall not be advertised simultaneously with either 40GBASE-KR4, 100GBASE-KR4 or 100GBASE-KP4 as their physical interface is different

Proposed Response *Response Status* **O**

Cl **73** *SC* **73.7.2** *P* **26** *L* **27** # 158

Dawe, Piers — IPtronics

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

This says "the Receive Switch function shall also connect the ... PMA receivers to the MDI if the PMAs are present". I presume the Receive Switch function is part of the AN sublayer, which sits under the PMD. If so, it could connect between PMD and MDI but it does not touch the PMA, therefore cannot connect its receivers to anything.

SuggestedRemedy

Sorry, I don't know what the remedy is.

Proposed Response *Response Status* **O**

Cl **73** *SC* **73.7.6** *P* **26** *L* **43** # 211

Dudek, Mike — QLogic

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

The power dissipation and latency of the 100GBASE-KR4 are expected to be lower than 100GBASE-KP4. It would therefore be better to use 100GBASE-KR4 if both are available.

SuggestedRemedy

Reverse the priority order of 100GBASE-KR4 and 100GBASE-KP4 in table 73-5

Proposed Response *Response Status* **O**

Cl **74** SC **74.1** P **28** L **40** # 8

Lusted, Kent — Intel

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

The overview specifies "For a PHY with a multi-lane BASE-R PCS, the FEC sublayer is instantiated for each PCS lane and operates autonomously on a per PCS lane basis."

The definition section in 802.3bh draft 3.1 says "100GBASE-R: 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.)" 100GBASE-CR4, 100GBASE-KR4, and 100GBASE-KP4 are , therefore, considered a 100GBASE-R PHY layer but they use the Clause 91 Reed Solomon FEC not Clause 74 FEC. The Clause 91 Reed Solomon FEC FEC sublayer is *not* instantiated on each PCS lane nor does it operate autonomously on a per PCS lane basis.

See P802.3bh, Draft 3.1, sect 5, page 541, line 9.

SuggestedRemedy

Change text as follows: "For a PHY with a multi-lane BASE-R PCS, this FEC sublayer is instantiated for each PCS lane and operates autonomously on a per PCS lane basis."

Proposed Response *Response Status* **O**

Cl **74** SC **74.1** P **28** L **40** # 7

Lusted, Kent — Intel

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

The overview specifies this FEC for "10GBASE-R and other BASE-R PHYs."

The definition section in 802.3bh draft 3.1 says "100GBASE-R: 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.)" 100GBASE-CR4, 100GBASE-KR4, and 100GBASE-KP4 are , therefore, considered a 100GBASE-R PHY layer but they use the Clause 91 Reed Solomon FEC not Clause 74 FEC.

The ambiguity in the overview could imply that this particular FEC can be used with any "BASE-R PCS"-based PHY. (Which is not true.)

See P802.3bh, Draft 3.1, sect 5, page 541, line 5.

SuggestedRemedy

Change text as follows: "This clause specifies an optional Forward Error Correction (FEC) sublayer for 10GBASE-KR, 40GBASE-CR4, 40GBASE-KR4, and 100GBASE-CR10 PHYs."

Proposed Response *Response Status* **O**

Cl **74** SC **74.2** P **28** L **41** # 9

Lusted, Kent — Intel

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

The objectives items 'a' and 'c' have references to BASE-R PHYs. The ambiguity in the overview could imply that this particular FEC can be used with any "BASE-R PCS"-based PHY. (Which is not true.)

The definition section in 802.3bh draft 3.1 says "100GBASE-R: 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.)" 100GBASE-CR4, 100GBASE-KR4, and 100GBASE-KP4 are , therefore, considered a 100GBASE-R PHY layer but they use the Clause 91 Reed Solomon FEC not Clause 74 FEC. .

See P802.3bh, Draft 3.1, sect 5, page 541, line 22 and 24-25.

SuggestedRemedy

Change text for 'a' as follows: "To support forward error correction mechanism for 10GBASE-KR, 40GBASE-CR4, 40GBASE-KR4, and 100GBASE-CR10 PHYs."

change text for 'c' as follows: "To support the PCS, PMA, and PMD sublayers defined for 10GBASE-KR, 40GBASE-CR4, 40GBASE-KR4, and 100GBASE-CR10."

Proposed Response *Response Status* **O**

Cl **78** SC **78.1** P **29** L **16** # 129

Dawe, Piers — IPtronics

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

This says "EEE supports the 100BASE-TX PHY". A floor might support a table, not usually the other way round. I think the PHY is bearing the burden of this protocol.

SuggestedRemedy

Change "EEE supports the 100BASE-TX PHY, the 1000BASE-T..." to "the 100BASE-TX PHY, the 1000BASE-T... may optionally support EEE." and so on, considering any PHY types where EEE is required.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1** *P* **29** *L* **17** # 162

Dawe, Piers — IPtronics

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

In a project that is seeking to obsolete 100GBASE-CR10 and replace with something just a little less bulky, is it really worth retrofitting 100GBASE-CR10 with EEE?

SuggestedRemedy

Consider leaving 100GBASE-CR10 alone.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1** *P* **29** *L* **18** # 32

Anslow, Pete — Ciena

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

"... the 100GBASE-CR10 and 100GBASE-CR4 PHY." should have "the" in front of "100GBASE-CR4 PHY" to be consistent with the rest of this paragraph.

SuggestedRemedy

Change:
"and 100GBASE-CR4 PHY." to:
"and the 100GBASE-CR4 PHY."

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1** *P* **29** *L* **20** # 226

Matthew, Brown — Applied Micro

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

EEE is also supported on CAUI.

SuggestedRemedy

Change "EEE also supports XGMII extension using the XGXS for 10 Gb/s PHYs." to "EEE also supports XGMII extension using the XGXS for 10 Gb/s PHYs and inter-sublayer service interface using the CAUI for 100 Gb/s PHYs."

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1** *P* **29** *L* **42** # 291

D'Ambrosia, John — Dell

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

Table 78-1 lists clauses associated with each interface type, but if this is supposed to detail all clauses associated with each PHY type it is incomplete

SuggestedRemedy

Copy Table 80-2 entries for 100GBASE-CR10, 100GBASE-CR4, 100GBASE-KR4, 100GBASE-KP4.

Add entress for 40GBASE-KR4 and 40GBASE-CR4 if it is agreed to add EEE support for these PHYs and PAR changed.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1.4** *P* **29** *L* **42** # 163

Dawe, Piers — IPtronics

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

The items in this table are not interfaces. The column heading says "PHY type". Compare the other tables and their titles in this clause.

SuggestedRemedy

For consistency, change "Clauses associated with each interface type" to "Clauses associated with each PHY type"

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1.4** *P* **29** *L* **46** # 230

Matthew, Brown — Applied Micro

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

RS sub-layer, CAUI, and FEC not included in table 78-1.

SuggestedRemedy

In Table 78-1...
To row 1 add reference to clause 74.
To each row in table add reference to clause 81 (RS).
To row 3 add reference to clause 91 (FEC).
Add new row for CAUI and refer to Annex 83A.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.2** *P* **30** *L* **12** # 142

Dawe, Piers IPtronics

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

The items in this table are not protocols. The table's title says "PHY". Compare the other tables and their titles in this clause.

SuggestedRemedy

For consistency, change "Protocol" to "PHY type"

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.5** *P* **30** *L* **26** # 128

Dawe, Piers IPtronics

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

This says "For PHYs with an operating speed of 100Gb/s (that implement EEE) two modes of LPI operation are supported." So it's all or nothing. The fast wake mode is far less disruptive at the analog level, and might be more useful in the core of a network that never really goes quiet.

SuggestedRemedy

Make the two modes independently optional (or possibly, have three choices: none, fast or both).
Adjust Clause 45 Table 190, EEE advertisement register, to manage this.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.5** *P* **30** *L* **26** # 31

Anslow, Pete Ciena

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

"100Gb/s" should have a non-breaking space (Ctrl-space) between 100 and Gb/s.
Same issue on line 45

SuggestedRemedy

Add a non-breaking space (Ctrl-space) between 100 and Gb/s on lines 26 and 45

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.5** *P* **30** *L* **26** # 156

Dawe, Piers IPtronics

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

100Gb/s

SuggestedRemedy

100 Gb/s

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.5.2** *P* **30** *L* **50** # 33

Anslow, Pete Ciena

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

In "(PEASE) bit (1.n.n) is" it would be helpful to show "1.n.n" in magenta text to highlight the TBD value.

Same on Page 31, line 22

SuggestedRemedy

Show "1.n.n" in magenta text on Page 30, line 50 and on Page 31, line 22

Proposed Response *Response Status* **O**

Cl **80** *SC* **80** *P* **33** *L* **4** # 240

Barrass, Hugh Cisco

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

Editor's note is out of date.

SuggestedRemedy

Delete editor's note at start of clause.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.2** *P* **33** *L* **8** # 20

Lusted, Kent — Intel

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

Objectives list does not contain entries for the new PHY types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf.

SuggestedRemedy

Change item i.4 to read "At least 7m over a 10 lane copper cable assembly"

Add item i.5 as "At least 5m over a 4 lane copper cable assembly"
Add item i.6 as "Less than or equal to 35dB at 12.9GHz over a backplane"
Add item i.7 as "Less than or equal to 33dB at 7.0GHz over a backplane"

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.3** *P* **33** *L* **8** # 279

D'Ambrosia, John — Dell

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

Fig 80-1 needs to be updated to reflect 100GBASE-P stack
Note 1 does not reflect that there are two types of FEC now for 100GBASE-R

SuggestedRemedy

Add third stack reflecting 100GBASE-P stack (repeat 100GBASE-R stack, but note for FEC has to be different, as there is only 1 type of FEC associated with -P PHY)
Add note 3 to 100GBASE-R stack next to FEC, as the type of FEC is PHY dependent
Note 3 - FEC TYPE dependent on PHY TYPE

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.3** *P* **33** *L* **8** # 21

Lusted, Kent — Intel

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

Exceptions list item "h" in does not contain entries for the new PHY types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf.

See P802.3bh Draft 3.1, sect6, pg 60, line 44,

SuggestedRemedy

change text to read as "The MDIs as specified in Clause 84 for 40GBASE-KR4, in Clause 85 for 40GBASE-CR4, in Clause 86 for 40GBASE-SR4, Clause 87 for 40GBASE-LR4, in Clause 88 for 100GBASE-LR4 and 100GBASE-ER4, in Clause 92 for 100GBASE-CR4, 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* **8** *L* **33** # 280

D'Ambrosia, John — Dell

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

No mention of MDI for 100GBASE-CR4
Note H implies that there is a MDI for 40GBASE-KR4. KR4 does not have a specified MDI.

SuggestedRemedy

Add Note J - The MDI as specified in Clause 92 for 100GBASE-CR4 uses a 4 lane data path.

Note H - Delete "in Clause 84 for 40GBASE-KR4,"

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.4** *P* **33** *L* **8** # 281

D'Ambrosia, John Dell

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

modifications are needed for 80.1.4 regarding inclusion of the new PHY names in the nomenclature that are not included in D1.0

Discussion of 100GBASE-KR / KP needs to be addressed

Table 80-1 missing table entries for 3 PHYs being developed by 802.3bj

SuggestedRemedy

1. Change this sentence
40GBASE-R or 100GBASE-R represents a family of Physical Layer devices using a physical coding sublayer for 40 Gb/s or 100 Gb/s operation over multiple PCS lanes based on 64B/66B block encoding (see Clause 82).

To

40GBASE-R or 100GBASE-R represents a family of Physical Layer devices using a physical coding sublayer for 40 Gb/s or 100 Gb/s operation over multiple PCS lanes based on NRZ signaling and 64B/66B block encoding (see Clause 82).

2. Add sentence
100GBASE-P represents a Physical Layer devices using a physical coding sublayer for 100 Gb/s operation over multiple PCS lanes based on PAM-4 signaling and 64B/66B block encoding (see Clause 82)

3. Add entries to Table 80-1

100GBASE-CR4: IEEE 802.3 Phyical Layer specification for 100Gb/s, based on NRZ signaling, using 100GBASE-R encoding over four lanes of shielded balanced copper cabling, with reach up to at least 5 m. (See IEEE Std 802.3, Clause 92.)

100GBASE-KP4: IEEE 802.3 Phyical Layer specification for 100Gb/s, based on PAM-4 signaling, using 100GBASE-R encoding over 4 lanes of an electrical backplane with a total insertion loss of <= 33 dB at 7.0 GHz. (See IEEE Std 802.3bj, Clause 94)

100GBASE-KR4: IEEE 802.3 Phyical Layer specification for 100Gb/s, based on NRZ signaling, using 100GBASE-R encoding over 4 lanes of an electrical backplane with a total insertion loss of <= 35 dB at 12.9 GHz. (See IEEE Std 802.3bj, Clause 93)

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.1.5** *P* **33** *L* **8** # 278

D'Ambrosia, John Dell

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

Table 80-2 details nomenclature and clause correlation.
No entries for 100GBASE-CR4, 100GBASE-KR4, and 100GBASE-KP4.
No column entries correlating to Clause 78.
nO column entries correlating to Clause 91

SuggestedRemedy

add columns for Clause 78 and 91 with corresponding M/O requirements
Add row entries for 100GBASE-CR4, 100GBASE-KR4, and 100GBASE-KP4 with M/O requirements for each PHY.

If Optional EEE for 100GBASE-CR10, 40GBASE-KR4, and 40GBASE-CR4 is added - add "O" entries to Clause 78 column

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.2.2** *P* **33** *L* **8** # 22

Lusted, Kent Intel

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

Spec references Clause 83 as the only PMA for a 100GBASE-R device.

see P802.3bh D3.1, sect6, page 62, line 53

SuggestedRemedy

Change ending of first sentence of first paragraph from "and the PMA specification defined in Clause 83." to be "and the PMA specification defined in Clause 83 or Clause 94."

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.2.3** *P* **33** *L* **8** # 12

Lusted, Kent — Intel

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

Update 80.2.3 references Clause 74 as the only FEC sublayer for 40GBASE-R and 100GBASE-R.

IEEE 802.3bh Draft 3.1, Cl 82.1.1, (Section 6, Page 63, line 10) exact wording is "The FEC sublayer is specified in Clause 74."

SuggestedRemedy

Append "The FEC sublayer is specified in Clause 74." to add " for 10GBASE-KR, 40GBASE-KR4, 40GBASE-CR4 and 100GBASE-CR10. The FEC sublayer is specified in Clause 91 for 100GBASE-CR4, 100GBASE-KR4 and 100GBASE-KP4."

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.2.3** *P* **33** *L* **8** # 24

Lusted, Kent — Intel

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

Update 80.2.3 references states that the FEC sublayer in instantiated for each PCS lane. This is true for Clause 74 FEC but is not true for the newly adopted Reed Solomon FEC in Clause 91.

IEEE 802.3bh Draft 3.1, Cl 82.1.1, (Section 6, Page 63, line 7) exact wording is "The FEC sublayer can be placed in between the PCS and PMA sublayers or between two PMA sublayers, is instantiated for each PCS lane, and operates autonomously on a per PCS lane basis."

SuggestedRemedy

Change to read as follows "The FEC sublayer can be placed in between the PCS and PMA sublayers or between two PMA sublayers. The Clause 74 FEC sublayer is instantiated for each PCS lane and operates autonomously on a per PCS lane basis. The Clause 91 FEC is instantiated once for all PCS lanes."

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.2.3** *P* **33** *L* **8** # 282

D'Ambrosia, John — Dell

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

Following text needs modifications to reflect new FEC
80.2.3 Forward Error Correction (FEC) sublayer
The Forward Error Correction sublayer is an optional sublayer for 40GBASE-R and 100GBASE-R copper and backplane PHYs. The FEC sublayer can be placed in between the PCS and PMA sublayers or between two PMA sublayers, is instantiated for each PCS lane, and operates autonomously on a per PCS lane basis. The FEC sublayer is specified in Clause 74.

SuggestedRemedy

Change to

80.2.3 Forward Error Correction (FEC) sublayer
The Forward Error Correction sublayer is an optional sublayer for 40GBASE-R and 100GBASE-R copper and backplane PHYs. The FEC sublayer can be placed in between the PCS and PMA sublayers or between two PMA sublayers, is instantiated for each PCS lane, and operates autonomously on a per PCS lane basis. The appropriate FEC sublayer is PHY dependent, and are specified in Clauses 74 and 91.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.2.4** *P* **33** *L* **8** # 23

Lusted, Kent — Intel

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

PMA sublayer subclause references Clause 83 as the only PMA for a 100GBASE-R device.

see P802.3bh D3.1, sect6, page 63, line 21

SuggestedRemedy

Append " or Clause 94" to the sentence that constitutes the 2nd paragraph.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.2.5** *P* **33** *L* **8** # 13

Lusted, Kent — Intel

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

Update 80.2.5 references Clauses 84-89 as the only PMDs for 40GBASE-R and 100GBASE-R. Per the new PHY types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf.

IEEE 802.3bh Draft 3.1, Cl 82.1.1, (Section 6, Page 63, line 29) exact wording is "The 40GBASE-R and 100GBASE-R PMDs and their corresponding media are specified in Clause 84
through Clause 89."

SuggestedRemedy

Append "The 40GBASE-R and 100GBASE-R PMDs and their corresponding media are specified in Clause 84 through Clause 89." to add " and Clause 92 through 94."

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.3.2** *P* **34** *L* **50** # 229

Matthew, Brown — Applied Micro

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

The LPI signals are relevant if EEE is supported (or is capable); specifically, EEE has be negotiated. For devices where EEE is implemented, the tx_mode and rx_mode signals are required only if EEE is supported.

SuggestedRemedy

Change "NOTE 2—FOR OPTIONAL EEE IMPLEMENTATION to "NOTE 2—For optional EEE capability" or "NOTE 2—For optional EEE support".

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.3.3.4.2** *P* **34** *L* # 283

D'Ambrosia, John — Dell

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

Note 1 of Figure 80-3 should reflect the different 100GBASE PHYS. FEC is mandatory for 100GBASE-KP4

SuggestedRemedy

Change Note 1 to

Note 1 - Mandatory, Optional, or omitted depending on PHY type.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.3.3.4.2** *P* **34** *L* **1** # 67

Gustlin, Mark — Xilinx

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

The RS FEC sublayer is unique, for NRZ and PAM4, it cannot connect to a 20:10 PMA, it must connect ot a 4:4 PMA only, this has to be shown somewhere.

SuggestedRemedy

Rework the figure and put in some text into clause 80 to indicate that the RS FEC has 20 PCS lanes in, but 4 physical lanes out, and there is no other PMA on the line side other than a 4:4. To reduce confustion I think we should call the RS FEC sublayer block something other than FEC to distiguish it from the KR FEC since the connection properties are different.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.4** *P* **37** *L* **45** # 292

D'Ambrosia, John — Dell

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

No entry in Table 80-3 for new FEC sublayer for 100GBASE-R FEC per Clause 91

SuggestedRemedy

Add entry to Table 80-3 calling out 100GBASE FEC per clause 91

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.5** *P* **35** *L* **30** # 284

D'Ambrosia, John — Dell

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

Figure 80-4 Note 1 needs to address all PHYs

Also for following figures
Figure 80-5
Figure 81-1
Figure 82-1
Figure 83-1

SuggestedRemedy

Add note

Note 1 - Mandatory, Optional, or omitted depending on PHY type.

Proposed Response *Response Status* **O**

Cl **80** *SC* **80.7** *P* *L* # 19

Lusted, Kent — Intel

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

IEEE 802.3bh draft 3.1 clause 80.7 (Section 6, page 73, line 14) does not contain entries for the new types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf.

SuggestedRemedy

Change text to read "The supplier of a protocol implementation that is claimed to conform to any part of IEEE Std 802.3,
Clause 45, Clause 73, Clause 74, Clause 81 through Clause 89, Clause 91 through Clause 94, and related annexes demonstrates
compliance by completing a protocol implementation conformance statement (PICS) proforma."

Proposed Response *Response Status* **O**

Cl **80** *SC* **80-3** *P* **34** *L* # 177

Sela, Oren — Mellanox Technologies

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

in 80-3 the IS_TX_MODE.request and IS_RX_MODE.indication - it is difficult from the drawing to know which parameter relates to which arrow

SuggestedRemedy

edit the diagram so that the arrow and text are better aligned

Proposed Response *Response Status* **O**

Cl **80** *SC* **Table 80-1** *P* **33** *L* **8** # 10

Lusted, Kent — Intel

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

Table 80-1 does not list the new PHY types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf.

For reference, the exact wording from IEEE 802.3bh Draft 3.1, Cl 82.1.1, (Section6, Page 99, line 11) is "The 100GBASE-R PCS is a sublayer of the 100 Gb/s PHYs listed in Table 80–1. The terms 40GBASE-R and 100GBASE-R are used when referring generally to Physical Layers using the PCS defined in this clause."

SuggestedRemedy

Update Table 80-1 to include the following entries, in this order, starting at the end of the table:

Format would be Name | Description
100GBASE-CR4 | 100 Gb/s PHY using 100GBASE-R encoding over 4 lanes of shielded balanced copper cabling, with reach up to at least 5 m (see Clause 92)
100GBASE-KR4 | 100 Gb/s PHY using 100GBASE-R encoding over four lanes of an electrical backplane with a total channel insertion loss of less than or equal to 35 dB at 12.9 GHz (See Clause 93)
100GBASE-KP4 | 100 Gb/s PHY using 100GBASE-R encoding over four lanes of an electrical backplane with a total channel insertion loss of less than or equal to 33dB at 7.0 GHz (See Clause 94)

See presentation to be submitted in the future. lusted_01_0712.pdf

Proposed Response *Response Status* **O**

Cl **80** *SC* **Table 80-2** *P* **33** *L* **8** # 11

Lusted, Kent Intel

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

Table 80-2 does not list the new PHY types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf.

SuggestedRemedy

Update Table 80-2 to include the following entries, in this order, starting at the end of the table:
100GBASE-CR4
100GBASE-KR4
100GBASE-KP4

Add appropriate columns and names for Clauses 78, 91-94 where appropriate.

Add appropriate O and M markings per Table 92-1, Table 93-1, and Table 94-1

See presentation to be submitted in the future. lusted_01_0712.pdf

Proposed Response *Response Status* **O**

Cl **80** *SC* **Table 80-3** *P* **35** *L* **29** # 15

Lusted, Kent Intel

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

IEEE 802.3bh draft 3.1 Table 80-3 Sublayer delay constraints does not contain entries for Reed-Solomon FEC Sublayer for 100GBASE-KR PHYs.

SuggestedRemedy

Add entries for "100GBASE-R Reed Solomon FEC" after 100GBASE-R FEC in Table 80-3 and, set Maximum (bit time) & Maximum (pause quanta) & Maximum (ns) values to TBD.

Note column shall be "See 91.6."

See presentation to be submitted in the future. lusted_01_0712.pdf

Proposed Response *Response Status* **O**

Cl **80** *SC* **Table 80-3** *P* **35** *L* **29** # 16

Lusted, Kent Intel

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

IEEE 802.3bh draft 3.1 Table 80-3 Sublayer delay constraints does not contain entries for 100GBASE-KP4 PHY PMD types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf.

To complicate matters, Clause 94 defines the 100GBASE-KP4 PMA and PMD sublayer together. Furthermore, Clause 91 FEC operation is mandatory for 100GBASE-KP4.

SuggestedRemedy

Add entries for "100GBASE-KP4 FEC, PMA, and PMD" at the end of Table 80-3 and, set Maximum (bit time) & Maximum (pause quanta) & Maximum (ns) values to TBD.

Note for 100GBASE-KR4 entry shall be "See 94.3.3."

Proposed Response *Response Status* **O**

Cl **80** *SC* **Table 80-3** *P* **35** *L* **29** # 14

Lusted, Kent Intel

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

IEEE 802.3bh draft 3.1 Table 80-3 Sublayer delay constraints does not contain entries for 100GBASE-CR4 and 100GBASE-KR4 PHY PMD types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf.

SuggestedRemedy

Add entries for 100GBASE-CR4 PMD and 100GBASE-KR4 PMD at the end of Table 80-3 and, set Maximum (bit time) & Maximum (pause quanta) & Maximum (ns) values to TBD.

Note for 100GBASE-CR4 PMD shall be "Does not include delay of cable medium. See 92.4."

Note for 100GBASE-KR4 PMD shall be "See 93.4."

See presentation to be submitted in the future. lusted_01_0712.pdf

Proposed Response *Response Status* **O**

Cl **80** *SC* **Table 80-4** *P* **35** *L* **29** # 18

Lusted, Kent — Intel

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

IEEE 802.3bh draft 3.1 Table 80-5 summary of Skew Variation constraints notes section does not include references to the 100GBASE-CR4 and 100GBASE-KR4 PHY PMD types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf.

SuggestedRemedy

append Notes section of skew points SP2, SP3, SP4, and SP5 to add " or 92.5 or 93.5."

Proposed Response *Response Status* **O**

Cl **80** *SC* **Table 80-4** *P* **35** *L* **29** # 17

Lusted, Kent — Intel

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

IEEE 802.3bh draft 3.1 Table 80-4 Summary of Skew constraints notes section does not include references to the 100GBASE-CR4 and 100GBASE-KR4 PHY PMD types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf.

SuggestedRemedy

append Notes section of skew points SP2, SP3, SP4, and SP5 to add " or 92.5 or 93.5."

Proposed Response *Response Status* **O**

Cl **81** *SC* **81.1.7** *P* **37** *L* **21** # 228

Matthew, Brown — Applied Micro

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

The RS sees the fault state of the underlying PCS/PMA via link faults: e.g., local fault. The RS should also be concerned with local fault and remote fault sent from the link partner. The link_fault variable in the RS will cover both of these.

SuggestedRemedy

Change "unless the attached link has been operational for at least one second (i.e. link_status = OK, according to the underlying PCS/PMA)."
"unless the attached link has been operational as indicated by link_fault = OK for at least one second ."

Proposed Response *Response Status* **O**

Cl **81** *SC* **81.3** *P* **38** *L* **4** # 241

Barrass, Hugh — Cisco

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

Editor's note is out of date.

SuggestedRemedy

Delete editor's note at start of clause.

Proposed Response *Response Status* **O**

Cl **81** *SC* **81.3.1.5** *P* **38** *L* **43** # 176

Sela, Oren — Mellanox Technologies

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

Add cross reference to Table-78-4

SuggestedRemedy

Add cross reference

Proposed Response *Response Status* **O**

Cl **81** *SC* **81.3a.2.1** *P* **42** *L* **34** # 225

Matthew, Brown — Applied Micro

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

Convention in other 10G, 40G, and 100G, clauses is to denote "reset" without sub-layer prefix.

SuggestedRemedy

Change rs_reset to reset on line 33 page 42 and in Figure 81-10a.

Proposed Response *Response Status* **O**

Cl **81** *SC* **81.3a.3.1** *P* **43** *L* **31** # 223

Matthew, Brown — Applied Micro

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

There is no defined IDLE for PLS_DATA.indicate. The intent is to say that no packets are sent to the MAC from the RS while LP_IDLE is received on the RS.

SuggestedRemedy

Change "continue to signal IDLE on PLS_DATA.indicate" to
"not signal DATA_VALID on PLS_DATA_VALID.indication(DATA_VALID_STATUS)"
or some variant thereof.

Proposed Response *Response Status* **O**

Cl **81** *SC* **81.3a.3.1** *P* **43** *L* **32** # 224

Matthew, Brown — Applied Micro

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

Two instances of XGMII.

SuggestedRemedy

Change two instances of XGMII to CGMII.

Proposed Response *Response Status* **O**

Cl **81** *SC* **81.4** *P* **44** *L* **16** # 36

Anslow, Pete — Ciena

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

This says: "Insert the new subclause 81.4.3.5a after 81.4.3.5 for LPI functions:" but 81.4.3.5 is the last subclause of Clause 81 so the new subclause should be 81.4.3.6

SuggestedRemedy

Change:
"Insert the new subclause 81.4.3.5a after 81.4.3.5 for LPI functions:" to:
"Insert the new subclause 81.4.3.6 after 81.4.3.5 for LPI functions:"

Proposed Response *Response Status* **O**

Cl **82** *SC* **2.7a** *P* **47** *L* **12** # 102

Slavick, Jeff — Avago Technologies

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

The text states that RAMs are sent while we're not transmitting real data. However I believe we want to state that when the down_count variable reaches zero we also transition to standard alignment marker transmission.

SuggestedRemedy

Change the sentence in 82.2.7a line 11-12 to:
RAMs are sent in the place of normal alignment markers when the transmitter has an LPI transmit state other than TX_ACTIVE and down_count_done is FALSE.

Add following in 82.18.2.4 to the down_count definition:
When the down_count counter reaches 0 it will set the down_count_done = TRUE

Add the following into Figure 82-16 TX_SLEEP state:
down_count_done <= FALSE

Proposed Response *Response Status* **O**

Cl **82** *SC* **2.7a** *P* **47** *L* **12** # 95

Slavick, Jeff — Avago Technologies

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

Transmission of RAMs occurs whenever we leave the TX_ACTIVE state.

SuggestedRemedy

RAMs are sent in the place of normal alignment markers when the transmitter has an LPI transmit state other than DATA.

to:

RAMs are sent in the place of normal alignment markers when the transmitter has an LPI transmit state other than TX_ACTIVE.

Proposed Response *Response Status* **O**

Cl **82** *SC* **2.7a** *P* **47** *L* **20** # 99

Slavick, Jeff — Avago Technologies

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

Figure 82-9a

The text DC-1 and DC-0 are shown in the figure but never defined in the surronding text. DC is meant to refer to the value of the down_count counter.

SuggestedRemedy

Change DC-1 to "RAM" and DC-0 to "last RAM"

Proposed Response *Response Status* **O**

Cl **82** *SC* **3.1** *P* **53** *L* **19** # 94

Slavick, Jeff — Avago Technologies

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

Table 82-7

There are TBD's in this table but the text defining these variables has already mapped these to the currently defined EEE MDIO registers.

SuggestedRemedy

Change the TBD's in Table 82-7 to the following
Tx LPI indication 3.1.9
Tx LPI recieved 3.1.11
Rx LPI indication 3.1.8
Rx LPI recieved 3.1.10
Wake_error_counter 3.22

Proposed Response *Response Status* **O**

Cl **82** *SC* **3.1** *P* **53** *L* **19** # 93

Slavick, Jeff — Avago Technologies

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

Table 82-7

Copy paste error where the Tx versions of the variables are not listed, but the Rx are listed twice.

SuggestedRemedy

Change Table 82-7 to have the following
Tx LPI indication | Tx LPI indication | TBD | Tx LPI indication
Tx LPI recieved | Tx LPI recieved | TBD | Tx LPI recevied
Rx LPI indication | Rx LPI indication | TBD | Rx LPI indication
Rx LPI recieved | Rx LPI recieved | TBD | Rx LPI recevied
Wake_error_counter | Wake_error_counter | TBD | Wake_error_counter

Proposed Response *Response Status* **O**

Cl **82** *SC* **6** *P* **58** *L* **2** # 98

Slavick, Jeff — Avago Technologies

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

The Transmit and Receive state diagrams have a dotted box around the optional *_LI state. The transmit state diagram has a note about it being optional for when EEE

SuggestedRemedy

Copy the note from Figure 82-14 into Figure 82-15.

I believe this was the same resolution done in 802.3bh (comment #202 against D2.0)

Proposed Response *Response Status* **O**

Cl **82** *SC* **6** *P* **60** *L* **14** # 101

Slavick, Jeff — Avago Technologies

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

Figure 82-16

We are using AMs for alignment processes in 100G which provides a known constant patttern. So there's no need to ever bypass the scrambler like we did in 10G-KR to provide a known pattern when FEC is on.

SuggestedRemedy

Remove the scrambler_bypass <= FALSE from the TX_SLEEP state

Proposed Response *Response Status* **O**

Cl **82** *SC* **6** *P* **60** *L* **33** # 96

Slavick, Jeff — Avago Technologies

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

The down_count variable states that it's initial value is set in the LPI Transmit diagram, but that information is missing.

SuggestedRemedy

Add down_count <= TBD in the TX_RF_WAKE
Add down_count <= IF LPI_FW THEN TBD ELSE TBD in the TX_WAKE state

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.1.4** *P* *L* # 126

Lusted, Kent — Intel

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

Inter-sublayer interfaces text references clause 74 as the only FEC sublayer for the PCS. Need to update with reference to Clause 91 Reed Solomon FEC.

See P802.3bh Draft 3.1 section 6 page 101, line 16.

SuggestedRemedy

Add a reference to Clause 91 or strike the reference to Clause 74 depending on task force decision regarding mandatory or optional Cl 91 FEC for 100GBASE-KR4 and 100GBASE-CR4.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.1.4.2** *P* **45** *L* **9** # 27

Lusted, Kent — Intel

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

Need to update PMA and FEC service interface reference to include the new PMA in 100GBASE-KP4 and the FEC service interface defined in Clause 92.1.

see P802.3bh Draft 3.1, section 6, page 101, line

SuggestedRemedy

Change sentence from "The PMA or FEC service interface is defined in 83.3 and is an instance of the inter-sublayer service interface definition in 80.3." to "The PMA or FEC service interface is defined in 83.3 or 94.2.1 and is an instance of the inter-sublayer service interface definition in 80.3 or 91.3."

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.1.5** *P* **46** *L* **33** # 242

Barrass, Hugh — Cisco

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

The additional signals added in Fig 82-2 should be underlined

SuggestedRemedy

Underline

inst:IS_RX_MODE.indication
inst:IS_TX_MODE.request

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.2.2** *P* **48** *L* **37** # 265

Barrass, Hugh Cisco

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

align_status needs a similar note to the one given for block_lock.

SuggestedRemedy

Insert the following before the block_lock note:

Insert a note in 82.2.18.2.2 below the definition for “align_status”:

NOTE: If the EEE capability is supported, then this variable is affected by the LPI receive state diagram. If the EEE capability is not supported then this variable is identical to rx_align_status controlled by the lock state diagram.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.2.2** *P* **48** *L* **38** # 50

Anslow, Pete Ciena

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

This says "... controlled by the lock state diagram." but Clause 82 has a "Block lock state diagram" and an "Alignment marker lock state diagram but no "lock state diagram"

Same issue in the definition of rx_block_lock on line 50

SuggestedRemedy

Change "... controlled by the lock state diagram." to:
"... controlled by the block lock state diagram."

In the definition of rx_block_lock on line 50 change:
"Variable used by the lock state diagram ..." to:
"Variable used by the block lock state diagram ..."

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.2.2** *P* **48** *L* **43** # 264

Barrass, Hugh Cisco

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

Variable rx_align_status is missing.

SuggestedRemedy

Add a variable:

rx_align_status

Variable used by the PCS deskew process to reflect the status of the PCS lane-to-lane alignment. Set true when all lanes are synchronized and aligned, set false when the deskew process is not complete.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.2.2** *P* **48** *L* **43** # 262

Barrass, Hugh Cisco

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

The receive LPI state diagram can use the tx_mode parameter from the incoming data stream. But this will need a new variable.

SuggestedRemedy

Add a variable:

received_tx_mode

A variable reflecting state of the LPI transmit function for the link partner. The value of this variable is inferred from the coding of the RAMs of the incoming data stream.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.2.2** *P* **48** *L* **45** # 247

Barrass, Hugh — Cisco

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

This section uses "true" and "false" in the base document, not "TRUE" and "FALSE."

SuggestedRemedy

Replace "TRUE" with "true" and "FALSE" with "false"

7 instances.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.2.2** *P* **48** *L* **45** # 252

Barrass, Hugh — Cisco

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

According to submitted presentation, down_count can also be used to convey tx_mode for a detached PMA.

SuggestedRemedy

Add a variable:

down_count_enable

Boolean variable controlling decrement of the counter down_count. This variable is set by the LPI transmit state diagram.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.2.2** *P* **48** *L* **48** # 49

Anslow, Pete — Ciena

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

The variable rx_block_lock is shown as being used only for the EEE capability. However as pointed out by comment #41 against Clause 49 of D2.0 in the 802.3 revision project, the variable rx_block_lock is required by the revised state diagrams even if EEE is not supported.
In Clause 49 the variable has been moved above the "The following variables are used only for the EEE capability:" statement in 49.2.13.2.2

See http://www.ieee802.org/3/bh/comments/P802d3_802d3_bh_D2p0_All_Comment.pdf

SuggestedRemedy

Insert the rx_block_lock definition at the appropriate point above the "The following variables are used only for the EEE capability:" statement.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.2.2** *P* **49** *L* **12** # 258

Barrass, Hugh — Cisco

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

rx_mode only needs to differentiate between DATA, ALERT & QUIET

SuggestedRemedy

Delete FW from rx_mode.

Make the same change in 85.2 & 80.3.3.5.1

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.2.2** *P* **49** *L* **20** # 2

Lusted, Kent — Intel

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

text in variable definition of "tx_mode" sentence references LPI transmit state diagram but the parantheses references Figure 82-12

SuggestedRemedy

Change text in parantheses to reference Figure 82-16.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.2.3** *P* **49** *L* **47** # 239

Matthew, Brown — Applied Micro

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

In 40G/100G PCS will always have either 8 or 0 /LI/ in a block.

SuggestedRemedy

Change "zero or four" to "eight".

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.2.3** *P* **50** *L* **25** # 227

Matthew, Brown — Applied Micro

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

In 40G/100G PCS will always have either 8 or 0 /LI/ in a block.

SuggestedRemedy

Change "zero or four" to "eight".

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.2.4** *P* **51** *L* **4** # 253

Barrass, Hugh — Cisco

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

According to submitted presentation, down_count can also be used to convey tx_mode for a detached PMA. Therefore down_count should only decrement when it's told to...

SuggestedRemedy

Add the following at the end of the sentence (after "RAM is sent")

while variable down_count_enable = TRUE.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.3** *P* **61** *L* **19** # 263

Barrass, Hugh — Cisco

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

LPI receive state diagram can use received_tx_mode.

SuggestedRemedy

Replace "rx_mode = FW" with "received_tx_mode = FW"
Replace "rx_mode != FW" with "received_tx_mode != FW"

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.3.1** *P* **52** *L* **38** # 40

Anslow, Pete — Ciena

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

The last three rows of Table 82-5b have no Min values, so the cells should contain an em dash

SuggestedRemedy

Insert an em dash in the Min cells for the lsat three rows of Table 82-5b

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.3.1** *P* **52** *L* **6** # 39

Anslow, Pete — Ciena

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

This says "... as shown in Table 82–5 for transmit and Table 82–5 for receive" but the references should be to Table 82–5a and Table 82–5b

SuggestedRemedy

Change:
"... as shown in Table 82–5 for transmit and Table 82–5 for receive" to:
"... as shown in Table 82–5a for transmit and Table 82–5b for receive"

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.3.1** *P* **60** *L* **14** # 254

Barrass, Hugh — Cisco

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

In state TX_SLEEP, scrambler_bypass is a copy & paste error

SuggestedRemedy

Delete scrambler_bypass term.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.3.1** *P* **60** *L* **14** # 256

Barrass, Hugh — Cisco

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

tx_mode assignment missing in state TX_SLEEP

SuggestedRemedy

Add assignment tx_mode = SLEEP in state TX_SLEEP.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.3.1** *P* **60** *L* **3** # 255

Barrass, Hugh — Cisco

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

According to submitted presentation, down_count can also be used to convey tx_mode for a detached PMA. The variable down_count and also the decrement enable must be assigned for each state.

SuggestedRemedy

Add assignments in states as follows:

TX_ACTIVE - no assignment
TX_SLEEP down_count = 255, down_count_enable = FALSE
TX_QUIET down_count = 242, down_count_enable = FALSE
TX_RF_ALERT down_count = 236, down_count_enable = FALSE
TX_ALERT down_count = 213, down_count_enable = FALSE
TX_FW down_count = 192, down_count_enable = FALSE
TX_RF_WAKE IF(LPI_FW down_count = 3 ELSE down_count = 38), down_count_enable = TRUE
TX_WAKE IF(LPI_FW down_count = 3 ELSE down_count = 38), down_count_enable = TRUE

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.3.1** *P* **61** *L* **1** # 243

Barrass, Hugh — Cisco

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

Editor's note has served its purpose.

SuggestedRemedy

Delete editor's note.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.3.1** *P* **61** *L* **10** # 244

Barrass, Hugh — Cisco

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

Typo - "rx_rx_"

SuggestedRemedy

Change "rx_rx_" to "rx_"

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.18.3.1** *P* **61** *L* **21** # 245

Barrass, Hugh — Cisco

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

Typo - PI_FW

SuggestedRemedy

Change "PI_FW" to "LPI_FW"

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.3.6** *P* **46** *L* **51** # 42

Anslow, Pete — Ciena

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

The unmodified text shown for 82.2.3.6 includes:
"The start control character (/S/) indicates the start of a packet. This delimiter is only valid on the first octet of the XLGMII/CGMII (TXD<0:7> and RXD<0:7>). Receipt of an /S/ on any other octet of TXD indicates an error. Block type field values implicitly encode an /S/ as the first character of the block."
But this text is from 82.2.3.7 not 82.2.3.6

SuggestedRemedy

Delete the text quoted above from 82.2.3.6

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.3.6** *P* **47** *L* **1** # 34

Anslow, Pete — Ciena

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

"To communicate LPI, LPI control character /LI/ is sent ..." would read better if "the" was inserted before the second "LPI"

SuggestedRemedy

Change:
"To communicate LPI, LPI control character ..." to:
"To communicate LPI, the LPI control character ..."

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.7a** *P* **47** *L* **10** # 122

Ofelt, David — Juniper Networks

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

Missing "the" in "For optional EEE function"

SuggestedRemedy

Change to "For the optional EEE function"

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.7a** *P* **47** *L* **13** # 248

Barrass, Hugh — Cisco

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

The DC field is not strictly a count down (also there's a typo - CD for DC).

SuggestedRemedy

Change "count-down (CD)" to "count down field (DC)"

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.7a** *P* **47** *L* **16** # 249

Barrass, Hugh — Cisco

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

According to submitted presentation, the DC field can also be used to convey tx_mode for a detached PMA.

SuggestedRemedy

Add the following before the last sentence of the paragraph:

The count down field is also used to communicate some of the states of the tx_mode when it is not being used to coordinate the transition.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.7a** *P* **47** *L* **19** # 250

Barrass, Hugh — Cisco

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

The DC field is not 1 or 0 as shown in Fig 82-9a.

SuggestedRemedy

Change "DC-1" to "down_count = 1"

Change "DC-0" to "down_count = 0"

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.7a** *P* **47** *L* **19** # 38

Anslow, Pete — Ciena

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

In Figure 82.9a there are two labels "DC - 1" and "DC - 0" which refer to values of DC being 1 and 0. This would be clearer if the labels were changed to "DC = 1" and "DC = 0"
Also, the lines in the figure do not quite line up with each other.

SuggestedRemedy

Change the labels "DC - 1" and "DC - 0" to "DC = 1" and "DC = 0"
Fix the alignment of the lines in the figure (I am willing to help with this if required).

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.7a** *P* **47** *L* **20** # 75

Gustlin, Mark — Xilinx

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

the lable of the countdown field is DC, should it be CD?
I guess it is represents down_count but there is no explenation of what it means near this figure.

SuggestedRemedy

Per comment.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.7a** *P* **47** *L* **6** # 37

Anslow, Pete — Ciena

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

This says "Insert 82.2.7a for RAM definition:". Firstly, it would be helpful to explicitly state where the subclause should be inserted and secondly, the current placement is between the "Alignment marker insertion" and "BIP calculations" subclauses.
Since the BIP is not inserted into RAMs, it seems better to insert the "Rapid alignment marker insertion" text after the "BIP calculations" rather than before.

SuggestedRemedy

Change:
"Insert 82.2.7a for RAM definition:" to:
"Insert 82.2.8a after 82.2.8 for RAM definition:"
and change the numbering of the text to be inserted accordingly.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.7a** *P* **48** *L* **8** # 251

Barrass, Hugh — Cisco

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

The CD field could use some more explanation.

SuggestedRemedy

Add the following at the end of the paragraph:

The CD field is used by the link partner to understand the expected transition from RAMs to normal AMs. It may also be used by a detached transmit PMA sublayer to infer the state of the PCS.

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.2.7a** *P* **48** *L* **9** # 124

Ofelt, David — Juniper Networks

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

The BIP fields are removed from the alignment markers when in the mode where we send rapid alignment markers. This raises some questions about monitoring link heath in the face of EEE. There seem to be three interesting regions - normal operation, waking up, and sleeping. We can only track bit errors in the first but not the other two. I think this should be explicitly pointed out in the text.

SuggestedRemedy

Add some text along the lines of:
"BIP statistics are only calculated and correct when the link is in DATA state. In all other states, the running parity is not calculated".

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.7.6.5** *P* **62** *L* **40** # 26

Lusted, Kent — Intel

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

In Row "AN2", the Value box does not contain entries for the new types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf.

Interestingly, 40GBASE-KR4, 40GBASECR4, 100GBASE-CR10 are not listed.

SuggestedRemedy

Change text to read "Support of the primitive AN_LINK.indication(link_status), when the PCS is used with 10GBASE-KR PMD, 100GBASE-CR4, 100GBASE-KR4, or 100GBASE-KP4 PMD."

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.7.6.5** *P* **62** *L* **40** # 25

Lusted, Kent — Intel

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

In Row "AN1", the Feature box does not contain entries for the new types adopted in IEEE 802.3bj objectives as shown in http://www.ieee802.org/3/bj/objectives_0312.pdf and the names adopted in Motion 3 of http://www.ieee802.org/3/bj/public/may12/minutes_01a_0512_unapproved.pdf.

SuggestedRemedy

Change text to read "Support for use with a 40GBASE-KR4, 40GBASECR4, 100GBASE-CR10, 100GBASE-CR4, 100GBASE-KR4, or 100GBASE-KP4 PMD."

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.7.6.6** *P* **62** *L* **25** # 51

Anslow, Pete — Ciena

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

LP-05 and LP-06 have a Value/Comment of "Support additions to Figure 82–xx for LPI operation", but (particularly when the amendment has been incorporated into the standard) it is not clear what the "additions" for LPI are.

SuggestedRemedy

For LP-05 and LP-06, change:
"Support additions to Figure 82–xx for LPI operation" to:
"Support LPI operation in Figure 82–xx"

Proposed Response *Response Status* **O**

Cl **82** *SC* **82.7a** *P* **48** *L* **5** # 182

Sela, Oren — Mellanox Technologies

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

Logical XOR should be bit wise XOR

SuggestedRemedy

change:
The value of the CD3 field is derived by the logical XOR of the down_count variable with the M0 value for the lane
To:
The value of the CD3 field is derived by the bit wise XOR of the down_count variable with the M0 value for the lane

Proposed Response *Response Status* **O**

Cl **82** *SC* **82-16** *P* **60** *L* **15** # 183

Sela, Oren — Mellanox Technologies

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

In state TX_SLEEP - the scrambler_baypass <= false is redundant

SuggestedRemedy

delete the scrabler_baypass <= false

Proposed Response *Response Status* **O**

Cl **82** *SC* **82-17** *P* **61** *L* **14** # 184

Sela, Oren — Mellanox Technologies

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

Start rx_tq_timer will not expire if RX keep receiving LPI as it is reset on RX_SLEEP.
Same issue is also in CL49.
Should be fixed like done in 802.3az D3.1 for CL36 per - healey_03_0510

SuggestedRemedy

Add a sub state before RX_SLEEP and start the rx_tq_timer in that state.
UCT from that state to RX_SLEEP

Proposed Response *Response Status* **O**

Cl **82** *SC* **82-9a** *P* **47** *L* **20** # 178

Sela, Oren — Mellanox Technologies

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

In figure 82-9a the RAMs the Count down is presented as CD-1 looks like CD minus 1

SuggestedRemedy

replace DC-1 and DC-0 by DC=1 and DC=0

Proposed Response *Response Status* **O**

Cl **82** *SC* **Figure 82-17** *P* **61** *L* **10** # 3

Lusted, Kent — Intel

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

typo in variable "rx_rx_align_status"

SuggestedRemedy

change "rx_rx_align_status" to "rx_align_status"

Proposed Response *Response Status* **O**

Cl **82** *SC* **Figure 82-17** *P* **61** *L* **20** # 4

Lusted, Kent — Intel

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

typo in variable "* PI_FW"

SuggestedRemedy

change "* PL_FW" to "* LPI_FW"

Proposed Response *Response Status* **O**

Cl **83** *SC* **83** *P* **63** *L* **1** # 28

Lusted, Kent — Intel

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

Title suggests that Clause 83 is the only PMA sublayer for a 100GBASE-R PHY. The definition section in 802.3bh draft 3.1 says "100GBASE-R: 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.)" Clause 94 is, therefore, considered a 100GBASE-R PMA.

SuggestedRemedy

Change the Clause 83 title to "Physical Medium Attachment (PMA) sublayer, for 40GBASE-R and 100GBASE-R"

Proposed Response *Response Status* **O**

Cl **83** *SC* **83.1.1** *P* **63** *L* **3** # 29

Lusted, Kent — Intel

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

The scope in 83.1.1 suggests that Clause 83 is the only PMA sublayer for a 100GBASE-R PHY. The definition section in 802.3bh draft 3.1 says "100GBASE-R: 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.)" Clause 94 is, therefore, considered a 100GBASE-R PMA.

See of P802.3bh Draft 3.1, section 6, page 137, line 7

SuggestedRemedy

change text as shown: "This clause specifies a Physical Medium Attachment sublayer (PMA) that is common to two families of (40 Gb/s and 100 Gb/s) Physical Layer implementations, known as 40GBASE-R and 100GBASE-R. The PMA allows the PCS (specified in Clause 82) to connect in a media-independent way with a range of physical media. This/these 40GBASE-R PMA(s) can support any of the 40 Gb/s PMDs in Table 80-2. This/these 100GBASE-R PMA(s) can support any of the 100 Gb/s PMDs in Table 80-2 except 100GBASE-KP4 (Clause 92). Within this specific clause, the terms 40GBASE-R and 100GBASE-R are used when referring generally to Physical Layers using the PMA defined in this clause. "

See presentation to be submitted in the future: lusted_02_0712.pdf

Proposed Response *Response Status* **O**

Cl **83** *SC* **83.3** *P* **63** *L* **17** # 257

Barrass, Hugh — Cisco

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

According to the submitted presentation, tx_mode and rx_mode need to be conveyed across the PMA service interface when a detached PMA is implemented.

SuggestedRemedy

Add a note after (and other sublayers of the PHY) -

Note: A PMA/PMD that is separated from the PCS by a CAUI may infer the state of tx_mode by decoding one or more PCS lanes and observing the RAMs present in the data stream. Similarly a PMA that is connected by a CAUI to a separated PMA may infer the state of rx_mode by observing the behavior of the CAUI signals.

Proposed Response *Response Status* **O**

Cl **83** *SC* **83.5.11** *P* **63** *L* **33** # 259

Barrass, Hugh — Cisco

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

As per the editor's note - remove these subclauses and place them in 83A

SuggestedRemedy

Move 83.5.11 to 83A.3.4.7

Move 83.5.12 to 83A.3.3.6

Move 83.5.12.1 to 83A.3.3.1.1

Delete the editor's note.

Proposed Response *Response Status* **O**

Cl **83** *SC* **85.5.11** *P* **63** *L* **37** # 260

Barrass, Hugh — Cisco

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

AS states in the editor's note, this should be in Annex 83A.

There needs to be a description for CAUI behavior for EEE.

SuggestedRemedy

Add a subclause

83A.3.2a EEE operation

If the optional Energy Efficient Ethernet (EEE) capability is supported (see Clause 78, 78.3) then the inter-sublayer service interface includes two additional primitives as described in 83.3 and may also support CAUI shutdown.

The following additional behavior is defined for EEE:

In the ingress direction, the CAUI shall transmit a repeating 16-bit pattern, hexadecimal 0xFF00 while parameter rx_mode = ALERT.

In the ingress direction, in addition to the transmit disable function defined by 83.5.12 and 83.5.12.1 (references changed by another comment), the CAUI shall transmit the PRBS31 pattern defined in 83.5.10 when rx_mode = QUIET. The requirement to disable the transmitters takes precedance over the PRBS test pattern transmission.

In the ingress direction, a PMA that is connected by a CAUI to a separated PMA may infer the state of rx_mode by observing this behavior of the CAUI signals.

Proposed Response *Response Status* **O**

Cl **83** *SC* **Figure 83-1** *P* **63** *L* **3** # 30

Lusted, Kent — Intel

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

Title of the figure suggests that Clause 83 is the only PMA sublayer for a 100GBASE-R PHY. The definition section in 802.3bh draft 3.1 says "100GBASE-R: 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.)" Clause 94 is, therefore, considered a 100GBASE-R PMA.

See P802.3bh, draft 3.1, section 6, page 138, line 31

SuggestedRemedy

Change the title to figure 83-1 to " PMA for 40GBASE-R and 100GBASE-R relationship to the..."

Proposed Response *Response Status* **O**

Cl **83C** *SC* **83C** *P* **401** *L* **1** # 74

Gustlin, Mark — Xilinx

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

Note that the page # is from 802.3ba-2010.
Given that the RS FEC sublayer cannot sit above anything other than a 4:4 PMA, that should be described/shown in clause 83C diagrams and text.

SuggestedRemedy

Per comment

Proposed Response *Response Status* **O**

Cl **85** *SC* **2** *P* **67** *L* **41** # 100

Slavick, Jeff — Avago Technologies

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

The listed TX_MODE values includes SLEEP, but the PCS never sets TX_MODE to SLEEP

SuggestedRemedy

Change the text in 85.2 lines 41-42 to:

The TX_MODE parameter takes on one of seven values: DATA, QUIET, FW, ALERT, RF_ALERT, WAKE or RF_WAKE.

Proposed Response *Response Status* **O**

Cl **85** *SC* **85.1** *P* **67** *L* **12** # 285

D'Ambrosia, John Dell

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

Modifications to Fig 85-1

1. Figure does not reflect 100GBASE-CR4

SuggestedRemedy

Change "100GBASE-CR10" to "100GBASE-R"

Proposed Response *Response Status* **O**

Cl **85** *SC* **85.7.4** *P* **67** *L* **8** # 261

Barrass, Hugh Cisco

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

As per the editor's note, a definition is required for the signal detection function within EEE.

SuggestedRemedy

Delete the editor's note.

Add the following at the end of the clause.

When the PHY supports the optional EEE capability, the signal detect function is also used to control the state of the rx_mode parameter. The parameter rx_mode is set to DATA following system reset or completion of training. Following the reception of a data stream containing RAMs with the code indicating tx_mode = SLEEP, rx_mode shall be set to QUIET and shal remain in that state until a signal is detected at the receiver input that is the output of a channel that satisfies the requirements of all the parameters of both interference tolerance test channels defined in 72.7.2.1 when driven by a square wave pattern with a period of 16 unit intervals and peak-to-peak
differential output amplitude of 720 mV. Parameter rx_mode shall be set to ALERT within 500ns of the application of this signal. Parameter rx_mode shall return to DATA within 4uS of a return to normal data reception.

Proposed Response *Response Status* **O**

Cl **85** *SC* **85.8.3** *P* **68** *L* **35** # 246

Barrass, Hugh Cisco

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

The editor's note has served its purpose.

SuggestedRemedy

Delete the editor's note.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91** *P* **70** *L* **1** # 295

D'Ambrosia, John Dell

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

The title is "Reed-Solomon Forward Error Correction (FEC) sublayer for 100GBASE-R PHYs." Commenter has noted nomenclature issue related to 100GBASE-KR4 and 100GBASE-KP4. Definition provided where both are types of -R PHYs, but -KR uses NRZ signaling and -KP uses PAM-4 signaling.

THerefore

SuggestedRemedy

Change title to
Reed-Solomon Forward Error Correction (FEC) sublayer for 100GBASE-KR4 and 100GBASE-CR4 PHYs

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.1.2** *P* **70** *L* **44** # 41

Anslow, Pete Ciena

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

The style used to show Note 1 is different from that used in the other 100G clauses, e.g. in Figures 80-1, 80-2, 80-3, 81-1, 82-1, 83-1 etc.

SuggestedRemedy

Change:
"1 CONDITIONAL BASED ON PHY TYPE" to:
"NOTE 1—CONDITIONAL BASED ON PHY TYPE"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.2** *P* **71** *L* **14** # 68

Gustlin, Mark Xilinx

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

The RS FEC is unique, for NRZ and PAM4 it cannot connect to a 20:10 PMA, it must connect ot a 4:4 PMA only. In this sentance the or PMA is not correct, we need to indicate the special nature of this FEC sublayer that it can only connect to a 4:4 PMA.

SuggestedRemedy

Per the comment, also might need to add in some other text in other areas of this clause to indicate the delta vs. the clause 74 FEC.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.2.4.9** *P* **75** *L* **3135** # 191

Sela, Oren Mellanox Technologies

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

t=7/15 should be replaced with t=<7/15

SuggestedRemedy

line 31:
replace t=7 with t=<7
Line 35:
replace 7=15 with t=<15

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.1** *P* **72** *L* **12** # 69

Gustlin, Mark Xilinx

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

The BER Monitor (high BER) block was not in the baseline, and I don't think it is a needed function.

SuggestedRemedy

Remove the block.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.1** *P* **72** *L* **24** # 77

Gustlin, Mark Xilinx

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

Figure 91-2 shows the processing flow for the RS FEC. In cideciyan_02_0512 Roy proposes an option to change the processing flow so that there is not two self-synchronous scramblers, by substituting a synchronous scrambler for the self syync scrambler shown in this figure. A further optimization has been discussed which removes the need for this self synchronous scrambler. This optimizes the processing flow further. A Presentation will be made in July that proposes an optimized processing flow.

SuggestedRemedy

Adopt the changes to the processing flow as outlined in gustlin_02_0712.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.2** *P* **74** *L* **1** # 52

Anslow, Pete Ciena

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

The convention used within 802.3 is for some arrays of objects to be denoted via angle brackets "<x:y>". When using this format, 802.3 normally places the larger index first and the smaller second. This is followed correctly for example on Page 73 line 48 of D1.0 with "tx_xcoded<256:0>".

While the alternative form, e.g. "tx_xcoded<0:256>" seems more natural, 802.3 is almost consistent in placing the larger index first. The text in 91.4.2.6 through 91.4.3.9 is rather confusing because it uses a mixture of the two different formats.
If there is some meaning in this change of order, then this should be explained in the text. If not, then the index order should be changed to be consistently larger first, smaller second to be in line with 802.3

SuggestedRemedy

Change the order of the indexes of all of the arrays of objects in 91.4.2.6 through 91.4.3.9 to be the larger index first and the smaller second.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.2.11** *P* **76** *L* **10** # 189

Sela, Oren — Mellanox Technologies

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

Need to specify the symbol bit order

SuggestedRemedy

Add the flowing text:
For the 10 bit symbol m - a0:a9 the transmission order shall be such that the MSB (a9) shall be transmitted first and the LSB (a0) shall be transmitted last.

Should add and example

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.2.2** *P* **73** *L* **16** # 70

Gustlin, Mark — Xilinx

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

In the statement about tolerable skew and skew variation, there is no skew point to the input of the FEC block.

SuggestedRemedy

Modify clause 80 to add a skew point that is appropriate for in input to the FEC sublayer.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.2.6** *P* **73** *L* **48** # 72

Gustlin, Mark — Xilinx

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

The transcoding is complicated enough that I think it warrents a picture or two.

SuggestedRemedy

Per the comment.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.2.6** *P* **74** *L* **19** # 111

Cideciyan, Roy — IBM

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

Reference to "Table 82-5" is not correct

SuggestedRemedy

Replace "Table 82-5" by "Figure 82-5"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.2.6** *P* **74** *L* **19** # 115

Cideciyan, Roy — IBM

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

Reference should have been made to "Figure 82-5" which is not in D1.0

SuggestedRemedy

After replacing "Table 82-5" by "Figure 82-5" insert Figure 82-5 into the draft

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.2.6** *P* **74** *L* **22** # 123

Ofelt, David — Juniper Networks

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

The 64b66b->256b267b transcoding algorithm is a succinct description of the process, but it can take a bit of work to decypher. A figure would make this significantly easier to understand.

SuggestedRemedy

Add a figure showing the 5 transcoding cases- 1) all data, 2) first control word in position 0, 3) first control word in position 1, 4) first control word in position 2, and 5) first control word in position 3.

I can provide example figures if the editors like.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.2.8** *P* **74** *L* **52** # 53

Anslow, Pete — Ciena

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

According to slide 17 of the adopted baseline in gustlin_01_0312.pdf, the BIP values in the lane markers are carried through from the input to the output of the FEC sublayer. This is what the arrangement in 91.4.2.8 does, but it would be helpful to point out that the resulting BIP cannot be used to monitor errors on the subsequent link as the transcoding has changed the bit sequence.

SuggestedRemedy

Add a paragraph above the one that starts "A 5-bit pad is appended ..." to say:
"The above process has the effect of carrying forward the BIP3 and BIP7 fields from the incoming alignment markers to the outgoing ones. These BIP fields, however, cannot be used to monitor errors in the subsequent link as the transcoding process has changed the bit sequence."

Note: this statement remains true even if the alternative architecture proposed in cideciyan_02_0512.pdf is adopted.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.2.8** *P* **75** *L* **16** # 71

Gustlin, Mark — Xilinx

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

This statement is not true for EEE bringup: One group of aligned and reordered alignment markers are mapped every 20 × 16384 66-bit blocks.

SuggestedRemedy

Add in that when a EEE interface is being brougt up then rapid AMs are sent and are every 20x8 blocks.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.2.9** *P* **75** *L* **36** # 117

Cideciyan, Roy — IBM

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

Encoders can be systematic but not codes

SuggestedRemedy

Replace "The codewords shall be systematic." by "The encoder shall be systematic."

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.2.9** *P* **75** *L* **37** # 116

Cideciyan, Roy — IBM

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

missing definition of "alpha"

SuggestedRemedy

Replace "polynomial shall be 1 (alpha^0)" by "polynomial shall be 1 (alpha^0) where the primitive element alpha is a root of the field polynomial"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.1** *P* **78** *L* **18** # 73

Gustlin, Mark — Xilinx

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

What skew point is this? I assume it is SP6? If so then the TBDs should come from clause 80 and we should state SP6.

SuggestedRemedy

Per the comment.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.2** *P* **78** *L* **35** # 238

Matthew, Brown — Applied Micro

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

Editorial note no longer required.
Alignment markers are not scrambled for KP4.
The same alignment lock methodology used for KR4 may be used for KP4.

SuggestedRemedy

Delete editor's note.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.3** *P* **78** *L* **46** # 43

Anslow, Pete — Ciena

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

This says "The Reed-Solomon extracts ..." which should be "The Reed-Solomon decoder extracts ..."

SuggestedRemedy

Change:
"The Reed-Solomon extracts ..." to:
"The Reed-Solomon decoder extracts ..."

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.4** *P* **79** *L* **9** # 237

Matthew, Brown — Applied Micro

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

Editorial note no longer required.
Alignment markers are not scrambled for KP4.
The lock, alignment and reorder methodology used for KR4 may be used for KP4.

SuggestedRemedy

Delete editor's note.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.6** *P* **79** *L* # 179

Sela, Oren — Mellanox Technologies

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

The example should be in Annex 91A but the generation polynomial should be in 91.4.2.9

SuggestedRemedy

add the generation polynomial to 91.4.3.6

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.6** *P* **79** *L* **27** # 54

Anslow, Pete — Ciena

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

In item b) "tx_xcoded" should be "rx_xcoded"

SuggestedRemedy

Change "tx_xcoded" to "rx_xcoded"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.6** *P* **79** *L* **27** # 118

Cideciyan, Roy — IBM

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

spelling of "tx_xcoded<(64j+1):(64j+64)>" not correct

SuggestedRemedy

Change spelling of "tx_xcoded<(64j+1):(64j+64)>" to "rx_xcoded<(64j+1):(64j+64)>"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.6** *P* **79** *L* **33** # 119

Cideciyan, Roy — IBM

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

"rx_coded_c<j+1>=0" not correct

SuggestedRemedy

Replace "rx_coded_c<j+1>=0" by "rx_coded_c<1>=0"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.6** *P* **79** *L* **33** # 55

Anslow, Pete — Ciena

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

In item c) "rx_coded_c<j+1>" should be "rx_xcoded<j+1>"

SuggestedRemedy

Change "rx_coded_c<j+1>" to "rx_xcoded<j+1>"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.6** *P* **79** *L* **33** # 44

Anslow, Pete — Ciena

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

This says "In other words, rx_coded_c is the first 66-bit control block in the resulting group of four blocks"
Since finding the value of c happens before the creation of the four blocks, this woild be better worded as "will be the first" rather than "is the first"

SuggestedRemedy

Change "is the first" to "will be the first"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.6** *P* **79** *L* **36** # 112

Cideciyan, Roy — IBM

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

Reference to "Table 82-5" is not correct.

SuggestedRemedy

Replace "Table 82-5" by "Figure 82-5"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.6** *P* **79** *L* **39** # 120

Cideciyan, Roy — IBM

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

"rx_payloads<0:0:(64c+3)>" is not correct.

SuggestedRemedy

Replace "rx_payloads<0:0:(64c+3)>" by "rx_payloads<0:(64c+3)>"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.6** *P* **79** *L* **40** # 185

Sela, Oren — Mellanox Technologies

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

Typo in sub-bullet e

SuggestedRemedy

replace:
rx_payloads<0:0:(64c+3)> = rx_xcoded<5:(64c+8)>
with:
rx_payloads<0:(64c+3)> = rx_xcoded<5:(64c+8)

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.6** *P* **79** *L* **42** # 121

Cideciyan, Roy — IBM

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

"rx_payloads<64j+1:(64j+63)>" is not correct

SuggestedRemedy

Replace "rx_payloads<64j+1:(64j+63)>" by "rx_payloads<64j:(64j+63)>"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.6** *P* **79** *L* **42** # 45

Anslow, Pete — Ciena

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

In item f), "rx_payloads<64j+1:(64j+63)>" has brackets () round the second term "64j+63", but not round the first term "64j+1"

SuggestedRemedy

Make this consistent with the rest of the subclause by changing rx_payloads<64j+1:(64j+63)> to rx_payloads<(64j+1):(64j+63)>.

Note, there is another comment against this text that proposes that the larger of the two indexes should be first to conform to usual practice in 802.3. If this is accepted then this becomes: rx_payloads<(64j+63):(64j+1)>

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.6** *P* **79** *L* **43** # 186

Sela, Oren — Mellanox Technologies

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

Error in sub-bullet f

SuggestedRemedy

replace:
rx_coded_j<2:65> = rx_payloads<64j+1:(64j+63)> for j=0 to 3
with:
rx_coded_j<2:65> = rx_payloads<64j:(64j+63)> for j=0 to 3

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.9** *P* **80** *L* **10** # 46

Anslow, Pete — Ciena

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

"alignment makers" should be "alignment markers"

SuggestedRemedy

change "alignment makers" to "alignment markers"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.9** *P* **80** *L* **24** # 47

Anslow, Pete — Ciena

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

"am_payloads<i, 64j:(64j+63)" is missing the closing ">"

SuggestedRemedy

Change to "am_payloads<i, 64j:(64j+63)>"

Note, there is another comment against this text that proposes that the larger of the two indexes should be first to conform to usual practice in 802.3. If this is accepted then this becomes: "am_payloads<i, (64j+63):64j>"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.9** *P* **80** *L* **30** # 114

Cideciyan, Roy — IBM

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

Reference is made to subclause "82.2.8" which is not part of D1.0

SuggestedRemedy

Include subclause "82.2.8"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.3.9** *P* **80** *L* **30** # 113

Cideciyan, Roy — IBM

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

Missing word "of"

SuggestedRemedy

Replace "the result the calculation" by "the result of the calculation"

Proposed Response *Response Status* **O**

Cl **91** *SC* **91.4.4** *P* **82** *L* **1** # 66

Gustlin, Mark — Xilinx

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

Populate the FEC state machines based on the state machines in Slide 10 and 12 from wang_01_0512.

SuggestedRemedy

Per the comment.

Proposed Response *Response Status* **O**

Cl **91** *SC* **91-4,91-5** *P* **77** *L* # 180

Sela, Oren — Mellanox Technologies

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

There is a conflict between the symbol naming in the draft and what is commonly used:
a0 maps to mn-1 and a527 maps to m0.
Need to clarify

SuggestedRemedy

A clarfication statement is needed

Proposed Response *Response Status* **O**

Cl **92** *SC* **10.3** *P* **109** *L* **33** # 205

Hidaka, Yasuo — Fujitsu Laboratories of

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

f is defined as MHz here, but f is defined as GHz in many other places.
It is recommended to define f as GHz here.

SuggestedRemedy

Change definition of f on line 33 and 48 as GHz.
Change RHS of equation (92-23) as -0.7-0.176*f.
Change RHS of equation (92-24) as 0.7 + 0.176*f.
Change line 44 as 0.05GHz <= f <= 18.75GHz

Proposed Response *Response Status* **O**

Cl **92** *SC* **10.5** *P* **111** *L* **36** # 89

Shanbhag, Megha — TE Connectivity, Ltd

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

The maximum frequency for calculation of MDNEXT in equation (92-26) is given as 10000MHz. However under Section 92.10.7 (page 112, line 16) it is stated that the MDNEXT spans frequency range up to a maximum of 20000MHz for calculation of ICN.

SuggestedRemedy

I believe the intended maximum frequency is 20000MHz, so replace 10000MHz with 20000MHz in equation (92-26)

Proposed Response *Response Status* **O**

Cl **92** *SC* **10.5** *P* **111** *L* **36** # 199

Hidaka, Yasuo — Fujitsu Laboratories of

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

MDNEXT is defined up to 10GHz, here.
It was defined up to 10GHz for 10.3125Gbd in clause 85.10.5.
Since the data rate is now 25.8125Gbdd, MDNEXT should be defined up to 25GHz.

SuggestedRemedy

Change the frequency range of MDNEXT up to 25GHz.

Proposed Response *Response Status* **O**

Cl **92** *SC* **10.5** *P* **111** *L* **41** # 206

Hidaka, Yasuo — Fujitsu Laboratories of

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

f is defined as MHz here, but f is defined as GHz in many other places.
It is recommended to define f as GHz here.

SuggestedRemedy

Define f as GHz on line 41.
Change line 36 as "0.05GHz <= f <= 10GHz".

Proposed Response *Response Status* **O**

Cl **92** *SC* **10.6** *P* **112** *L* **1** # 200

Hidaka, Yasuo — Fujitsu Laboratories of

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

MDFEXT is defined up to 10GHz, here.
It was defined up to 10GHz for 10.3125Gbd in clause 85.10.6.
Since the data rate is now 25.8125Gbdd, MDFEXT should be defined up to 25GHz.

SuggestedRemedy

Change the frequency range of MDFEXT up to 25GHz.

Proposed Response *Response Status* **O**

Cl **92** *SC* **10.6** *P* **112** *L* **1** # 90

Shanbhag, Megha — TE Connectivity, Ltd

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

The maximum frequency for calculation of MDFEXT in equation (92-27) is given as 10000MHz. However under Section 92.10.7 (page 112, line 16) it is stated that the MDFEXT spans frequency range up to a maximum of 20000MHz for calculation of ICN.

SuggestedRemedy

Replace 10000MHz with 20000MHz in equation (92-27)

Proposed Response *Response Status* **O**

Cl **92** *SC* **10.7** *P* **112** *L* **16** # 201

Hidaka, Yasuo — Fujitsu Laboratories of

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

ICN is calculated up to 20GHz, here.
It was calculated up to 10GHz for 10.3125Gbd in clause 85.10.7.
Since the data rate is now 25.8125Gbdd, ICN should be calculated up to 25GHz.

SuggestedRemedy

Change frequency range to "0.05GHz to 25GHz".

Proposed Response *Response Status* **O**

Cl **92** *SC* **10.7** *P* **112** *L* **2730** # 91

Shanbhag, Megha — TE Connectivity, Ltd

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

Equations (92-28) and (92-29) have the sinc terms in calculation of weight defined as, sinc(fn/fb)2

This seems ambiguous to me. I am not sure if this means,
sinc2(fn/fb) OR
sinc((fn/fb)2)

SuggestedRemedy

If the intention is to calculate sinc of the ratio (fn/fb) and then square it then replace this term in equations (92-28) and (92-29) with,
sinc2(fn/fb)

If the intention is to calculate the sinc of the ratio (fn/fb) after it is squared then perhaps including the extra parentheses as shown below would remove any ambiguity.
sinc((fn/fb)2)

Proposed Response *Response Status* **O**

Cl **92** *SC* **10.7** *P* **112** *L* **37** # 202

Hidaka, Yasuo — Fujitsu Laboratories of

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

3dB reference receiver bandwidth is set to 20GHz here.
It was set to 7.5GHz for 10.3125Gbd in clause 85.10.7.
Since the data rate is now 25.8125Gbd, it should be set to 18.75GHz.

SuggestedRemedy

Replace 20GHz with 18.75GHz.

Proposed Response *Response Status* **O**

Cl **92** *SC* **10.7** *P* **112** *L* **7** # 207

Hidaka, Yasuo — Fujitsu Laboratories of

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

f is defined as MHz here, but f is defined as GHz in many other places.
It is recommended to define f as GHz here.

SuggestedRemedy

Define f as GHz on line 7.
Change the line 1 as 0.05GHz <= f <= 10GHz.

Proposed Response *Response Status* **O**

Cl **92** *SC* **4** *P* **87** *L* **48** # 196

Hidaka, Yasuo — Fujitsu Laboratories of

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

This clause is not for 100GBASE-KR4.

SuggestedRemedy

Change it to 100GBASE-CR4.

Proposed Response *Response Status* **O**

Cl **92** *SC* **5** *P* **88** *L* **3** # 197

Hidaka, Yasuo — Fujitsu Laboratories of

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

T is missing at the head of line.

SuggestedRemedy

Change 'he' with 'The'.

Proposed Response *Response Status* **O**

Cl **92** *SC* **8.3.5** *P* **101** *L* **54** # 198

Hidaka, Yasuo — Fujitsu Laboratories of

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

Figure 92-5 is Tx figure, but it is refered as test fixture of both of TP2 and TP3.

SuggestedRemedy

Change the caption with "Transmitter and Receiver test fixture", and
change the figure meaningful for receiver testing as test pattern generator.

Or, use Figure 92-5 only for Tx test fixture, and define Rx test fixture separately in clause 92.8.4.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.1** *P* **85** *L* **16** # 296

D'Ambrosia, John Dell

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

Table 92-1 lists the physical layer clauses associated with 100GBASE-CR4 PMD, and states that Clause 83A CAUI is optional. However, CAUI is based on 10 lanes of 10.3125 Gb/s, and therefore would also require two instantiations of the Clause 83 PMA sublayers. CAUI implementations can not reside inside FEC'd portion of link.

Also, the PMA sublayer beneath the FEC sublayer SHALL be a [4:4] PMA sublayer, and not the generic PMA sublayer as specified in Clause 83.

The same problem applies to Clause 93 as well.

SuggestedRemedy

Add a note to 83A CAUI line that states if 83A CAUI is present then two instantiations of Clause 83 PMA [(n:10) and (10:n] must be present. It is also assumed that a CAUI would actually reside between two clause 83 PMA sublayers that would reside above the FEC sublayer. This is brought up then, because now we need to define the PMA Sublayer positioning in a fashion similar to what is currently done in 83.1.4. This also would include addresing the MMD addresses for multiple PMA sublayers.

also, i believe from prior work it was stated that if the adopted FEC approach were to be used - you could not change the number of lanes until the data link was "de-FEC'd". This means the following two things -
1. You can't connect a clause 94 PMA to a Clause 83 PMA to do a CAUI
2. CAUI shall only be used outside of the FEC'd link.

This needs to be captured in a section similar to the guidelines applying to partioning of PMAs on page 139 of P802d3rev_d3p1.pdf on Page 139. Also, this needs to include something that states that the PMA below the FEC sublayer has to be a [4:4] PMA sublayer.

Possibility of adding PMA related text to Clause 91. However, then we lose the general nature of the FEC for other lane count implementations. THerefore PMA, text needs to be added to Clauses 92 and 93 to cover the issues addressed here.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.1** *P* **85** *L* **21** # 76

Gustlin, Mark Xilinx

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

Here FEC is listed as being TBD, which means that 64b/66b data can be send across this interface. Roy presented in cideciyan_01_0512 some MTTFPA concerns with sending 64b/66b encoded data that is bit multiplexed across the 25G lanes. He shows that we only achieve a MTTFPA of~10^5 years when there is highly correlated errors (due to burst error spreading within the packet). Several options are being discussed on how to solve this issue, for now add in a editor's note that this issue is known and being investigated. This also applies to clause 93.

SuggestedRemedy

Per the comment.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.1** *P* **85** *L* **7** # 159

Dawe, Piers IPtronics

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

If the clause has an associated annex, that should be pointed out to the reader right at the beginning.

SuggestedRemedy

This clause specifies the 100GBASE-CR4 PMD and baseband medium, and Annex 92A provides information related to test points that may not be testable in an implemented system.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10.5** *P* **111** *L* **35** # 220

Dudek, Mike QLogic

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

The frequency range is listed to too low a frequency (only 10GHz)(it also doesn't match other text)

SuggestedRemedy

Change 10000MHz to 20000MHz here and on page 112 line 1 to match the other text.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10.5** *P* **113** *L* **26** # 267

DiMinico, Christopher MC Communications

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

The total integrated crosstalk RMS noise voltage Equation (92–33) and illustration in Figure 92–12 are TBD's.

SuggestedRemedy

diminico_0712.pdf provides the total integrated crosstalk RMS noise voltage Equation (92–33).

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10.8** *P* **114** *L* **3** # 160

Dawe, Piers IPtronics

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

This says "The test fixture of Figure 92–13 or its functional equivalent, is required for measuring..." Functional specifications are brief, high-level (logic level) specifications of what the PMD layer does. They are mostly about bits and bytes and topology: just the "digital" function, not the analog detail. Functional is less than electrical. Here in an analog test setup, we need the right analog, electrical behaviour.

SuggestedRemedy

As the maintenance committee has agreed for 83A.5.2, delete "functional". Also in 94.3.11.1, 94.3.12.1, 92.7.1 (twice), 92.8.3.4, 92.8.3.5.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10.9.1** *P* **115** *L* **26** # 268

DiMinico, Christopher MC Communications

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

92.10.9.1 Mated test fixtures insertion loss Equations (92–35) and (92-36 and illustration in Figure 92–15 are TBD's.

SuggestedRemedy

diminico_0712.pdf provides the 92.10.9.1 Mated test fixtures insertion loss Equations (92–35) and (92-36) and illustration in Figure 92–15.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10.9.2** *P* **116** *L* **30** # 269

DiMinico, Christopher MC Communications

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

92.10.9.2 Mated test fixtures return loss Equation (92–37) an illustration in Figure 92–16 are TBD's.

SuggestedRemedy

diminico_0712.pdf provides 92.10.9.2 Mated test fixtures return loss Equation (92–37) an illustration in Figure 92–16.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10.9.3** *P* **116** *L* **31** # 270

DiMinico, Christopher MC Communications

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

92.10.9.3 Mated test fixtures common-mode return loss Equation (92–37) an illustration in Figure 92–16 are TBD's.

SuggestedRemedy

diminico_0712.pdf provides the 92.10.9.3 Mated test fixtures common-mode return loss Equation (92–37) an illustration in Figure 92–16.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10.9.4** *P* **117** *L* **31** # 271

DiMinico, Christopher MC Communications

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

92.10.9.4 Mated test fixtures common-mode conversion loss Equation (92–38) an illustration in Figure 92–17 are TBD's.

SuggestedRemedy

diminico_0712.pdf provides the 92.10.9.4 Mated test fixtures common-mode conversion loss Equation (92–38) an illustration in Figure 92–17.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.10.9.5** *P* **118** *L* **35** # 272

DiMinico, Christopher — MC Communications

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

92.10.9.5 Mated test fixtures integrated crosstalk noise parameter values in Table 92-12 are TBD's.

SuggestedRemedy

diminico_0712.pdf provides the 92.10.9.5 Mated test fixtures integrated crosstalk noise parameter values in Table 92-12.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.5** *P* **88** *L* **3** # 222

Matthew, Brown — Applied Micro

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

Spelling.

SuggestedRemedy

Change "he Skew" to "The skew".

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.5** *P* **88** *L* **3** # 210

Dudek, Mike — QLogic

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

Missing T

SuggestedRemedy

Add T to he.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.5** *P* **88** *L* **3** # 83

Moore, Charles — Avago Technologies

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

Missing ""T"" in first sentence

SuggestedRemedy

replace:
"he Skew (relative delay)"
with
"The Skew (relative delay)"

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.5** *P* **88** *L* **3** # 56

Maguire, Valerie — Siemon

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

Missing "T"

SuggestedRemedy

Change "he skew" to "The skew"

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.7.1** *P* **89** *L* **41** # 141

Dawe, Piers — IPtronics

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

"Functional specifications" are brief, high-level (logic level) specifications of what the PMD layer does. This text is going too far into the electrical detail which is better placed elsewhere, e.g. at the beginning of the "Definitions of parameters and measurement methods" subclause.

SuggestedRemedy

Try to move some of the material between line 41 line "A mated connector pair has been included" and p90 line 2 "Annex 92A." into the channel or "Definitions of parameters and measurement methods" subclause.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.7.1** *P* **90** *L* **40** # 164

Dawe, Piers IPtronics

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

Table layout

SuggestedRemedy

Please use the full width of the page: make the right hand column wider.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.7.1** *P* **90** *L* **48** # 212

Dudek, Mike QLogic

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

In table 92-4 The Test points TP0 to TP1 and TP4 to TP5 don't match the description. There are no mated connector pairs between eg TP0 and TP1

SuggestedRemedy

Change the test points on this row from TP1 to TP2 and from TP4 to TP3

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.7.1** *P* **90** *L* **7** # 161

Dawe, Piers IPtronics

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

Figure 92-2 shows TP0 just by the PMD transmit function, TP1 just by the connector and so on. This is at odds with the text: TP1-4 are offset from the connector by the HCB or MCB trace loss, TP0 and TP5 are not offset.

SuggestedRemedy

Make the arrow for TP0 and TP5 point exactly at the end of the function, move the arrows for TP1-4 further from the connectors. Thanks!

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.7.8** *P* **92** *L* **16** # 165

Dawe, Piers IPtronics

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

This (a PMD clause) says "Local loopback mode shall be provided by the adjacent PMA (see 83.5.8) as a test function to the device." That's impossible: only the PMA clause can tell the PMA what to do.
"Device" is not a standards word (too vague).
Why is this loopback needed?

SuggestedRemedy

83.5.8, PMA local loopback mode, says "PMA local loopback shall be provided by the PMA adjacent to the PMD for 40GBASE-KR4, 40GBASECR4, and 100BASE-CR10 PMDs."
If it's really necessary, explain in the comment response, and add 100BASE-CR4 to the list in 83.5.8, and here in 92.7.8, change to "The PMA adjacent to the PMD provides PMA local loopback mode (see 83.5.8) as a test function."
Otherwise, chnage to "The PMA adjacent to the PMD may optionally provide PMA local loopback mode (see 83.5.8) as a test function."
Similarly for 93.7.8 and 94.2.9.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8** *P* **94** *L* **1** # 140

Dawe, Piers IPtronics

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

The layout of these clauses makes them hard to use, with PMD specifications on the one hand, and measurement and definition detail on the other, muddled together.

SuggestedRemedy

Follow the usual layout of a PMD clause, with subclause for transmitter and receiver then a separate subclause: Definition of parameters and measurement methods.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **94** *L* **1** # 170

Dawe, Piers IPtronics

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

"92.8.3 Transmitter characteristics" sounds like a datasheet. Please write in normative standards language!
Also follow the house style of 100GE unless improving on it.

SuggestedRemedy

Change "92.8.3 Transmitter characteristics" to "92.8.3 Transmitter electrical specifications". Similarly for receiver and the other PMD clauses.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **94** *L* **13** # 169

Dawe, Piers IPtronics

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

Trying to define the nominal unit interval is not necessary, very difficult to do precisely, and not usual: most PMD clauses including 93 and 94 don't.

SuggestedRemedy

Delete this row, and in Table 92-7. In 92.8.3.9 and 92.8.4.4, change "nominally" to "approximately" or delete the sentences.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **94** *L* **15** # 213

Dudek, Mike QLogic

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

In Table 92-5 the Differential peak to peak output voltage max with Tx disabled is TBD. This value should include the Tx output (30mV) plus crosstalk from the Rx.

SuggestedRemedy

Suggest to replace TBD with 35mV

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **94** *L* **21** # 214

Dudek, Mike QLogic

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

In table 92-5 the Amplitude peak-to-peak (max) is TBD. It should be the same as the TP0 informative spec.

SuggestedRemedy

Change TBD to 1200mV.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **94** *L* **22** # 127

Dawe, Piers IPtronics

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

"Transmitter DC amplitude" is misnamed; it is not a DC amplitude (because it's not DC). It's called "Steady-state voltage vf" in clauses 93 and 94. Fibre Channel and InfiniBand call it "steady-state output voltage".

SuggestedRemedy

If this parameter is to be used, change the name to "Steady-state voltage vf".

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **94** *L* **36** # 135

Dawe, Piers IPtronics

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

Surprisingly, total jitter (or Total Jitter) is not defined, except arguably in 58.7.12. This says "Total jitter at a BER of 10^-12 measured per 83A.5.1...". 83A.5.1 says "Transmit jitter is defined with respect to a test procedure resulting in a BER bathtub curve such as that described in Annex 48B.3." 48B.3, Jitter output test methodologies, has some formulae for Dual Dirac method, but it is informative and written for 8B/10B not scrambled signals. This remedy follows recent work in Fibre Channel and OIF and takes into account the difference between 8B/10B and scrambled signals, but the definition works for 8B/10B also.
Clearly, Total Jitter is a proper noun because it doesn't mean all the jitter there is.
This definition can be used for clauses 92, 93 and 94, and all previous clauses.

SuggestedRemedy

Make sure Total Jitter is capitalised.
In 1.4 Definitions, insert:
1.4.x Total Jitter:
The Total Jitter of a signal is defined as the difference between the two sampling times before and after the majority of the transitions of a signal at which the error ratio at these sampling times is equal to the specification error ratio.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **94** *L* **36** # 136

Dawe, Piers IPtronics

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

TJ-DDJ is hard to measure well because TJ is hard to measure well.

SuggestedRemedy

Consider replacing the TJ-DDJ spec with a J9-DDJ spec - easier to measure with reasonable accuracy in a reasonable time.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **94** *L* **41** # 134

Dawe, Piers IPtronics

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

Random jitter (or Random Jitter) is not defined in the way we can use here. 48B.3, Jitter output test methodologies, has some formulae for Dual Dirac method, but it is informative, written for 8B/10B not scrambled signals, and uses RJ_RMS so it's wrong by a factor of 14. Saying that "Random jitter is specified at a BER of 10^–12" doesn't fix this: then random jitter is one sigma from the slope of the bathtub at 10^-12 - still wrong by a factor of 14. This remedy follows recent work in Fibre Channel and OIF and takes into account the difference between 8B/10B and scrambled signals.

SuggestedRemedy

"Because it's not necessarily random and to avoid confusion with the different Random Jitter defined in 48B-7, for clarity, it would be better to follow OIF in these clauses and refer to "Gaussian Jitter".
If "Gaussian Jitter", create definition in 1.4 Definitions as follows. If "Random Jitter", create definition in a subclause of 92 or 93 as follows.
Either way, it's a proper noun (because it's not the jitter that's random: not the ordinary English meaning of the words), so use capitals.
Gaussian Jitter: Gaussian Jitter, often called Random Jitter whether random or not, is the difference between Total Jitter and the dual-Dirac estimate of high probability (or "deterministic") jitter. It is found from a Gaussian fit to the tails of the jitter distribution of a signal.
or
Random Jitter (which is not necessarily all random) is the difference between Total Jitter and the dual-Dirac estimate of high probability (or "deterministic") jitter. It is found from a Gaussian fit to the tails of the jitter distribution of a signal.
Refer to the new definition where "random jitter" or RJ is currently used.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **94** *L* **42** # 133

Dawe, Piers IPtronics

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

The definition for Duty Cycle Distortion in 72.7.1.9 is ambiguous, because it's not clear enough that the pattern or sequence are different things. "The data pattern for jitter measurements shall be test patterns 2 or 3 as defined in 52.9.1.1.", "The duty cycle distortion test pattern shall consist of no fewer than eight symbols of alternating polarity.", "The peak-to-peak duty cycle distortion is defined as the absolute value of the difference in the mean pulse width of a 1 pulse or the mean pulse width of a 0 pulse (as measured at the mean of the high- and low-voltage levels in a clock-like repeating 0101 bit sequence) and the nominal pulse width." Is there meant to be a difference between pattern and sequence? Is this definition meant to agree with the algorithm built into scopes (mean difference between rising and falling edges of an eye)?
Also referring to a 10G clause which refers to single-lane patterns should be avoided now. After reading e.g. Fibre Channel documents, here is a clearer, stand-alone definition.
Applies to 92, 93 and 94.

SuggestedRemedy

In this clause, Duty Cycle Distortion is defined as the absolute value of the difference between the average time of rising edges and the average time of falling edges for a mixed-frequency pattern such as PRBS9 or PRBS31. It may be measured by the absolute value of the difference between the pulse width of a '1' and or a '0' pulse and the unit interval in a 10101010 sequence embedded in a mixed-frequency pattern.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **94** *L* **44** # 138

Dawe, Piers IPtronics

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

This says "DDJ is measured with PRBS9 as specified in 83.5.10." 83.5.10 refers to Table 68–6, where PRBS9 is defined. Neither addresses the definition of DDJ or how to measure it.

SuggestedRemedy

Put 92.8.3.8 in "Subclause reference"
Delete "DDJ is a jitter component where jitter that is not correlated to the data pattern has been removed. DDJ is measured with PRBS9 as specified in 83.5.10."
Capitalise Data Dependent Jitter.
In 92.8.3.8, refer to 83.5.10 and Table 68–6.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3** *P* **94** *L* **8** # 273

DiMinico, Christopher MC Communications

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

Table 92–5—Transmitter characteristics at TP2 summary includes TBD parameters and TBD equation references.

SuggestedRemedy

diminico_0712.pdf provides parameters and equations for Table 92–5 TBD parameters and TBD equation references.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.3** *P* **96** *L* **17** # 131

Dawe, Piers IPtronics

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

The calculated "DC amplitude" may be disappointingly far from the true steady-state output voltage at the IC if the host loss is as much as 6.81 dB. VMA might work better.

SuggestedRemedy

Consider changing to VMA or using new parameter values in Table 92-6.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.3** *P* **96** *L* **42** # 215

Dudek, Mike QLogic

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

It is not necessary to explain differences between this 100G backplane spec and 10GBASE-KR spec.

SuggestedRemedy

Delete the first two sentences in this paragraph. (ie delete The requirement.....specified for 10GBASE-KR.)

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.3** *P* **96** *L* **42** # 130

Dawe, Piers IPtronics

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

"The requirements for the 100GBASE-CR4 transmit equalizer are intended to be similar to the requirements for 10GBASE-KR specified in 72.7.1.10." Clause 72 is off topic.

SuggestedRemedy

Change to "The requirements for the 100GBASE-CR4 transmit equalizer are intended to be similar to the requirements for 100GBASE-KR4 specified in 93.8.1.5."

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.3** *P* **97** *L* **10** # 216

Dudek, Mike QLogic

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

The term "DC amplitude" is a very poor choice of name as this measurement does not provide a DC value.

SuggestedRemedy

Replace "DC amplitude" with "Steady state voltage". Here, also in
Page 97 line 13
Table 92-5 (page 94 line 22)
Footnote b to table 92-5 (page 94 line 40

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.4** *P* **100** *L* **17** # 166

Dawe, Piers IPtronics

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

Eq 92-14 doesn't determine the loss between two points, it limits it. But how is it determined?

SuggestedRemedy

Sorry, I don't have a remedy.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.4** *P* **100** *L* **33** # 167

Dawe, Piers IPtronics

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

Editor's note (to be removed prior to final publication) says "In Annex 92A, the insertion loss from TP0 to TP2 or from TP3 to TP5 is 10 dB at 12.8906 GHz.
I think it's actually eq 92-14, not Annex 92A. Also, it is useful information in the longer term.

SuggestedRemedy

Change to an enduring informative NOTE--The maximum insertion loss from TP0 to TP2 or from TP3 to TP5 is 10 dB at 12.8906 GHz.
Similarly for 92.8.3.7 Test fixture insertion loss, 92.10.8 Cable assembly test fixture, and 92.10.9.1 Mated test fixtures insertion loss.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.7** *P* **102** *L* **8** # 168

Dawe, Piers IPtronics

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

"The reference test fixture printed circuit board insertion loss shall meet the values determined using Equation (92–15)." is not something the implementer can sign off the PICS for: the reference loss is what we say it is; nothing for him to do.

SuggestedRemedy

The reference test fixture printed circuit board insertion loss is given in Equation (92–15).

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.3.8** *P* **102** *L* **29** # 139

Dawe, Piers IPtronics

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

Here we have a formal definition of DDJ that shows it's not all the jitter that's data dependent. So it's a proper noun.

SuggestedRemedy

Use capitals for Data Dependent Jitter, throughout.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4** *P* **103** *L* **44** # 217

Dudek, Mike QLogic

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

In table 92-7 the Differential peak to peak input amplitude tolerance (max) is listed as TBD. We should make this equal to the maximum output from the expected chips defined in clause 93.

SuggestedRemedy

Change TBD to 1200

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4** *P* **103** *L* **45** # 274

DiMinico, Christopher MC Communications

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

Table 92–7—Receiver characteristics at TP3 summary includes TBD parameters for Differential peak-to-peak input amplitude tolerance
(max) 72.7.2.4 and Differential to common-mode input return loss and Differential input return loss (min)

SuggestedRemedy

(1) Differential peak-to-peak input amplitude tolerance
(max) 72.7.2.4 - 1200 mV

(2) Differential to common-mode input return loss - 10 min from 10 MHz to 25 GHz dB
(3)Return_loss(f) >= 12 - 1.26*sqrt(f) 0.01 <= f <10.31
Return_loss(f) >= 6.3 - 13*log10(f/13.75) 10.31 < f <25

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4.2** *P* **104** *L* **23** # 275

DiMinico, Christopher MC Communications

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

Table 92–8—100GBASE-CR4 interference tolerance parameters includes TBD parameters and TBD equation references.

SuggestedRemedy

diminico_0712.pdf provides parameters for Table 92–8—100GBASE-CR4 interference tolerance TBD and related parameters.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4.2** *P* **104** *L* **38** # 157

Dawe, Piers IPtronics

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

This says "Calibrated ICN (RMS) - sigma_nx" So I find the Calibrated ICN (RMS) and subtract sigma_nx (which is near-end integrated crosstalk noise per 92.10.7), right?

SuggestedRemedy

Write what you mean unambiguously.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4.2.4** *P* **106** *L* **22** # 218

Dudek, Mike QLogic

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

The output waveform of the pattern generator needs to comply with a 25G per lane spec not 10GBASE-KR.

SuggestedRemedy

Change the reference from 72.7.1.11 to either "The specifications at TP0 defined in Annex 92A" or the Specifications defined in 93.8.1

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4.5** *P* **106** *L* **49** # 153

Dawe, Piers IPtronics

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

"The low frequency 3 dB cutoff of the AC coupling shall be less than TBD kHz." On the one hand, the signalling rate is 2.5x higher. On the other, the signal integrity challenge is much higher. Anyway, one would expect backwards compatibility of a passive cable.

SuggestedRemedy

50 kHz, or perhaps lower.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4.5** *P* **106** *L* **49** # 171

Dawe, Piers — IPtronics

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

"The 100GBASE-CR4 receivers are AC coupled. AC coupling shall be part of the receive function for Style-2 100GBASE-CR4 connectors. For Style-1 100GBASE-CR4 plug connectors, the receive lanes are AC coupled; the coupling capacitors shall be within the plug connectors."
But, isn't there only one connector type at present, with the AC coupling in the cable, therefore not needed in the receiver?

SuggestedRemedy

Delete the first two sentences and "Style-1".

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.8.4.5** *P* **106** *L* **49** # 219

Dudek, Mike — QLogic

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

The Style 2 connector isn't to be used for 100G-CR4 and we haven't defined different Style connectors.

SuggestedRemedy

Delete the sentence "AC coupling shall be part of the receive function for Style-2 100GBASE-CR4 connectors." and delete "style 1" in the next sentence.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92.9** *P* **107** *L* **6** # 293

D'Ambrosia, John — Dell

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

As 100GBASE-CR4 is based on NRZ signaling and based on channel budget similar to 100GBASE-KR4, it would be beneficial for the channel characteristics to be similar.

Figure 93-5 provides insertion loss limits for FEC enabled and FEC disabled.

SuggestedRemedy

It is assumed that Eq 92A-5 is for FEC enabled. Add equation for FEC Dsiabled insertion loss.

Proposed Response *Response Status* **O**

Cl **92** *SC* **92-1** *P* **85** *L* # 187

Sela, Oren — Mellanox Technologies

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

Need to add CL72 to the table due to startup protocol and the PMD control which is referenced to CL72

SuggestedRemedy

Add to table 92-1:
72-PMD control required

Proposed Response *Response Status* **O**

Cl **92A** *SC* **4** *P* **173** *L* **26** # 208

Hidaka, Yasuo — Fujitsu Laboratories of

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

The section title uses smaller font than the previous section (92A.3).

SuggestedRemedy

Use the same font size in the section title of 92A.4.

Proposed Response *Response Status* **O**

Cl **92A** *SC* **4** *P* **173** *L* **51** # 209

Hidaka, Yasuo — Fujitsu Laboratories of

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

f is defined as MHz here, but f is defined as GHz in many other places.
It is recommended to define f as GHz here.

SuggestedRemedy

Define f as GHz on line 51.
Change line 47 with 0.01GHz <= f <= 18.75GHz.

Proposed Response *Response Status* **O**

Cl **92A** *SC* **4** *P* **174** *L* **15** # 192

Hidaka, Yasuo — Fujitsu Laboratories of

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

f is defined as MHz here, but f is defined as GHz in many other places.
It is recommended to define f as GHz here.

SuggestedRemedy

Define f as GHz on line 15 and 40.
Change line 11 with 0.01GHz <= f <= 18.75GHz.
Change line 36 with 0.05GHz <= f <= 18.75GHz.

Proposed Response *Response Status* **O**

Cl **92A** *SC* **5** *P* **175** *L* **44** # 193

Hidaka, Yasuo — Fujitsu Laboratories of

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

f is defined as MHz here, but f is defined as GHz in many other places.
It is recommended to define f as GHz here.

SuggestedRemedy

Define f as GHz on line 44.

Proposed Response *Response Status* **O**

Cl **92A** *SC* **5** *P* **176** *L* **43** # 194

Hidaka, Yasuo — Fujitsu Laboratories of

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

f is defined as MHz here, but f is defined as GHz in many other places.
It is recommended to define f as GHz here.

SuggestedRemedy

Define f as GHz on line 43.

Proposed Response *Response Status* **O**

Cl **92A** *SC* **7** *P* **177** *L* **16** # 195

Hidaka, Yasuo — Fujitsu Laboratories of

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

f is defined as MHz here, but f is defined as GHz in many other places.
It is recommended to define f as GHz here.

SuggestedRemedy

Define f as GHz on line 16.
Change line 21 with "frequency range 0.05GHz to 18.75GHz with a maximum frequency spacing of 0.01GHz".
Change line 25 with "all frequencies from 0.05GHz to 18.75GHz".
Change line 39 with "0.05GHz to 20GHz with a maximum frequency spacing of 0.01GHz".

Proposed Response *Response Status* **O**

Cl **92A** *SC* **8** *P* **177** *L* **39** # 204

Hidaka, Yasuo — Fujitsu Laboratories of

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

MDNEXT and MDFEXT is defined up to 20GHz here.
It was defined up to 10GHz for 10.3125Gbd in clause 85A.8.
Since the data rate is now 25.78125Gbd, it should be defined up to 25GHz.

SuggestedRemedy

Change 20GHz with 25GHz.

Proposed Response *Response Status* **O**

Cl **92A** *SC* **92A.4** *P* **174** *L* **4** # 276

DiMinico, Christopher — MC Communications

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

Transmitter and receiver differential printed circuit board trace loss minimum insertion loss Equation 92A-2 has TBD.

SuggestedRemedy

diminico_0712.pdf provides equation for minimum Transmitter and receiver differential printed circuit board trace loss insertion loss Equation 92A-2.

Proposed Response *Response Status* **O**

Cl **92A** *SC* **92A.5** *P* **174** *L* **31** # 172

Dawe, Piers IPtronics

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

These 30 dB and 35 dB end-to-end losses seem to be about 5 dB beyond what can be reliably specified today. They would need to be proved out.

SuggestedRemedy

1. Improve the specification method and/or reduce the end-to-end loss to about 25 dB (without FEC) or 30 dB with FEC.
2. Show working silicon that works with the specified channels, with a path to full robustness.

Proposed Response *Response Status* **O**

Cl **92A** *SC* **92A.8** *P* **177** *L* **46** # 266

DiMinico, Christopher MC Communications

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

The total integrated crosstalk RMS noise voltage of the channel in Equation (92A–7) and illustration in Figure 92A–3 are TBD's.

SuggestedRemedy

diminico_0712.pdf provides the total integrated crosstalk RMS noise voltage of the channel in Equation (92A–7).

Proposed Response *Response Status* **O**

Cl **93** *SC* **7.12** *P* **130** *L* **33** # 97

Slavick, Jeff Avago Technologies

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

Clause 72 allows for multiple tap coefficient change requests to occur at the same time. The update for each tap is done independent of each other. There are variables that combine the current overall setting of the transmitter and are used by each TAP when evaluating if it's allowed to make the change. When multiple requests are made simultaneously that cause the transmitter to go beyond it's operating range, there is no clear definition of what should be done. You can for example service one or two of the requests because it doesn't cause you to go out of bounds, or you can deny all.

SuggestedRemedy

Add the following text to 93.7.12 and 92.7.12 to the end of the first paragraph.

Each lane shall only request an adjustment to one Coefficient at a time and shall wait until receiving a response for that request before sending another request.

Proposed Response *Response Status* **O**

Cl **93** *SC* **8.1** *P* **131** *L* **34** # 203

Hidaka, Yasuo Fujitsu Laboratories of

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

Table 93-4.
Total jitter excluding DDJ is defined as 0.28UI.
It was defined as 0.25UI excluding DDJ in clause 85.
It was defined as 0.28UI including DDJ in clause 72.
OIF define it as 0.28UI including DDJ.

We should change it to 0.25UI as it excludes DDJ.

SuggestedRemedy

Change 0.28UI with 0.25UI.

Proposed Response *Response Status* **O**

Cl **93** *SC* **92.8.3.8** *P* **135** *L* **48** # 154

Dawe, Piers IPtronics

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

This says "the measurement bandwidth should be at least TBD GHz". But a definition needs to be precise and not biased: we can't say whether more bandwidth is "better", or less bandwidth. We give the reader the hint in the next sentence that it may not be critical. (I don't think it makes a huge difference as long as it's a reasonable linear-phase response.)

SuggestedRemedy

Change "For DDJ measurements, the measurement bandwidth should be at least TBD GHz." to "The waveform is observed through a fourth-order Bessel-Thomson response with a bandwidth of 33 GHz."

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.4.2** *P* **139** *L* **7** # 58

Mellitz, Richard Intel Corporation

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

The correlation between system performance and test specifications can be improved with a specification based on time domain simulation based on measured S-parameters. This will reduce the need for guard banding and hence increase the number of channels that can pass the specifications.

SuggestedRemedy

The correlation between system performance and test specifications can be improved with a specification based on a time domain figure of merit derived from measured S-parameters. This will reduce the need for guard banding and hence increase the number of channels that can pass the specifications for which consensus has determined will electrically operate successfully.
Make the changes to the draft as described in presentation by Mellitz, Moore, Dudek, Li, et al supported with a presentation for why the method is better and how it works, by Moore, Ran, Mellitz, et al.
At time of this comments file names and requestor have not been finalized.

At time of this comments file names and requestor have not been finalized.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.7.12** *P* **130** *L* **31** # 175

Dawe, Piers IPtronics

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

This says "Each lane of the 100GBASE-KR4 PMD shall use the same control function as 10GBASE-KR, as defined in 72.6.10." and 72.6.10 says "The control channel is signaled using differential Manchester encoding (DME) at a signaling rate equal to one quarter of the 10GBASE-KR signaling rate. Since each DME symbol contains two DME transition positions and each transition position is four 10GBASE-KR UI, one control channel bit is transmitted every eight 10GBASE-KR UI.
Do you mean use the same training frames run 2.5 times faster (including DME 2.5 times faster) or DME at rate stated above but PRBS 2.5x faster?

SuggestedRemedy

Please make this clear.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1** *P* **130** *L* **50** # 84

Moore, Charles Avago Technologies

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

TP0 is inaccessable for measurement. We need to add a test point TP0A, connected to TP0 through a specified channel.

SuggestedRemedy

change line:
"Transmitter characteristics measured at TP0 are summarized in Table 93–4."

to

"Transmitter characteristics measured at TP0A are summarized in Table 93–4."

Add definition of TP0A to be connected to Tx Under test by a channel with:
1.3dB <IL at Nyquist < 1.6dB
Return loss > 15dB 10MHz to 15 GHz

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1** *P* **131** *L* # 145

Dawe, Piers IPtronics

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

For robustness, it would help if there were something like a minimum VMA spec (say 0 to 50 mV) so that the Tx would never set the signal to invert if the Rx asked for one too many tap weight changes.

SuggestedRemedy

Consider adding a minimum VMA spec, or similar, so that Tx can never invert the signal or set all its the taps to zero when still technically transmitting.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1 Table 93-4** *P* **131** *L* **11** # 1

Latchman, Ryan Mindspeed

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

Common mode DC output voltage is specified between 0V and TBDV. TBD needs to be established.

0V minimum is not a practical common mode (see figure 93-3)

In the case of DC coupling, a max leakage current spec is required to ensure device reliability and biasing.

SuggestedRemedy

Change TBD to 1.9V

Change Common-mode DC output voltage (min.) to 0.4V

Add leakage current spec to Table 93-4 (source and sink)

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.2** *P* **131** *L* **11** # 81

Moore, Charles Avago Technologies

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

v_d and v_cm are defined in terms of SLi<p> and SLi<n>. Since SLi<p> has a subscript, i, shouldn't v_d and v_cm also be subscripted?

SuggestedRemedy

replace v_d with v_d_i and v_cm with v_cm_i

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.2** *P* **131** *L* **50** # 143

Dawe, Piers IPtronics

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

A pattern with a 2 UI period is not a "square wave":
52.9.1.2 Square wave pattern definition
A pattern consisting of four to eleven consecutive ones followed by an equal run of zeros may be used as a square wave.
Table 86-11-Test patterns
Square wave (8 ones, 8 zeros)
And this is a bad choice: the true peak-to-peak voltage could be significantly larger. We really want to contain the VMA or steady-state voltage because more of that passes though a lossy channel.

SuggestedRemedy

Use a mixed frequency pattern: PRBS31 or scrambled idle, possibly PRBS9.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.2** *P* **131** *L* **51** # 146

Dawe, Piers IPtronics

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

At present, this and other signal parameters are specified as if observed in an infinite bandwidth. At these rates, that's just too expensive. And noisy.

SuggestedRemedy

Define output voltage, transition time, DCD, TJ, AC common-mode output voltage and more as observed through a 33 GHz fourth-order Bessel-Thomson response.
(Someone with a much faster scope can use a software filter for most parameters, which would give great accuracy.)

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.2** *P* **132** *L* **2** # 155

Dawe, Piers IPtronics

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

Need to define the measurement filter for AC common-mode output voltage. It is convenient (lower cost) if it is the same as for DDJ and so on.

SuggestedRemedy

"The signal is observed through a fourth-order Bessel-Thomson response with a bandwidth of 33 GHz."

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.2** *P* **132** *L* **2** # 144

Dawe, Piers IPtronics

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

Use consistent order of words. Base document uses "AC common-mode" or "ac common-mode" 20 times, 8 "common-mode AC" or "common-mode ac". Similar proportions on the internet: 6,470 to 3,830.

SuggestedRemedy

Change "common-mode AC" to "AC common-mode" throughout (5 changes). For consistency, do the same for "common-mode DC output voltage"

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.3** *P* **132** *L* **21** # 85

Moore, Charles Avago Technologies

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

Tx output return loss is TBD, we need values for equations (93-1) and (93-2)

SuggestedRemedy

use:
DifferentialReturnLoss(f) =
10 x log10((0.026 + (f/32)^2) / (1 + f/32)^2)) dB, 0.05<f<20 (93-1)

CommonModeReturnLoss(f) =
6 dB, 0.05<f<20 (93-2)

f in GHz

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.3** *P* **132** *L* **22** # 65

Mellitz, Richard Intel Corporation

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

Resolve Return loss TBD

SuggestedRemedy

Tie return loss to channel specification proposal presentation by Mellitz, Moore, Dudek, Li, et al supported with a presentation for why the time domain method is better and how it works, by Moore, Ran, Mellitz, et al.
At time of this comments file names and requestor have not been finalized.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.5.1** *P* **134** *L* **19** # 147

Dawe, Piers IPtronics

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

This isn't a test spec. No "shall be verified" or "shall be tested" allowed! All we ask is that the thing comply - it might be established by design or batch testing. The wording in 93.8.1.4 Transition time is nicer.

SuggestedRemedy

Change "The steady state voltage and linear fit pulse peak values shall be verified after the transmit equalizer coefficients have been set to the “preset” values." to "The steady state voltage and linear fit pulse peak values shall comply with the specifications in Table 93-4 when the transmit equalizer coefficients have been set to the “preset” values."

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.7** *P* **135** *L* **37** # 151

Dawe, Piers IPtronics

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

We can define Random Jitter!

SuggestedRemedy

See my comment against 92.8.3 for RJ.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.7** *P* **135** *L* **41** # 149

Dawe, Piers IPtronics

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

The procedure for DCD in 72.7.1.9 is not satisfactory: a 1010 sequence embedded in a PRBS will give a different (higher) result than a 1010 pattern alone: because in the latter case, the signal's mean is different, and this flatters the result. As service signals are like PRBS not like continuous 1010, the former is the relevant measure. Also it's closer to the algorithm built into oscilloscopes.

SuggestedRemedy

See my comment against 92.8.3 for DCD.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.7** *P* **135** *L* **44** # 150

Dawe, Piers IPtronics

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

I wouldn't refer to Annex 48B.3. It has some formulae for Dual Dirac method, but it is informative, written for 8B/10B not scrambled signals, and, critically, uses RJ_RMS which I think is not what is meant here.
We should not outlaw e.g. scope-based ways of measuring TJ.

SuggestedRemedy

Don't refer to Annex 48B.3. If you need a reference, you could try MJSQ chapter 8, but I think you can replace the sentence with a reference to a definition of TJ.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.7** *P* **135** *L* **44** # 148

Dawe, Piers IPtronics

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

This isn't a definition of Total Jitter (does not answer the question: what is Total Jitter?) although it provides essential information on pattern and reference CRU.

SuggestedRemedy

See my comment against 92.8.3 for definition of Total Jitter. Refer to definition from here.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.7** *P* **135** *L* **45** # 152

Dawe, Piers IPtronics

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

Filling in a TBD for the reference CRU bandwidth.

SuggestedRemedy

Isn't this just 4x2.5=10 MHz, in proportion with the signalling rate?

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.1.7** *P* **135** *L* **48** # 137

Dawe, Piers IPtronics

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

This says "Data Dependent Jitter is characterized using the procedure defined in 85.8.3.8." while 92.8.3.8 largely copies 85.8.3.8, but with an "at least TBD" measurement bandwidth.

SuggestedRemedy

To make it clear to the reader that it's much the same DDJ, and to avoid duplication, I think this can be done by reference, listing any exceptions. See another comment for choice of filter.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.2.1** *P* **136** *L* **21** # 86

Moore, Charles Avago Technologies

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

Rx output return loss is TBD, we need values for equations (93-3) and (93-4)

SuggestedRemedy

use:
DifferentialReturnLoss(f) =
10 x log10((0.026 + (f/32)^2) / (1 + (f/32)^2)) dB, 0.05<f<20 (93-3)

CommonModeReturnLoss(f) =
6 dB, 0.05<f<20 (93-4)

f in GHz

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.2.1** *P* **136** *L* **22** # 63

Mellitz, Richard Intel Corporation

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

Resolve Return loss TBD

SuggestedRemedy

Tie return loss to channel specification proposal presentation by Mellitz, Moore, Dudek, Li, et al supported with a presentation for why the time domain method is better and how it works, by Moore, Ran, Mellitz, et al.
At time of this comments file names and requestor have not been finalized.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.2.1** *P* **136** *L* **29** # 87

Moore, Charles — Avago Technologies

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

No justification for specifying differential to common mode return loss has been given. It has no value.

SuggestedRemedy

Delte it.Remove line 28 and equation 93-5

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.2.2** *P* **136** *L* **42** # 88

Moore, Charles — Avago Technologies

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

Receiver used in clause 93 is a package PHY, where clause 85 receiver is defined at a bulkhead connector. Using procedure defined in 85.8.4.2 in not appropriate, use annex 69A instead.

SuggestedRemedy

change:
"Receiver interference tolerance is characterized using the procedure defined in 85.8.4.2"
to:
"Receiver interference tolerance is characterized using the procedure defined in Annex 69A."
Change Annex 69A.2.2 to allow definition of channel loss either in terms of ~mTC and bTC or a0, a1, a2, and a4.
Delete reference to channel noise which is not defined.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.2.2** *P* **137** *L* **19** # 61

Mellitz, Richard — Intel Corporation

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

Since FEC changes the minimum BER applied broad band noise should be constrained with an appropriate crest factor

SuggestedRemedy

Add entry in table after Applied RMS noise for "Applied Crest factor" are the like.
Suggested value for is erfcinv(2*minimum BER)*sqrt(2). This could go into Annex 69A.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.8.2.2** *P* **137** *L* **3** # 78

Moore, Charles — Avago Technologies

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

table 93-7 is technically imcomplete: full of TBD's

SuggestedRemedy

replace TBD's with values from moore_02A_0312.pdf page 30. If we wish to use a_n values in the same way as 92.10.2 the numbers from moore_02A_0312.pdf page 30 which are expressed in Napier and Hz will have to be converted to dB and GHz.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.9** *P* **137** *L* **25** # 79

Moore, Charles — Avago Technologies

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

As contituted 93.9 is just a placeholder for a spec.

SuggestedRemedy

Either use specification method in presentation at July meeting, or use method defined in moore_01_0311 and moore_01_0312.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.9.1** *P* **138** *L* **14** # 60

Mellitz, Richard — Intel Corporation

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

IL description are inconsistent between clauses 93 and 94 and table 93-7

SuggestedRemedy

Add equation for Amax and coefficients as in 94-18 based on equations 93-7 and 93-6

Proposed Response *Response Status* **O**

Cl **93** *SC* **93.9.1** *P* **138** *L* **22** # 173

Dawe, Piers — IPtronics

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

The 30 dB (and 35 dB) end-to-end losses are 6.6 dB more than 10GBASE-KR, (a factor of 2.1), and when combined with the worse package impairments at the higher signalling rate, seem to be beyond what can be reliably specified today. They would need to be proved out.

SuggestedRemedy

1. Improve the specification method and/or reduce the end-to-end loss to about 25 dB (without FEC) or 30 dB with FEC.
2. Show working silicon that works with the specified channels, with a path to full robustness.

Proposed Response *Response Status* **O**

Cl **93** *SC* **93-1** *P* **123** *L* # 188

Sela, Oren — Mellanox Technologies

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

Need to add CL72 to table 93-1 due to startup protocol and reference to PMD control

SuggestedRemedy

Add to table 93-1:
72 - PMD control required

Proposed Response *Response Status* **O**

Cl **93** *SC* **Table 93-4** *P* **131** *L* **11** # 82

Moore, Charles — Avago Technologies

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

need a value for Common mode CD output voltage (max)

SuggestedRemedy

replace TBD with 900mV. Also change page 132 line 1
"between 0 V and TBD V"
with
"between 0 V and 0.90 V"

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.1** *P* **142** *L* **26** # 294

D'Ambrosia, John — Dell

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

Table 94-1 lists the physical layer clauses associated with 100GBASE-KR4 PMD, and states that Clause 83A CAUI is optional. However, CAUI is based on 10 lanes of 10.3125 Gb/s, and therefore would also require two instantiations of the Clause 83 PMA sublayer

SuggestedRemedy

Table 94-1 need to include Clause 83 PMA as optional.
Add a note to 83A CAUI line that states if 83A CAUI is present then two instantiations of Clause 83 PMA [(n:10) and (10:n] must be present. It is also assumed that a CAUI would actually reside between two clause 83 PMA sublayers that would reside above the FEC sublayer. This is brought up then, because now we need to define the PMA Sublayer positioning in a fashion similar to what is currently done in 83.1.4. This also would include addresing the MMD addresses for multiple PMA sublayers.

also, i believe from prior work it was stated that if the adopted FEC approach were to be used - you could not change the number of lanes until the data link was "de-FEC'd". This means the following two things -
1. You can't connect a clause 94 PMA to a Clause 83 PMA to do a CAUI
2. CAUI shall only be used outside of the FEC'd link.

This needs to be captured in a section similar to the guidelines applying to partioning of PMAs on page 139 of P802d3rev_d3p1.pdf on Page 139.

It would makie sense to move 94.2 PMA subclauses into

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.2.2** *P* **146** *L* **18** # 48

Anslow, Pete — Ciena

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

In Clause 94 there are several arrays of objects denoted by single letters. A useful feature of these arrays is to choose a letter that makes it easy to remember which array is which.
In draft D1.0:
T() for Termination blocks
G() for Grey-coded symbols
P() for Precoded symbols
are all easy to remember.

C() for FEC frame bits
F() for overhead frame bits
Q() for PAM4 symbols
are not very memorable - F() in particular would much more naturally stand for FEC frame bits.
For the overhead frame, O would be a possibility, but this could be confused with a zero.

SuggestedRemedy

Change the letters to:
F() for FEC frame bits
V() for oVerhead frame bits
M() for PAM4 symbols

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.2.2.4** *P* **147** *L* **40** # 80

Moore, Charles — Avago Technologies

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

Termination bits complicate the coding and add 2.2% overhead. It is not clear that we receive real benefit in return. If a ML receiver is used it will allow us to correct a single bit error in a 45 bit block. Such errors are not likely to be what gets past FEC. Most likely multibit errors, which the termination block is less likely to correct, will be what cause FEC failures. Also if the receiver does not use ML, there is no value to the termination bits.

SuggestedRemedy

Remove termination bits and either use the reduced overhead to strengthen FEC or reduce line rate.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.2.4** *P* **50** *L* **24** # 236

Matthew, Brown — Applied Micro

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

Detailed descriptions of the PMA decoding process are required.

SuggestedRemedy

Write a de-coding section to complement sections 94.2.2.1 to 94.2.2.8.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.2.5** *P* **150** *L* **29** # 234

Matthew, Brown — Applied Micro

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

For EEE operation, a signal structure and framing mechanism for allowing the receiver to quickly lock to the PMA frame signal.

SuggestedRemedy

A proposal will be provided at the July meeting.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.2.5** *P* **150** *L* **29** # 235

Matthew, Brown — Applied Micro

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

For EEE operation, a signal structure and framing mechanism for allowing the PMA/PMD to remain operational during the fast wake.

SuggestedRemedy

A proposal will be provided at the July meeting.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.10** *P* **159** *L* **38** # 125

Lusted, Kent — Intel

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

PMD control function for 100GBASE-KP4 needs a baseline proposal.

SuggestedRemedy

See presentation lusted_03_0712.pdf to be submitted at a future date

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.11** *P* **160** *L* **3** # 106

Moore, Charles — Avago Technologies

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

TP0 is inaccessable for measurement. Usetest point TP0A, connected to TP0 through a specified channel.

SuggestedRemedy

change line:
"Transmitter characteristics measured at TP0 are summarized in Table 93–4."
to:
"Transmitter characteristics measured at TP0A are summarized in Table 93–4."

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.11.4** *P* **162** *L* **22** # 57

Mellitz, Richard — Intel Corporation

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

Resolve Return loss TBD

SuggestedRemedy

Tie return loss to channel specification proposal presentation by Mellitz, Moore, Dudek, Li, et al supported with a presentation for why the time domain method is better and how it works, by Moore, Ran, Mellitz, et al.
At time of this comments file names and requestor have not been finalized.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.11.4** *P* **162** *L* **22** # 108

Moore, Charles — Avago Technologies

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

equation 94-3 is TBD, this is technically incomplete

SuggestedRemedy

use equation given in moore_02a_0312.pdf page 20

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.12** *P* **167** *L* **2** # 104

Moore, Charles — Avago Technologies

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

TP5 is inaccessable for measurement. Usetest point TP5A, connected to TP0 through a specified channel.

SuggestedRemedy

change line:
"Receiver characteristics measured at TP5 are summarized in Table 93–4."
to:
"Receiver characteristics measured at TP5A are summarized in Table 93–4."

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.12.2** *P* **167** *L* **52** # 109

Moore, Charles — Avago Technologies

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

Equation 94-14 is TBD, that is technically incomplete.

SuggestedRemedy

Use equation from moore_02a_0312.pdf page 20. Page 20 gives it a Tx differential return loss but the same equation can be used for Rx

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.12.2** *P* **167** *L* **52** # 64

Mellitz, Richard — Intel Corporation

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

Resolve Return loss TBD

SuggestedRemedy

Tie return loss to channel specification proposal presentation by Mellitz, Moore, Dudek, Li, et al supported with a presentation for why the time domain method is better and how it works, by Moore, Ran, Mellitz, et al.
At time of this comments file names and requestor have not been finalized.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.3.12.3** *P* **168** *L* **43** # 62

Mellitz, Richard — Intel Corporation

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

Since FEC changes the minimum BER applied broad band noise should be constrained with an appropriate crest factor

SuggestedRemedy

Add entry in table after Applied RMS noise for "Applied Crest factor" are the like.
Suggested value for is erfcinv(2*minimum BER)*sqrt(2). This could go into Annex 69A.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.4** *P* **169** *L* **1** # 105

Moore, Charles — Avago Technologies

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

The specifications given are probably insuficient to give high confidence that a cahnnel will be usable.

SuggestedRemedy

use method defined is presentation which will be made at July meeting. Or use method defined in moore_01_0311.pdf and moore_01_0312.pdf

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.4.1** *P* **169** *L* **40** # 174

Dawe, Piers — IPtronics

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

33 dB end-to-end loss seems to be well beyond what can be reliably specified today. This is 3 dB beyond the highly aggressive NRZ non-FEC target, so it's nearly 10 dB or 3 times more than 10GBASE-KR.
The benefit from FEC and the multi-level penalty almost exactly cancel each other out.
The package loss at 14 GBd would be better than at 26 GBd but worse than at 10.3 GBd.
Multilevel distortion and more difficult clock recovery put PAM4 at a disadvantage.
If is true that crosstalk and/or reflection "noise" are partly bounded, not pure Gaussian, then the benefit of FEC would be reduced.
Proposed specifications at this challenging level would need to be proved out.

SuggestedRemedy

1. Improve the specification method and/or reduce the end-to-end loss to about 23 dB.
2. Determine if there really is a "broad market" that PAM4 with realistic specs can address and NRZ with FEC can't.
3. If not, delete the clause. If so, show working silicon that works with the specified channels, with a path to full robustness.

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.4.1** *P* **169** *L* **8** # 233

Matthew, Brown — Applied Micro

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

Equation 94-17 which is inherited from Clause 69 is based upon a second equation 94-18 which is no longer required separately for this Clause. Consolidate to a single equation set.

SuggestedRemedy

Change the top equation in 94-17 to:
a0+a1*sqrt(f)+a2*f+a3*f^2+a4*f^3

Change the bottom equation in 94-17 to:
a5+a6*(f-f2);

Delete line~17 starting with "Amax".

Delete lines 23 to 32.

Add the following:
a0 = 0.8
a1 = 1.7372e-4
a2 = 1.1554e-9
a3 = 2.7795e-19
a4 = -1.0423e-29
a5 = 33.467
a6 = 1e-8

Proposed Response *Response Status* **O**

Cl **94** *SC* **94.9.2** *P* **170** *L* **8** # 59

Mellitz, Richard — Intel Corporation

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

The correlation between system performance and test specifications can be improved with a specification based on time domain simulation based on measured S-parameters. This will reduce the need for guard banding and hence increase the number of channels that can pass the specifications.

SuggestedRemedy

The correlation between system performance and test specifications can be improved with a specification based on a time domain figure of merit derived from measured S-parameters. This will reduce the need for guard banding and hence increase the number of channels that can pass the specifications for which consensus has determined will electrically operate successfully.
Make the changes to the draft as described in presentation by Mellitz, Moore, Dudek, Li, et al supported with a presentation for why the method is better and how it works, by Moore, Ran, Mellitz, et al.
At time of this comments file names and requestor have not been finalized.

Proposed Response *Response Status* **O**

Cl **94** *SC* **Table 94-4** *P* **160** *L* **8** # 107

Moore, Charles — Avago Technologies

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

Table 94-4 contains many TBDs making it technically incomplete.

SuggestedRemedy

Use values from moore_02a_0312.pdf page 18.

Proposed Response *Response Status* **O**

Cl **94** *SC* **table 94-7** *P* **168** *L* **26** # 110

Moore, Charles — Avago Technologies

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

Technically incomplete: most values are TBD.

SuggestedRemedy

use values from moore_02a_0312.pdf page 31, using the valuse listed under "Test 3" for test 1 and values given for "Test 4" for test 2.

Proposed Response *Response Status* **O**

Cl **99** *SC* **45.2.7.13** *P* **20** *L* **8** # 289

D'Ambrosia, John Dell

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

EEE support is being developed for 100GBASE-nR4 PHY specifications. Backwards capability is always desirable, but adding EEE support for 40GBASE-CR4 and 40GBASE-KR4 is not within scope of this project. This will impact all instances that refers to 100GBASE-CR10 throughout the amendment.

The scope of the PAR for IEEE P802.3bj is as follows:
The scope of this project is to specify additions to and appropriate modifications of IEEE Std 802.3 to add 100 Gb/s 4 lane Physical Layer (PHY) specifications and management parameters for operation on backplanes and twinaxial copper cables.

SuggestedRemedy

Change the title of the project so it is inclusive of doing EEE for 40GBASE-CR4 and 40GBASE-KR4.

Change the scope of the PAR so it is inclusive of 40GBASE-CR4 and 40GBASE-KR4. Presentation to be submitted in July proposing changes to the PAR and possibly 5 Criteria.

Proposed Response *Response Status* **O**

Cl **99** *SC* **Errata** *P* **5** *L* **51** # 132

Dawe, Piers IPtronics

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

This says "Errata, if any, for this and all other standards can be accessed at" an IEEE URL. It's not so. IEEE is not the whole world; there are plenty of other standards, including ones we use, with errata elsewhere. In any case the web site denies it: "Not all of the available IEEE standards errata and or corrections are online, this list should not be considered to be comprehensive."

SuggestedRemedy

Change "all other" to "other IEEE". Get staff to correct their boilerplate. Insert space before "Users".

Proposed Response *Response Status* **O**