*Cl* **01** *SC* **1.4** *P* **24** *L* **6** # 15

Anslow, Pete Ciena

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

Now that IEEE P802.3bk/D3.1 has been submitted to RevCom for approval (and is expected to be approved by the SASB before the York meeting) the numbering in 1.4 needs to be updated to account for the deletion of 1.27 and the consequent renumbering of all definitions above 1.27.
It seems better to do this now rather than wait until Sponsor Ballot.

*SuggestedRemedy*

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

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, the comment pertains to necessary changes to the draft.

---

*Cl* **01** *SC* **1.4.167a** *P* **24** *L* **50** # 43

Marris, Arthur Cadence

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

This definition cannot refer to the quiet state because it only exists for Deep Sleep mode. Change to Low Power Idle.

*SuggestedRemedy*

1.4.167a Deep Sleep: One of the two modes of operation for Energy-Efficient Ethernet. Deep Sleep refers to the mode for which the transmitter ceases transmission during the quiet state to maximize the energy saving potential. (See Figure 78-3).

To:
1.4.167a Deep Sleep: One of the two modes of operation for Energy-Efficient Ethernet. Deep Sleep refers to the mode for which the transmitter ceases transmission during Low Power Idle to maximize the energy saving potential. (See Figure 78-3).

Make corresponding change in 78.1.3.3.1.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Note that this comment requires changes to both Clause 1 and 78.

*Cl* **01** *SC* **1.4.167a** *P* **24** *L* **50** # 17

Anslow, Pete Ciena

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

Throughout the remainder of the P802.3bj draft "deep sleep" is not capitalised (except when "Deep" is the first word of a sentence).

*SuggestedRemedy*

Change "Deep Sleep" to "Deep sleep" in two places on line 50.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **01** *SC* **1.4.167a** *P* **24** *L* **52** # 16

Anslow, Pete Ciena

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

For all definitions in subclause 1.4, cross-references to other parts of the 802.3 standard are prefaced by "IEEE Std 802.3,". This has not been done in the newly added 1.4.167a, 1.4.183a and 1.4.191a.
Also, in 1.4.191a "Clause 78-3a" should be "Figure 78-3a" (Probably an incorrect cross-reference format)

*SuggestedRemedy*

In 1.4.167a, change "See Figure 78-3" to "See IEEE Std 802.3, Figure 78-3"
In 1.4.183a, change "See Clause 78" to "See IEEE Std 802.3, Clause 78"
In 1.4.191a, change "See Clause 78-3a" to "See IEEE Std 802.3, Figure 78-3a"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **01** *SC* **1.4.191a** *P* **25** *L* **7** # 18

Anslow, Pete Ciena

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

The draft is inconsistent in its use of "fast wake" or "Fast Wake". Since the draft is consistent in using "deep sleep" (except for the newly added 1.167a) change to using "fast wake" here and throughout the draft (except where the name is part of a variable name).

*SuggestedRemedy*

Change to using "fast wake" here and throughout the draft (except where the name is part of a variable name).

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **01** *SC* **1.4.191a** *P* **25** *L* **7** # 44

Marris, Arthur — Cadence

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

Circular definition of Fast Wake. Change "fast wake state" to "Low Power Idle".

*SuggestedRemedy*

Change:
1.4.191a Fast Wake: One of the two modes of operation for Energy-Efficient Ethernet. Fast Wake refers to the mode for which the transmitter continues to transmit signals during the fast wake state so that the receiver can resume operation with a shorter wake time. (See Clause 78-3a).

To:
1.4.191a Fast Wake: One of the two modes of operation for Energy-Efficient Ethernet. Fast Wake refers to the mode for which the transmitter continues to transmit signals during Low Power Idle so that the receiver can resume operation with a shorter wake time. (See Clause 78-3a).

Make corresponding change in 78.1.3.3.1.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **30** *SC* **30.5.1.1.17** *P* **24** *L* **6** # 7

Anslow, Pete — Ciena

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

Now that IEEE P802.3bk/D3.1 has been submitted to RevCom for approval (and is expected to be approved by the SASB before the York meeting) the changes made to the text of 30.5.1.1.17 and 30.5.1.1.18 should be made to the base text of the P802.3bj draft. It seems better to do this now rather than wait until Sponsor Ballot.

*SuggestedRemedy*

Change the base text of 30.5.1.1.17 and 30.5.1.1.18 to reflect the changes made by the P802.3bk draft.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, this is a straightforward change that would otherwise be necessary in sponsor ballot.

*Cl* **30** *SC* **30.5.1.1.18** *P* **31** *L* **2** # 141

Wertheim, Oded — Mellanox Technologies

*Comment Type* **T** *Comment Status* **D** *FEC mgmt*

The aFECUncorrectableBlocks counter is defined as an array, where each element of the array contains a count of uncorrectable FEC blocks for that PCS lane or FEC lane.
When a FEC block (RS-FEC codeword) is transmitted over multiple FEC lanes, the counter cannot be associated with a specific lane.

Applies also to 30.5.1.1.17 aFECCorrectedBlocks

*SuggestedRemedy*

The indices of this array (0 to N - 1) denote the FEC sublayer instance number where N is the number of FEC sublayer instances in use. The number of FEC sublayer instances is set to the number of PCS lanes for PHYs that instantiate a FEC sublayer for each PCS lane and is set to one for PHYs that do not use PCS lanes or use a single FEC instance for multiple FEC lanes. Each element of this array contains a count of uncorrectable FEC blocks for that FEC sublayer instance.
Increment the counter by one for each FEC block that is determined to be uncorrectable by the FEC function in the PHY for the corresponding lane or FEC sublayer instance.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, this is an error in the draft that would otherwise require changing in sponsor ballot.

This applies to both the corrected and uncorrectable counts: 30.5.1.1.17, 30.5.1.1.18. Use the suggested remedy, with corrected or uncorrectable as appropriate for each.

*Cl* **30** *SC* **30.5.1.1.28** *P* **32** *L* **5** # 19

Anslow, Pete Ciena

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

This says "... will map to the RS-FEC capability register (see 45.2.1.92b)" but there is no "RS-FEC capability register" 45.2.1.92b is the RS-FEC status register.
Same issue in 30.5.1.1.29

*SuggestedRemedy*

Change:
"... will map to the RS-FEC capability register (see 45.2.1.92b)" to:
"... will map to the RS-FEC status register (see 45.2.1.92b)"
here and in 30.5.1.1.29

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, this is a straightforward change that would otherwise be necessary in sponsor ballot.

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*Cl* **45** *SC* **45.2.1.100** *P* **58** *L* **40** # 111

Lusted, Kent Intel

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

add space between Table 45-73 and Table title

*SuggestedRemedy*

add space between Table 45-73 and Table title

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, this is a straightforward change that would otherwise be necessary in sponsor ballot.

Add a long dash (not a space).

*Cl* **45** *SC* **45.2.1.7.4** *P* **40** *L* **19** # 1

Hajduczenia, Marek ZTE Corporation

*Comment Type* **E** *Comment Status* **D** *editing instructions*

On reading the editing instructions and looking at the table, it is not really clear that the table already exists.

*SuggestedRemedy*

Insert row with "..." before the row with 100GBASE-KP4 and after the row with 100GBASE-CR4 entry.
The same applies to Table 45-10 in 45.2.1.7.5.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The editing instructions say "Insert . in Table ." - this can only be possible if the Table already exists in the base standard.

---

*Cl* **45** *SC* **45.2.1.7.4** *P* **40** *L* **26** # 20

Anslow, Pete Ciena

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

The link for 100GBASE-CR4 in Table 45-9 is to 93.7.10, but is should be to 92.7.10
Similar issue for the link for 100GBASE-CR4 in Table 45-10

*SuggestedRemedy*

Change the link for 100GBASE-CR4 in Table 45-9 to 92.7.10
Change the link for 100GBASE-CR4 in Table 45-10 to 92.7.11

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **45** *SC* **45.2.1.92b** *P* **46** *L* **6** # 60

Szczepanek, Andre Inphi

*Comment Type* **T** *Comment Status* **D** *FEC mgmt*

FEC alignment only has one global status bit : 1.201.14 "FEC alignment status" indicating alignment of all lanes, whereas PCS alignment has both a global "PCS lane alignment status" and individual PCSL block and AM lock status bits.

If PCS alignment fails it is easy to determine the failing lane, whereas FEC alignment provides no indication of which lane is failing. We really need per lane FEC alignment status bits.

*SuggestedRemedy*

Add four bits "FEC AM Lock 3" through "FEC AM Lock 0" to register 1.201 (1.201.11:8 ?) or in a different register at the editors discretion.

I am willing to defer this comment to Sponsor ballot if necessary.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

The individual alignment bits were not considered necessary by commenters on the first 2 drafts, therefore this cannot be considered an absolute necessity.

The commenter is invited to discuss this with others and resubmit in Sponsor Ballot where such an improvement can be considered.

*Cl* **45** *SC* **45.2.1.92b.4** *P* **46** *L* **51** # 126

Slavick, Jeff Avago Technologies

*Comment Type* **T** *Comment Status* **D** *FEC mgmt*

The RS-FEC will always provide the FEC lane alignment status regardless of whether it is seperated or not.

*SuggestedRemedy*

Remove "A device that implements the RS-FEC status register but does not implement a separated RS-FEC shall return a one for bit 1.201.14." from this section.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

<Commenter did not submit a disapprove ballot. Editor changed CommentType from TR to T.>

*Cl* **45** *SC* **45.2.1.92e** *P* **49** *L* **52** # 26

Anslow, Pete Ciena

*Comment Type* **T** *Comment Status* **D** *FEC mgmt*

Now that the RS-FEC align status has been moved to register 1.201, the text:
"When read as a one, bit 1.206.15 indicates that the RS-FEC described in Clause 91 has locked and aligned all receive lanes. When read as a zero, bit 1.206.15 indicates that the RS-FEC has not locked and aligned all receive lanes."
should be deleted

*SuggestedRemedy*

Delete:
"When read as a one, bit 1.206.15 indicates that the RS-FEC described in Clause 91 has locked and aligned all receive lanes. When read as a zero, bit 1.206.15 indicates that the RS-FEC has not locked and aligned all receive lanes."

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **45** *SC* **45.2.1.92h** *P* **49** *L* **7** # 2

Hajduczenia, Marek ZTE Corporation

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

"FEC BIP error counter, lane 0 register" - register name does not have the comma in it.

*SuggestedRemedy*

This text ought to read: "FEC BIP error counter lane 0 register"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, this is a straightforward change that would otherwise be necessary in sponsor ballot.

---

*Cl* **45** *SC* **45.2.1.92m.3** *P* **55** *L* **17** # 12

Anslow, Pete Ciena

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

Comment #26 against D2.1 has not been fully implemented. The second part was:
In 45.2.1.92m.2 through 45.2.1.92m.12, add the full stop [to the end of the second sentence].
This has not been done in 45.2.1.92m.3 through 45.2.1.92m.12

*SuggestedRemedy*

In 45.2.1.92m.3 through 45.2.1.92m.12, add a full stop to the end of the second sentence.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **45** *SC* **45.2.1.92o** *P* **56** *L* **24** # 127

Slavick, Jeff — Avago Technologies

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

Bit number for Lane 13 alinged is wrong.

*SuggestedRemedy*

Change 1.281.28 to 1.281.5 in Table 45-71l

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

<Commenter did not submit a disapprove ballot. Editor changed CommentType from ER to E.>

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, this is a straightforward change that would otherwise be necessary in sponsor ballot.

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*Cl* **45** *SC* **45.2.1.98a** *P* **58** *L* **28** # 128

Slavick, Jeff — Avago Technologies

*Comment Type* **T** *Comment Status* **D** *bit order*

The text states that S0 is bit0, S10 is bit 10. So the default assumption would be that for lane 0 you'd set the MDIO register seed_0 11:0 -> 0x57E. However, the default seed values match what's in Table 92-5 which are listed in S0->S10 bit sequence (S0 is leftmost bit).

*SuggestedRemedy*

Change: "(binary)" to "(binary, S0 is left-most bit)"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

<Commenter did not submit a disapprove ballot. Editor changed CommentType from TR to T.>

*Cl* **45** *SC* **45.2.3.9.a** *P* **61** *L* **43** # 37

Marris, Arthur — Cadence

*Comment Type* **T** *Comment Status* **D** *EEE mgmt*

This is really referring to the PCS's ability to support EEE and so the reference to all 100BASE-R PHYs is irrelevant and confusing.

*SuggestedRemedy*

Change:
"If the device supports EEE fast wake operation for all 100GBASE-R PHYs, as defined in 78.1, this bit shall be set to a one; otherwise this bit shall be set to a zero."
To:
"If the PCS supports EEE fast wake operation, this bit shall be set to a one; otherwise this bit shall be set to a zero."

Make similar change to 45.2.3.9.f 40GBASE-R EEE fast wake supported on page 62 line 18.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

This bit only applies to 100Gb/s, so the suggested remedy would be incorrect.

Change to:

"If the PCS supports EEE fast wake operation for 100GBASE-R, this bit shall be set to a one; otherwise this bit shall be set to a zero."

Make similar change to 45.2.3.9.f 40GBASE-R EEE fast wake supported on page 62 line 18.

*Cl* **69** *SC* **69.1.1** *P* **69** *L* **5** # 38

Marris, Arthur — Cadence

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

Clause 69 no longer mentions that the backplane reach is 1 m.

*SuggestedRemedy*

Bring the first paragraph of 69.1.1 into 802.3bj and change:
"Ethernet operation over electrical backplanes, also referred to as "Backplane Ethernet," combines the IEEE 802.3 Media Access Control (MAC) and MAC Control sublayers with a family of Physical Layers defined to support operation over a modular chassis backplane."
To:
Ethernet operation over electrical backplanes, also referred to as "Backplane Ethernet," combines the IEEE 802.3 Media Access Control (MAC) and MAC Control sublayers with a family of Physical Layers defined to support operation over differential, controlled impedance traces on a printed circuit board with two connectors and total length up to at least 1 m consistent with the guidelines of Annex 69B.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The medium for the new backplane PHYs 100GBASE-KR4 and 100GBASE-KP4 are defined in terms of loss (i.e, dB), not in terms of physical length (e.g., meters). Addition of the 1 m length would not be consistent with the specification of these new backplane PHYs.

---

*Cl* **73** *SC* **73** *P* **74** *L* **5** # 9

Anslow, Pete — Ciena

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

The editing instruction is "Change" but no text is shown in underline or strikethrough to indicate the changes.

*SuggestedRemedy*

Show the changes using underline and strikethrough font.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, the comment pertains to necessary changes.

*Cl* **74** *SC* **74.5.1** *P* **79** *L* **2** # 52

Marris, Arthur — Cadence Design Syste

*Comment Type* **TR** *Comment Status* **D** *EEE primitives*

Need to bring "74.5.1 10GBASE-R service primitives" subclause into 802.3bj and correct RX_TX_MODE.indication definition.

Change "IS_RX_TX_MODE" to "FEC_RX_TX_MODE"

rx_tx_mode is only passed through the FEC, it is not used by it.

*SuggestedRemedy*

Bring "74.5.1 10GBASE-R service primitives" subclause into 802.3bj

Insert item h)
h) FEC_RX_TX_MODE.indication(rx_tx_mode)

Reword 74.5.1.8 so it reads as follows:
74.5.1.8 FEC_RX_TX_MODE.indication (optional)
FEC_RX_TX_MODE.indication(rx_tx_mode)
TA variable that reflects the value of the rx_tx_mode primitive PMA_RX_TX_MODE.indication.

74.5.1.8.1 Effect of receipt change:
"When rx_tx_mode is QUIET, the FEC decoder logic may deactivate functional blocks to conserve energy. When rx_tx_mode is DATA, the FEC decoder logic operates normally."
To:
"The effect of receipt of this primitive by the FEC client is unspecified by the FEC sublayer."

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Bring 74.5.1 into draft

Add item h) as suggested.

Add item h) to 3rd paragraph

Add a sentence to the 5th (final) paragraph:

For speeds greater than 10 Gb/s, if the optional EEE deep sleep capability is supported, rx_tx_mode is passed through the FEC but is not used by it.

Change IS_RX_TX_MODE to FEC_RX_TX_MODE

Leave 74.5.1.8.1 as is - the FEC decoder may choose to save energy as described, but does not have to.

*Cl* **74** *SC* **74.5.1.7** *P* **79** *L* **11** # 21

Anslow, Pete Ciena

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

10Gb/s should have a non-breaking space (ctrl space) between the number and the units.

*SuggestedRemedy*

Change "10Gb/s" to "10 Gb/s"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **74** *SC* **74.7.4.8** *P* **79** *L* **37** # 145

Ran, Adee Intel

*Comment Type* **T** *Comment Status* **D** *EEE primitives*

FEC rapid block synchronization seems to be required only for deep sleep.

Note another comment on this for all occurences in the new clauses.

*SuggestedRemedy*

Change "the optional EEE capability is supported" to "the optional EEE deep sleep capability is supported".

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

This paragraph is applicable to PHYs operating at 10 Gb/s. There is no distinction between fast wake and deep sleep for 10 Gb/s.

*Cl* **78** *SC* **78.1** *P* **81** *L* **16** # 32

Marris, Arthur Cadence

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

This could be better worded. The key thing is to point the reader to Table 78-1 where the PHYs with optional EEE support are listed.

*SuggestedRemedy*

Change:
Table 78-1 specifies clauses for EEE operation over twisted-pair cabling systems, twinax cable, and electrical backplanes; for XGMII extension using the XGXS for 10 Gb/s PHYs; and for inter sublayer service interfaces using the XLAUI for 40 Gb/s PHYs and CAUI for 100 Gb/s PHYs.

to:
EEE supports operation over twisted-pair cabling systems, twinax cable, electrical backplanes, the XGXS for 10 Gb/s PHYs, the XLAUI for 40 Gb/s PHYs and the CAUI for 100 Gb/s PHYs. Table 78-1 lists the supported PHYs and interfaces and their associated clauses.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, this is a straightforward change that would otherwise be necessary in sponsor ballot.

*Cl* **78** *SC* **78.1** *P* **81** *L* **36** # 50

Marris, Arthur Cadence Design Syste

*Comment Type* **T** *Comment Status* **D** *EEE description*

There is no high level description of how EEE signalling operates between the various PHY sublayers in Clause 78. There is however subclause "78.1.1.1 Interlayer service interfaces" but this only talks about the RS service interface.

*SuggestedRemedy*

Bring 78.1.1.1 into 802.3bj and rename subclause title.
Change:
78.1.1.1 Interlayer service interfaces
To:
78.1.1.1 Reconciliation Sublayer service interface

Bring 78.1.1 into 802.3bj by adding the following:
78.1.1 LPI Signaling
Insert the following text at the end of 78.1.1

The LPI Client connects to the RS service interface. LPI signalling between the RS and PCS is performed by LPI encoding on the Media Independent Interface. The transmit PCS encodes LPI symbols which are decoded by the link partner receive PCS. The receive and transmit PCS also generate a request signals each. These are passed down to the lower PHY sublayers and indicate when receive and transmit PHY functions may be powered down.

The EEE request signals from the PCS typically request quiet or normal operation. The Clause 49 and Clause 82 PCSes also request transmit alert operation to enable the partner device PMD to detect the end of the quiescent state. Additionally the PCS generates the RX_LPI_ACTIVE signal which indicates to the Clause 74 BASE-R FEC that it can use rapid block lock because the link partner PCS has bypassed scrambling.

Coding is defined in Clause 83 to allow LPI tranmsit quiet requests from the PCS to be signalled over the XLAUI and CAUI interfaces. The XLAUI and CAUI infer the receive quiet request from the data received from the link partner or from the RX_TX_MODE indication signal. The value of the RX_TX_MODE indication signal is itself inferred from the received data and is used when the EEE quiet coding has been corrupted by transcoding, FEC or bit multiplexing.

The receive PCS checks that the end of the quiescent state occurs at the correct time. The ENERGY_DETECT indicate signal is passed up from the PMD to the PCS for this purpose.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

This would add a large amount of text to a section that was otherwise stable for multiple drafts.

*Cl* **78** *SC* **78.1.3.3.2** *P* **82** *L* **26** # 33

Marris, Arthur Cadence

*Comment Type* **T** *Comment Status* **D** *EEE description*

Need to mention Fast Wake in PHY LPI receive operation.

*SuggestedRemedy*

Bring subclause 78.1.3.3.2 into 802.3bj and change:
"After sending the sleep signal, the link partner ceases transmission."

To:
"After sending the sleep signal, the link partner ceases transmission if not in Fast Wake mode."

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

This wording has been unchanged for multiple drafts. There is insufficient justification to make this enhancement at this stage.

*Cl* **78** *SC* **78.1.4** *P* **82** *L* **31** # 34

Marris, Arthur Cadence

*Comment Type* **T** *Comment Status* **D** *EEE description*

Need to also change the text in 78.1.4.

*SuggestedRemedy*

Bring the following text into 802.3bj and change:
EEE defines a low power mode of operation for the IEEE 802.3 PHYs and the XGXS listed in Table 78-1. The table also lists the clauses associated with each PHY or sublayer. Normative requirements for the EEE capability for each PHY type and for XGXS are in the associated clauses.

To:
EEE defines a low power mode of operation for the IEEE 802.3 PHYs and interfaces listed in Table 78-1. The table also lists the clauses associated with each PHY or sublayer. Normative requirements for the EEE capability for each PHY type and interface are in the associated clauses.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, this is a straightforward change that would otherwise be necessary in sponsor ballot.

*Cl* **78** *SC* **78.2** *P* **83** *L* **36** # 22

Anslow, Pete Ciena

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

Since the P802.3bj draft is now replacing Table 78-2, remove the trailing zeros from the 1000BASE-T row in accordance with the text of 1.2.6 of the base standard.

*SuggestedRemedy*

Change:
"182.0" to "182"
"202.0" to "202"
"198.0" to "198"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **78** *SC* **78.3** *P* **84** *L* **12** # 35

Marris, Arthur Cadence

*Comment Type* **T** *Comment Status* **D** *EEE negotiation*

There is not adequate support for "EEE deep sleep operation shall not be enabled unless both the local device and link partner advertise deep sleep capability during Auto-Negotiation for the resolved PHY type" in Clause 45. You need a separate entry for deep sleep for each relevant PHY type in the advertisement register.

*SuggestedRemedy*

Delete 7.60.15 LPI modes supported row in Table 45-190.

Create an additional EEE advertisement register to advertise deep sleep ability individually for each of the 40G and 100G PHYs. Make corresponding edits in Clause 45.2.7 for EEE link partner ability.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The comment does not apply to the substantive changes in this subclause made between Draft 2.1 and Draft 2.2, but the changes to register 3.20 should have been extended to register 7.60.

In 45.2.7.13 and 45.2.7.14, change "EEE capability" to "EEE deep sleep capability" for each PHY type (as done in register 3.20); delete the "LPI modes supported" bit (and associated text).

*Cl* **78** *SC* **78.3** *P* **84** *L* **3** # 49

Marris, Arthur Cadence Design Syste

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

The text "PHYs capable of deep sleep operation shall advertise that capability during the Auto-Negotiation stage" implies that PHYs that only support Fast Wake do not need to support AN. However the text in the next paragraph implies all PHYs that support EEE should do auto-negotiation.

*SuggestedRemedy*

Remove this change to the base standard so the text reverts to:
"The EEE capability shall be advertised during the Auto-Negotiation stage."

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

The wording is correct. PHYs that only support fast wake do not need to advertize using auto-negotiation. The following paragraph could be improved, but such cosmetic changes are not justified at this stage.

*Cl* **78** *SC* **78.5.2** *P* **92** *L* **35** # 36

Marris, Arthur Cadence

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

Make wording consistant with 78.5.1

*SuggestedRemedy*

Change:
"40 Gb/s and 100 Gb/s PHYs may be extended"
to:
"40 Gb/s and 100 Gb/s PHYs can be extended"

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

The wording is more appropriate in this clause, XLAUI/CAUI are optional interfaces.

*Cl* **79** *SC* **79.5.6a** *P* **97** *L* **22** # 10

Anslow, Pete Ciena

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

The title of 79.5.6a is "EEE TLV", but that is the title of 79.5.6 in the base standard. 79.5.6a should be titled "EEE Fast Wake TLV"

*SuggestedRemedy*

Change the title of 79.5.6a to "EEE Fast Wake TLV"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, this is a straightforward change that would otherwise be necessary in sponsor ballot.

---

*Cl* **80** *SC* **80.1.2** *P* **98** *L* **21** # 13

Anslow, Pete Ciena

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

The style of the note in 80.1.2 does not follow the IEEE style manual (see 17.1). "Note: " should be "NOTE-" (with an em dash)

*SuggestedRemedy*

Change "Note: " to "NOTE-" (with an em dash)

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **80** *SC* **80.1.4** *P* **100** *L* **9** # 23

Anslow, Pete Ciena

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

Comment #20 against D2.1 changed 1.4.60 to remove reference to 2-level pulse amplitude modulation for 40GBASE-R. However, this is still referred to in 80.1.4

*SuggestedRemedy*

Change the third paragraph of 80.1.4 to be two paragraphs as:

40GBASE-R represents a family of Physical Layer devices using the Clause 82 Physical Coding Sublayer for 40 Gb/s operation over multiple PCS lanes (see Clause 82). Some 40GBASE-R physical layer devices also may use the FEC of Clause 74.

100GBASE-R represents a family of Physical Layer devices using the Clause 82 Physical Coding Sublayer for 100 Gb/s operation over multiple PCS lanes (see Clause 82) and a PMD implementing 2-level pulse amplitude modulation (PAM). Some 100GBASE-R Physical Layer devices also use the transcoding and FEC of Clause 91 and some also may use the FEC of Clause 74.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **80** *SC* **80.3.1** *P* **103** *L* **21** # 48

Marris, Arthur — Cadence Design Syste

*Comment Type* **TR** *Comment Status* **D** *EEE primitives*

Make it clearer what IS_RX_LPI_ACTIVE.request is used for.

*SuggestedRemedy*

Change:
"The IS_RX_LPI_ACTIVE.request primitive is used to communicate to the FEC that the PCS is using its receive LPI function."
To:
"The IS_RX_LPI_ACTIVE.request primitive is used to communicate to the Clause 74 BASE-R FEC that the PCS has detected LPI signalling. This allows the FEC to use rapid block lock. The RS-FEC does not use this signal."

On page 107 line 16 change:
"This primitive is generated to indicate the state of the PCS LPI receive function."
To:
"This primitive is generated to indicate the state of the PCS LPI receive function. It is FALSE when in the RX_ACTIVE state and TRUE in all other states."

On page 107 line 21 change:
"In general, when"
to:
"When"

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

The text is technically correct and it cannot be justified to make such an enhancement to wording at this juncture.

---

*Cl* **80** *SC* **80.3.1** *P* **103** *L* **8** # 24

Anslow, Pete — Ciena

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

This says "... includes four additional primitives ..." but now there are five additional primitives.

*SuggestedRemedy*

Change "four additional primitives" to "five additional primitives"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **80** *SC* **80.5** *P* **110** *L* **11** # 27

Anslow, Pete — Ciena

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

Table 80-4 summarises the skew constraints for all 40G and 100G PHYs, but 94.3.4 is not included for 100GBASE-KP4.
Similar issue for Table 80-5

*SuggestedRemedy*

Add a cross reference to 94.3.4 to the Notes column for SP2, SP3, SP4, and SP5 in both Table 80-4 and Table 80-5

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **82** *SC* **82.2.12** *P* **125** *L* **29** # 25

Anslow, Pete — Ciena

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

In Table 80-4 the value of "Maximum Skew for 100GBASE-R PCS lane (UI)" for "At PCS receive (with RS-FEC)" has been corrected from 258 to 253 UI. However, the addition to Table 82-5 still shows (tilde 258 bits).

*SuggestedRemedy*

In the addition to Table 82-5 change "258 bits" to "253 bits"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **82** *SC* **82.2.18.2.2** *P* **126** *L* **26** # 40

Marris, Arthur — Cadence

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

Delete unused variable received_tx_mode.

*SuggestedRemedy*

Delete unused variable received_tx_mode.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, this is a straightforward change that would otherwise be necessary in sponsor ballot.

*Cl* **82** *SC* **82.2.18.3.1** *P* **130** *L* **25** # 42

Marris, Arthur Cadence

*Comment Type* **TR** *Comment Status* **D** *LPI state*

Remove LPI_FW stuff from Table 82-5b.

*SuggestedRemedy*

Change Tqr description from:
"The time the receiver waits for energy_detect to be set to true while in the RX_SLEEP and RX_QUIET or RX_FW states before asserting receive fault"
To:
"The time the receiver waits for energy_detect to be set to true while in the RX_QUIET state before asserting receive fault"

Delete Twr entry for LPI_FW = TRUE on line 28. Remove LPI_FW = FALSE from the other two entries.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, the changes suggested would otherwise need to be made in sponsor ballot.

*Cl* **82** *SC* **82.2.18.3.1** *P* **130** *L* **5** # 39

Marris, Arthur Cadence

*Comment Type* **TR** *Comment Status* **D** *LPI state*

Due to changes in the LPI Transmit state diagram some of the parameters in Table 82-5a are no longer relevant.

*SuggestedRemedy*

Delete rows for Tsl and Twl.
Change Tql description from:
Local Quiet Time from when tx_mode is set to QUIET or FW to entry into the TX_WAKE state
To:
Local Quiet Time from when tx_mode is set to QUIET to entry into the TX_WAKE state

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, the changes suggested would otherwise need to be made in sponsor ballot.

Delete rows for Tsl and Twl - when LPI_FW = TRUE (keep them for LPI_FW = FALSE).

Change Tql description as suggested:
Local Quiet Time from when tx_mode is set to QUIET or FW to entry into the TX_WAKE state
To:
Local Quiet Time from when tx_mode is set to QUIET to entry into the TX_WAKE state

*Cl* **82** *SC* **82.2.18.3.1** *P* **138** *L* **6** # 30

Marris, Arthur Cadence

*Comment Type* **T** *Comment Status* **D** *LPI state*

This comment refers to Figure 82-16 - LPI Trabsmit state diagram.

down_count should be initialized by reset.

The layout of the state diagram is untidy.

Also some of the states and values of tx_mode seem redundant.

*SuggestedRemedy*

Add down_count <= 0 to TX_ACTIVE state.

Also re-arrange the blocks and arcs in the diagram so the layout is a bit neater.

Rename TX_WAKE_2 to TX_WAKE2 to match references in the text.

Consider deleting the TX_FW state. It serves no purpose.

Consider deleting the FW, BYPASS and SLEEP tx_mode values as nothing uses these. If these values are kept add text to explain their purpose.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

Some of these enhancements may make constitute improvement, but there is insufficient justification to make changes to this diagram at this stage.

However, the state name TX_WAKE_2 must be changed to TX_WAKE2 to match the text.

*Cl* **82** *SC* **82.2.18.3.1** *P* **139** *L* **7** # 51

Marris, Arthur Cadence Design Syste

*Comment Type* **T** *Comment Status* **D** *LPI state*

This comment refers to Figure 82-17 the LPI Receive state diagram.

The RX_FW state is redundant. The only purpose RX_FW is to hold rx_lpi_active true, rx_lpi_active is only used by the Clause 74 FEC to achieve rapid synchronisation. However the Clause 74 FEC cannot do this in FW mode because the scrambler is never bypassed in FW mode. Therefore the receiver should always stay in the rx_active state in FW mode.

Seeing as the receiver operates normally in FW mode other text that refers to FW mode needs to be corrected.

*SuggestedRemedy*

Delete the RX_FW state.

Gate the transition from RX_ACTIVE to RX_TIMER with "* LPI_FW = FALSE"

Delete "If Fast Wake is selected then the receiver is expected to maintain sufficient state to allow much faster wake up." on line 47 on page 129.

Delete "when LPI_FW is FALSE and on the second received AM after entering the RX_ACTIVE state when LPI_FW is TRUE" on line 45 on page 122.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

Keeping the RX_FW state allows the receiver to use appropriate methods to save energy when in that state in the knowledge that BIP statistics will not be maintained and that a short wake time will be allowed to return to full function.

*Cl* **82** *SC* **82.2.8a** *P* **122** *L* **53** # 31

Marris, Arthur — Cadence

*Comment Type* **T** *Comment Status* **D** *LPI state*

Reword to make it clearer when RAMs are sent.

*SuggestedRemedy*

Change:
"RAMs are sent in the place of normal alignment markers when the transmitter has an LPI transmit state other than TX_ACTIVE or TX_FW while down_count_done = FALSE."

To:
"Normal alignment markers are sent when the transmitter has an LPI transmit state of TX_ACTIVE or TX_FW. RAMs are sent in the TX_WAKE2 state until down_count_done is TRUE and when in all the other states. down_count_done becomes TRUE approximately 2.25 microseconds after entering the TX_WAKE2 state which is earlier than the Twl2 timeout specified in Table 82-5a."

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, a slight rewording will aid comprehension:

Change:
"RAMs are sent in the place of normal alignment markers when the transmitter has an LPI transmit state other than TX_ACTIVE or TX_FW while down_count_done = FALSE."

To:
"Normal alignment markers are sent when the transmitter has an LPI transmit state of TX_ACTIVE or TX_FW; RAMs are sent in the TX_WAKE2 state until down_count_done is TRUE and in all the other LPI transmit states.

---

*Cl* **82** *SC* **82.2.8a** *P* **124** *L* **8** # 11

Anslow, Pete — Ciena

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

Table 82-2a is being inserted after Table 82-4 (in 82.2.8) so it should be numbered Table 82-4a

Similarly, Table 82-3a should be numbered Table 82-4b

*SuggestedRemedy*

Change the numbering of Table 82-2a to Table 82-4a
Change the numbering of Table 82-3a to Table 82-4b

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **83** *SC* **83.3** *P* **142** *L* **36** # 4

Anslow, Pete — Ciena

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

This says "... includes three additional primitives ..." but now there are four additional primitives.

*SuggestedRemedy*

Change "three additional primitives" to "four additional primitives"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **83** *SC* **83.5.11** *P* **144** *L* **50** # 76

Ran, Adee — Intel

*Comment Type* **E** *Comment Status* **D** *EEE primitives*

This new subclause includes sub-subclauses for "Additional transmit functions in the Tx direction", "Additional receive functions in the Tx direction", "Additional transmit functions in the Rx direction", and "Additional receive functions in the Rx direction".

It is not clear what "Rx direction" and "Tx direction" mean in this context since the PMA can be on either side of a CAUI/XLAUI. To add confusion, clause 83 in the base document refers to "receive direction" and "transmit direction" without explicitly defining them. I am not sure even if the terms in the new subclause are consistent with these.

*SuggestedRemedy*

Use more distinct terms for the directions. Perhaps CAUI/XLAUI ingress and CAUI/XLAUI egress. Or alternatively clarify what Tx and Rx directions are, and change "receive functions" and "transmit functions" to ingress functions and egress functions.

A diagram could also help.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The nomenclature for "Tx direction" and "Rx direction" matches Clause 83 in the base document (see 83.3). This nomenclature was introduced to distinguish between PMA or XLAUI/CAUI Tx/Rx orientations and the overall direction of data flow with respect to the MAC/PCS. The suggested remedy is inconsistent with this (e.g. suggested use of "ingress" or "egress"). The figures already in Clause 83 should suffice.

*Cl* **83** *SC* **83.5.11.6** *P* **146** *L* **50** # 5

Anslow, Pete Ciena

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

The time "Tho" should be T subscript ho as per line 8 of this page.
Same issue with "Ta" on line 53

*SuggestedRemedy*

Change "Tho" to T subscript ho
Change "Ta" to T subscript a on line 53

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **83A** *SC* **83A** *P* **378** *L* **1** # 3

Hajduczenia, Marek ZTE Corporation

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

All Annexes are not shown correctly in the pdf printout. The title shows in the PDF outline, but the annex number does not.

*SuggestedRemedy*

Please fix the PDF printing options to show Annex number in the pdf outline - the affected locations are shown in yellow highlight in the attached file (hajduczenia_3bj_01_0913.pdf)

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The "change-bar" version was provided for reference and the ballot instructions stated that comments should be submitted against the "clean" draft. The Annex headings are correct in the "clean" draft.

Note that the editor will investigate how the correct the problem for the change-bar version in future drafts.

*Cl* **84** *SC* **84.2** *P* **149** *L* **31** # 28

Marris, Arthur Cadence

*Comment Type* **T** *Comment Status* **D** *EEE primitives*

The service interface definition is not consistant with 80.3.3.4.1 and 80.3.3.5.1.

*SuggestedRemedy*

Change:
PMD:IS_TX_MODE.request
PMD:IS_RX_MODE.request
to:
PMD:IS_TX_MODE.request(tx_mode)
PMD:IS_RX_MODE.request(rx_mode)

Also correct captilization. Change TX_MODE to tx_mode three times and RX_MODE to rx_mode.

Also add "up to" to make consistant with other clauses:
"The tx_mode parameter takes on one of up to six values: DATA, SLEEP, QUIET, FW, ALERT or BYPASS"

Make similar change in 85.2

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **85** *SC* **85.2** *P* **153** *L* **36** # 41

Marris, Arthur Cadence

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

tx_mode can only take on six values.

*SuggestedRemedy*

Change to:
The tx_mode parameter takes on one of up to six values: DATA, SLEEP, QUIET, FW, ALERT or BYPASS.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **91** *SC* **91.2** *P* **159** *L* **23** # 6

Anslow, Pete — Ciena

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

This says "... includes three additional primitives ..." but now there are four additional primitives.

*SuggestedRemedy*

Change "three additional primitives" to "four additional primitives"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

---

*Cl* **91** *SC* **91.2** *P* **159** *L* **27** # 29

Marris, Arthur — Cadence

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

Should rx_lpi_active be added to the service interface for the Clause 91 RS_FEC? 80.3.3.6 says it is only used for Clause 74 but rx_lpi_active is referred to in several places in Clause 91.

*SuggestedRemedy*

Add:
FEC:IS_RX_LPI_ACTIVE.request

The IS_RX_LPI_ACTIVE.request primitive is used to communicate to the FEC that the PCS is using its receive LPI function.

In 80.3.3.6 change:
This primitive is only used for a PMA sublayer that is between the PCS and a Clause 74 FEC sublayer, in all other cases the primitive is never invoked and has no effect.

To:
This primitive is only used for a PMA sublayer that is between the PCS and an FEC sublayer, in all other cases the primitive is never invoked and has no effect.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The RS-FEC sublayer locally generates tx_lpi_active and rx_lpi_active per Figures 91-10 and 91-11 respectively. The primitive RX_LPI_ACTIVE.request is not used by the RS-FEC sublayer.

*Cl* **91** *SC* **91.6** *P* **182** *L* **14** # 61

Szczepanek, Andre — Inphi

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

Update Table 91-3 to include per lane FEC alignment, as per my Clause 45 comment

*SuggestedRemedy*

Update Table 91-3 to include per lane FEC alignment, as per my Clause 45 comment

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

See comment #60.

---

*Cl* **92** *SC* **92.10** *P* **211** *L* **12** # 132

Dudek, Mike — QLogic

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

Incorrect reference

*SuggestedRemedy*

Change 92.10.8 to 92.10.7

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Use suggested remedy

---

*Cl* **92** *SC* **92.10** *P* **211** *L* **13** # 81

Ran, Adee — Intel

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

Reference to 92.10.8 is incorrect.

*SuggestedRemedy*

Change 92.10.8 to 92.10.7.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See comment #132.

*Cl* **92** *SC* **92.10.1** *P* **211** *L* **38** # 71

Mellitz, Richard — Intel Corporation

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

Nominal differential characteristic impedance is an implementation choice. It is covered by all other specification by the required reference impedance for measurements which is normative. The use of the word "is" suggest a shall without a method to validate. Nominal is not relevant as it reference to a "normal" for a manufacturing process which has not been specified. Since it not necessary to any specification context I suggest removing.

*SuggestedRemedy*

Remove line:
The nominal differential characteristic impedance of the cable assembly is 100 ohms.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

The nominal differential characteristic impedance is for information consistent with other IEEE twinaxial cable assembly specifications e.g., 85.10.1.

---

*Cl* **92** *SC* **92.10.10** *P* **218** *L* **19** # 56

Moore, Charles — Avago Technologies

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

This sub clause in unnecessary or incomplete. It defines a quantity ICN but no spec for ICN is given.

*SuggestedRemedy*

Either provide a spec (informative ?) for ICN or delete Clauses 92.10.8, 92.10.9, and 92.10.10

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

ICN methodology is referenced from 92.11.3.5 Mated test fixtures integrated crosstalk noise where values are provided.

In 92.8.3.6 the far-end transmitter output noise is characterized as a deviation from the measured cable assembly ICN (far-end). The ICN methodology is called out.

Resolve with comment#62.

*Cl* **92** *SC* **92.10.3** *P* **213** *L* **49** # 55

Moore, Charles — Avago Technologies

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

It is not clear which of several possible return losses is intended here.

*SuggestedRemedy*

Change all references to "return loss" in 92.10.3 to "differentila return loss"

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

Table 92-10 heading indicates differential characteristics for 92.10.3.

*Cl* **92** *SC* **92.10.7** *P* **215** *L* **33** # 53

Moore, Charles — Avago Technologies

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

Actual COM spec, which should apply to entire 92.10.7 clause is placed at the end where it appears to be just part of 92.10.7.2.

*SuggestedRemedy*

Move line:

"The cable assembly COM shall be greater than or equal to 3 dB."

up to make it the second paragraph of 92.10.7

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Use suggested remedy.

---

*Cl* **92** *SC* **92.10.7** *P* **215** *L* **47** # 131

Dudek, Mike — QLogic

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

The COM requirement is buried in the channel crosstalk paths subsection.

*SuggestedRemedy*

Move the COM requirement sentence from 92.10.7.2 to a new paragraph at the end of this section.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See comment #53.

*Cl* **92** *SC* **92.10.7.1** *P* **216** *L* **5** # 79

Ran, Adee Intel

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

There is only one signal channel path denoted SCHS, so it does not need an index. useing an index k and setting it to 0 may only confuse readers.

*SuggestedRemedy*

Delete the index and the line describing k.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

Indicated explicitly as in 93A.1.1 "The total number of paths for a given channel is denoted as K and, by convention, the path index k=0 corresponds to the victim path."

---

*Cl* **92** *SC* **92.10.7.1.1** *P* **216** *L* **17** # 106

Ben-Artsi, Liav Marvell

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

The host PCB channel when concatenated to a TP1 to TP2 model does not produce the eye at TP2 according to the definition.
Therefore, the host PCB as defined at "92.10.7.1.1 TP0 to TP1 and TP4 to TP5 signal paths" does not represent the required signal distortion/degradation of the host PCB sections.

*SuggestedRemedy*

Will supply a presentation

*Proposed Response* *Response Status* **Z**

PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.

---

*Cl* **92** *SC* **92.10.7.1.1** *P* **216** *L* **19** # 133

Dudek, Mike QLogic

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

Incorrect reference

*SuggestedRemedy*

Change "table 92-13" to "table 92-12". Also make it a hot link.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Use suggested remedy.

*Cl* **92** *SC* **92.10.7.1.1** *P* **216** *L* **21** # 78

Ran, Adee Intel

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

In this subclause there are numbers and entities for the PCB length defined in-line. It would be more readable if they were put in a more structured form.

In the configuration spreadsheets for the COM tool there are entries for the values of these entities, so they can be parametric rather than hard-coded.

*SuggestedRemedy*

Change the second and third paragraphs to the following:

When using equations (93A-10) and (93A-11) to calculate the signal paths, values for the parameter zp should be taken from table 92-(X). [a new table]

Add a new table 92-(X) titled : PCB signal path construction
contents

| Signal path | Referring equations | Symbol | Value |
|---|---|---|---|
| S(HOSP) | 92-26, 92-27, 92-28 | z_pb(thru) | 185 |
| S(HOTxSP) | 92-27, 92-28 | z_pb(xtalk) | 90 |

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Add in second paragraph after one hundred and eighty five 1 mm sections (transmission line length parameter z_p in Table 93-8). Add in second paragraph after ninety 1 mm sections (transmission line length parameter z_p in Table 93-8).

Resolve with comment #72 since the actual values of z_p may change.

---

*Cl* **92** *SC* **92.10.7.1.1** *P* **216** *L* **33** # 63

Healey, Adam LSI Corporation

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

The transmission line S-parameters defined by coefficients of Table 92-12 are not causal and exhibit unusually high DC loss. In addition, since the polynomial models are based on a fit to the output of a detailed simulation, they can only be expected to be valid over the frequency range covered by the fit. This frequency range should be noted.

*SuggestedRemedy*

Correct the transmission line model and ensure that it is causal and passive. Add a note the states the frequency range for which the model is valid.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See comment #72.

*Cl* **92** *SC* **92.10.7.1.1** *P* **216** *L* **49** # 72

Mellitz, Richard — Intel Corporation

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

Apparently there was a transcription typo gamma1 in Table 92-12as these values were copied from simulations performed in the wee hours at May'12 Plenary.
However even the corrected version has a loss of -1.1dB loss at DC.
DC calualation suggest this should be in the range of a few tens of DB loss.

*SuggestedRemedy*

Change table to reflect the following:
141 mm for 6.26 dB and 68 mm for 3dB of loss
gamma complex([-1.886e-04 -1.929e-04 -2.958e-04 000 -2.468e-06] ,[000 -9.753e-04 -3.790e-02 000 8.889e-06] )
rho complex([5.112e-04 3.067e-18 1.330e-04 -4.712e-21 -6.795e-08] ,[000 3.404e-03 1.088e-18 -3.019e-06 -2.633e-21] )

These values are only valid it the receiver filter is applied.

presenation available to demonstrate casuaslity and DC loss

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

For committee review of presentation mellitz_3bj_01_0913.pdf.

*Cl* **92** *SC* **92.14.4.2** *P* **233** *L* **26** # 112

Lusted, Kent — Intel

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

Text is value/comment box for Item PF23 is different size from other boxes.

*SuggestedRemedy*

consider correcting it.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Make text value/comment box for Item PF23 same size as other boxes.

*Cl* **92** *SC* **92.14.4.2** *P* **234** *L* **19** # 80

Ran, Adee — Intel

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

MF11 seems to be a duplicate of PF18 "PMD control function" and is not a management function.

MF12 is also not a management function. It should be moved to 92.14.4.1.

*SuggestedRemedy*

Remove MF11 and MF12. Add an entry in 92.14.4.1 for response time instead of MF12.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note that this comment does not apply to the substantive changes made between Draft 2.1and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, the comment highlights an editorial clarification that should be addressed.

Delete: MF11
Change: PF18 Value/Comment field to "
Each lane shall use the same
control function as
10GBASE-KR, as defined in
72.6.10."
Move: MF12 PMD control response time under PF18.

*Cl* **92** *SC* **92.14.4.3** *P* **234** *L* **41** # 134

Dudek, Mike — QLogic

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

The value in this PIC is incorrect not matching the requirement in the document

*SuggestedRemedy*

Change "1mV" to "35mV"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Use suggested remedy.

*Cl* **92** *SC* **92.14.4.3** *P* **234** *L* **50** # 143

Ran, Adee Intel

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

TC8 and TC9 are required for deep sleep only, like TC10 and TC11. But this is implied by the "EEE:M" status.

*SuggestedRemedy*

Either delete the initial "If the optional EEE capability is supported" in TC8 to TC11, or change it to to "If the optional EEE deep sleep capability is supported", in TC8 and TC9.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

Note that this comment does not apply to the substantive changes made between Draft 2.1and Draft 2.2 and hence is not within the scope of the recirculation ballot.

See comment #144.

---

*Cl* **92** *SC* **92.14.4.3** *P* **235** *L* **32** # 57

Moore, Charles Avago Technologies

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

PICS TC16 does not agree with 92.8.3.7.2

*SuggestedRemedy*

change 0.34 minimum to 0.45 minimum

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See comment #89.

---

*Cl* **92** *SC* **92.14.4.3** *P* **235** *L* **34** # 90

Ran, Adee Intel

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

There is no longer any normative statement on the linear fit error.

comment also applies to 94.6.4.3.

*SuggestedRemedy*

Delete TC18 in 92.14.4.3.
Delete TC19 in 94.6.4.3.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Delete TC18 in 92.14.4.3.

*Cl* **92** *SC* **92.14.4.3** *P* **235** *L* **34** # 58

Moore, Charles Avago Technologies

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

PICS TC17 does not agree with 92.8.3.7.2

*SuggestedRemedy*

change "0.52 x vf" to "0.5 x vf"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See comment #89.

---

*Cl* **92** *SC* **92.14.4.3** *P* **235** *L* **35** # 59

Moore, Charles Avago Technologies

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

PICS TC18 is either no longer needed or should be changed to SNDR PICS

*SuggestedRemedy*

delete TC18 or change it to refer to 92.8.3.9 and specify SNDR greater than 29 dB

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See comment #90.

---

*Cl* **92** *SC* **92.14.4.5** *P* **237** *L* **22** # 135

Dudek, Mike QLogic

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

The value in this PIC is incorrect not matching the value in the clause

*SuggestedRemedy*

Change "4dB" to "3dB"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Use suggested remedy.

*Cl* **92** *SC* **92.2** *P* **191** *L* **7** # 144

Ran, Adee Intel

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

Signal detect, transmitter disable, and alert functionalities are required for deep sleep only.

This may also apply to the EEE service interface - primitives can be kept even if only fast wake is supported, but it seems unneccesary (85.2 states they are required only for deep sleep).

Applies to
92.2 (service interface)
92.7.5
92.7.6
92.8.3.1
93.2 (service interface, see above)
93.7.2
93.7.5
93.7.6
93.8.1.3
94.3.1 (service interface, see above)
94.3.6.2
94.3.6.5
94.3.6.6
94.3.12.3

PICS items MF5, MF6 which don't have the correct status

*SuggestedRemedy*

Change "the optional EEE capability is supported" to "the optional EEE deep sleep capability is supported" in the text of the mentioned subclauses.

Change status for MF5 and MF6 to "EEE:M".

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

Note that this comment does not apply to the substantive changes made between Draft 2.1and Draft 2.2 and hence is not within the scope of the recirculation ballot.

Although the commenter is correct that the added PMA/PMD functionality for EEE is really only for deep sleep the implementer is not burdened by this distinction other than figuring out there is nothing to do.

*Cl* **92** *SC* **92.7.12** *P* **197** *L* **13** # 113

Lusted, Kent Intel

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

The changes introduced in D2.2 is problematic since it makes the 2 ms response timeout normative regardless of frame lock state. If frame lock is lost for more than 2 ms, there is no compliant behavior.

The text of draft 2.1 (where losing lock for any period, though hard to track, still didn't violate anything) is preferred.

*SuggestedRemedy*

Revert the text back to "...when frame_lock_i is TRUE for lane i
(where i represents the lane number in the range 0 to 3), the period from receiving a new request to responding to that request shall be less than 2 ms."

See accompanying presentation.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

For committee review of lusted_3bj_01_0913.pdf.

*Cl* **92** *SC* **92.7.12** *P* **197** *L* **13** # 83

Ran, Adee Intel

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

The required response time definition change from D2.1 creates a requirement that may not be possible to meet in practice, without providing a graceful abort option. Making this requirement normative is a real problem: we don't porvide a test definition and it's difficult to claim that this is correct by design.

With the curret text, a way to guarantee conformance by design is to never respond to any request; that might be the only way to ensure conformance (and we don't want that to happen).

The text in D1.1 was conditional on the state of frame_lock and a product could be designed to meet it (be correct by design). The change is part of the response to my comment #94 against D1.1, but neither the original text nor the suggested remedy for that comment involved a normative statement with the problems above.

Note that existing text in 72.6.10.2.3 and its prevents sending any update requests until the curresponding status is not_updated. This implies that frame_lock is set. Thus sending requests implies being able to timely respond to incoming requests (but not vice versa; therefore adding an indication in the status report is preferred).

Comment applies to clauses 93 and 94 as well.

*SuggestedRemedy*

Revert to D1.1 text and use the suggested remedy for comment #94 against D1.1 (indicate the value of frame_lock in the status report field).

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See comment #113.

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*Cl* **92** *SC* **92.7.12** *P* **197** *L* **23** # 116

Lusted, Kent Intel

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

The text specifies the default identifiers for each lane number but not state how or where to change lane to identifier mapping.

*SuggestedRemedy*

Add a reference to Clause 45.2.1.98a

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The MDIO reference is stated in the last paragraph in 92.7.12:
"If the MDIO interface is implemented, then this function shall map the variables polynomial_i, seed_i, rx_trained_i, frame_lock_i, training_i, and training_failure_i to the registers and bits defined in 92.6.".

*Cl* **92** *SC* **92.8.3** *P* **199** *L* **32** # 62

Healey, Adam LSI Corporation

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

There are two different specifications and test methods for transmitter output noise referred to in Table 92-6: far-end output noise per 92.8.3.6 and SNDR per 92.8.3.9. While they don't exactly measure the same thing, it is not clear that both specifications are necessary.

*SuggestedRemedy*

Eliminate redundancy in the specifications. Since SNDR is presumably more comprehensive, it is suggested that this be kept and the far-end noise requirement be deleted.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Use suggested remedy.

---

*Cl* **92** *SC* **92.8.3** *P* **199** *L* **42** # 139

Dudek, Mike QLogic

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

It is intended that the IC's used for clause 93 will also be useable for clause 92 however requiring the same SNDR measured at TP2 as is achieved at TP0a is unrealistic due to connector reflections etc. Also the cable assembly COM is not fully specified as it requires a reference to the parameters to be used.

*SuggestedRemedy*

Change the SNDR requirement in table 92-6 and in section 92.8.3.9 from 29dB to 27dB. Change the sentence in 92.10.7 (page 215 line 46) "....Channel Operating Margin" to "Channel Operating Margin using the parameters for COM in table 93-8 except that the SNRtx should be set to 27dB.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

Is it necessarily the case that the SNR will be worse? Noise from transmitter might be lower due to loss of host channel? Although the commenter makes a recommendation, there is no supporting analysis to support the suggested relaxation. Furthermore, the reduction in SNR reduces the potential reach of the cable; this would have to be reconciled.

*Cl* **92** *SC* **92.8.3.1** *P* **199** *L* **35** # 89

Ran, Adee Intel

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

The minimum steady-state voltage value shouldn't have changed from D1.1. the new value 0.45 seems to come from slide 5 ran_3bj_02_0713; the text there referred to the ratio, rather to an absolute voltage (I should have written "ratio of peak pulse to V_f...")

The remedy was implementated incorrectly and the result may not be technically feasible with low-power designs in advanced CMOS processes.

It may be clearer if we define this ratio as the parameter that has to be measured.

*SuggestedRemedy*

Revert the minimum steady-state voltage to 0.34 V, here and in 92.8.3.7.2.

Change the value in row "Linear fit pulse peak (min)" to 0.45*V_f.

Optionally, change the parameter name to "Ratio of linear fit pulse peak to steady-state voltage (min)" with the value 0.45.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

For committee discussion.

*Cl* **92** *SC* **92.8.3.1** *P* **200** *L* **1** # 46

Moore, Charles Avago Technologies

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

The paragraph:

If the optional EEE capability is supported the following requirements also apply. The peak-to-peak differential output voltage shall be less than 35 mV within 500 ns of the transmitter being disabled. When the transmitter is disabled, the peak-to-peak differential output voltage shall be greater than 720 mV within 500 ns of the transmitter being enabled. The transmitter is enabled by the assertion of tx_mode=ALERT and the preceding requirement applies when the transmitted symbols are the periodic pattern defined in 92.8.1 and the transmitter equalizer coefficients are assigned their preset values. The transmitter shall meet the requirements of 92.8.3 within 1 ¿s of the transmitter being enabled. When the transmitter is disabled, the DC common-mode output voltage shall be maintained to within ±150 mV of the value for the enabled transmitter.

may be technically correct but it is clumsy and could mislead a careless reader.

*SuggestedRemedy*

Replace the paragraph with:

If the optional EEE capability is supported the following requirements also apply:

When the transmitter is disabled the DC common-mode voltage shall remain within +/-150 mV of the value for the enabled transmitter and the common mode voltage be less than 35 mV within 500 ns.

A disabled transmitter is enabled by the assertion of tx_mode=ALERT. When transmitted symbols are the periodic pattern defined in 92.8.1 and the transmitter equalizer coefficients are assigned their preset values the output voltage shall be greater than 720 mV within 500 ns and the transmitter shall meet all the requirements of 92.8.3 within 1 us.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The text is correct as written.

*Cl* **92** *SC* **92.8.3.10.2** *P* **206** *L* **10** # 118

Le Cheminant, Greg — Agilent Technologies

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

The method for measuring effective bounded uncorrelated jitter and effective random jitter is sound, but some parameters and phrasing place unnecessary restrictions on individual implementations of the process. Specifically, histogram bin resolution should be allowed to be finer than 5 fs, and curve fitting should not be restricted to a least mean square method. Some flexibility should be allowed in locating the region of the CDF for curve fitting. Some clarification is needed in the measurement construction process (does lower Q mean a value of Q lower on the CDF curve, and thus a higher Q, or up the curve and a lower Q value?) Based on the technical presentation from Pavel Zivny, I think the intent was to scan 'down' the CDF to higher values of Q, but would defer to him to define the approach (see item C in the measurement procedure). Finally, equation 92-13 appears to have some errors, as the units do not seem to be correct

*SuggestedRemedy*

Replace lines 10 through 30 with:

a) Acquire a horizontal histogram with at least 20,000 samples of a transition measured at the zero crossing point (or equivalent histogram), with bin width no more than 50 fs, and with the vertical size of the histogram box no more than 1 % of the signal VMA (see 86A.5.3.5).

b) Create a cumulative distribution function (CDF) transformed to Q versus jitter (time) from the left side of the histogram to the mean and from the right side of the histogram to the mean

c) Select regions on each side of the Q-space CDF with the highest Q value that corresponds to regions containing a statistically significant number of hits. For Example:

On each side of the CDF, select a region where every point in the CDF has at least 20 hits and at most 500 hits.

Or, On each side of the Q-space CDF, select the horizontal bin with the highest Q value with at least 50 hits in the histogram and the adjacent consecutive 4 bins with higher Q values for a collection of 5 bins.

d) On each side of the Q-space CDF, determine a straight-line fit to the selected regions of the forms in Equation (92-11) and Equation (92-12) for the left and right sides of the CDF, respectively.

e) Calculate the values of BUJ(delta-delta) and RJ(delta-delta) according to Equation (92-13) and Equation (92-14), respectively.

f) Equate effective bounded uncorrelated jitter and effective random jitter to BUJ(delta-delta) and RJ(delta-delta), respectively

Q_left=m_left*t+b_left (92-11)

Q_right=m_right*t+b_right (92-12)

BUJ_DD=|b_left/m_left -b_right/m_right | (92-13)

RJ_rms= |2/(m_right-m_left )| (92-14)

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

<editor changed subclause from 8.3.10.2 to 92.8.3.10.2>

For committee review.

See comment #47.

---

*Cl* **92** *SC* **92.8.3.10.2** *P* **206** *L* **10** # 8

Anslow, Pete — Ciena

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

In item a) "20,000" is not in accordance with the IEEE style manual. (see 14.3.2)

*SuggestedRemedy*

Change "20,000" to "20 000"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Use suggested remedy.

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*Cl* **92** *SC* **92.8.3.10.2** *P* **206** *L* **24** # 47

Moore, Charles — Avago Technologies

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

There is a math error in equation 92-13.

*SuggestedRemedy*

change equation 92-13 to read:

DJ_DD= b_left/m_left - b_right/m_right

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

For committee review.

See comment #118.

*Cl* **92** *SC* **92.8.3.5** *P* **201** *L* **26** # 107

Dawe, Piers — Mellanox

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

If transmit equalization is disabled, we would expect 8 ps or longer at TP0a. The transition time here at TP2 would be longer, or much longer, because of the host loss, so this spec seems ineffective. Also, this doesn't seem consistent with Table 92-13: that 9.6 ps there appears to be the signal that would go into a MCB then a cable, without the 33 GHz Bessel-Thomson response, and this is the signal coming out of a HCB, with the 33 GHz Bessel-Thomson response. This should be longer than that by the effect of a mated MCB-HCB loss and the 33 GHz Bessel-Thomson response.

*SuggestedRemedy*

Revise the limit or delete the requirement.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

Suggested remedy lacks sufficiently defined problem statement to support implementing in the draft.

However, comment has merit to consider inconsistencies in 92 with 93 and 94 i.e., to delete transistion time.

For committee review to delete transition time.

*Cl* **92** *SC* **92.8.3.6** *P* **202** *L* **1** # 77

Ran, Adee — Intel

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

For the high-loss cable assembly this should be RMSh_dev, not RMSl_dev.

*SuggestedRemedy*

Correct typo.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Use suggested remedy.

*Cl* **92** *SC* **92.8.3.6** *P* **202** *L* **8** # 88

Ran, Adee — Intel

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

The first terms in the square root arguments of equations 92-4 and 92-5 should be mean-square (square of RMS) rather than RMS.

Also, the note below these formula includes "should be considered to be zero", but according to the style manual "should" equals "is recommended that". This is a definition, not a recommendation; it should be put into the equation (or alternatively stated as "is defined as" instead of "should be considered to be").

*SuggestedRemedy*

Change equations 92-4 and 92-5 to
Txfel = { sqrt(RMSl_dev^2 - sigma_l^2) when RMSl_dev > sigma_l, 0 otherwise }

Txfeh = { sqrt(RMSh_dev^2 - sigma_h^2) when RMSh_dev > sigma_h, 0 otherwise }

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Change equations 92-4 and 92-5 to
Txfel = { sqrt(RMSl_dev^2 - sigma_l^2) when RMSl_dev > sigma_l, 0 otherwise }
Delete sentence P202 L15 "Note that.."

*Cl* **92** *SC* **92.8.3.7.1** *P* **203** *L* **12** # 85

Ran, Adee Intel

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

Waveform capture method refers to 85.5.10. As defined there, it does not assume or mention a clock recovery unit or equivalent method of handling jitter during measurement.

A tester may choose not to use a CRU, or to apply the same CRU used for jitter measurement, or use some onother method. The fitting error can be different depending on this choice. Fitting error affects current transmitter noise specifications.

Also, if implemented without a CRU, it may not be possible to get good enough data to create a reasonable linear fit for waveform parameters measurement.

*SuggestedRemedy*

Add after "per 85.8.3.3.4":

"The measurement should use a first-order clock recovery unit with a 3 dB frequency of 10 MHz, or an equivalent method".

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

If the waveform is averaged as prescribed in 85.8.3.3.4, the impact of any of any zero-mean phase can be made small. It is given that some means to synchronize the waveform capture to transmitter clock frequency is needed, but the specification of a phase noise transfer function is an unnecessary complication.

If the waveform is not averaged, this warrants further consideration.

For committee discussion.

*Cl* **92** *SC* **92.8.3.7.2** *P* **203** *L* **51** # 45

Moore, Charles Avago Technologies

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

No need to state twice:
"after the transmit equalizer coefficients have been set to the "preset" values."

*SuggestedRemedy*

Change:

The steady-state voltage shall be greater than or equal to 0.45 V and less than or equal to 0.6 V after the transmit equalizer coefficients have been set to the "preset" values.The peak value of p(k) shall be greater than 0.5 × vf after the transmit equalizer coefficients have been set to the "preset" values.

to:

When the transmit equalizer coefficients are in the "preset" condition the The steady-state voltage shall be greater than or equal to 0.45 V and less than or equal to 0.6 V and the peak value of p(k) shall be greater than 0.5 × vf."

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The text is correct as written.

*Cl* **92** *SC* **92.8.3.9** *P* **205** *L* **24** # 84

Ran, Adee Intel

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

With the current reference package and PCB models, the unequalized impulse response with creates non-negligible ISI for much longer than 9 UI after the main pulse.

With the definitions of linear fitted pulse length, even with a perfect transmitter cannot meet 29 dB SNDR (nor a normalized fit error of 0.037 which as the previous equivalent spec). Based on ISI alone, the pulse length has to be increased to at least 40 UI to yield the required SNDR.

Using realistic host board channels (e.g. TE contributed host to module) requires even larger pulse lengths; A TX which has maxmimum compliant jitter levels cannot meet the SNDR requirement regardless of the fitted pulse length.

We should find another way to limit the ISI span of the transmitter and its noise contribution.

Comment also applies to clause 93.

*SuggestedRemedy*

A presentation with a suggested remedy will be supplied.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

Suggested remedy lacks sufficiently defined problem statement to support implementing in the draft.

For committee review of cited presentation.
ran_3bj_01_0913.pdf

*Cl* **92** *SC* **92.8.4** *P* **207** *L* **10** # 86

Ran, Adee Intel

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

Receiver bit error ratio refers to 92.8.4.4 which is the receiver interferenec tolerance test. But that test was changed to measure RS-FEC symbol error ratio, with a limit of 1e-4. It is defined at the RS-FEC decoder output. At TP3 there are no RS-FEC symbol errors that can be measured.

*SuggestedRemedy*

Either
1. Remove the Bit error ratio row altogether
2. Keep it, but add a note that this value is implied by meeting the SER at the output of the RS-FEC decoder, as defined in 92.8.4.4.

I prefer the first.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Note that this comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, the commenter highlights a clarification that should be addressed.

To be consistent with 93 and 94 (tables 93-6 and 94-14), change parameter in row 4 in table 92-7 to "Interference Tolerance" and set the value to "See Table 92-8" and units to "-".

---

*Cl* **92** *SC* **92.8.4.4** *P* **208** *L* **3** # 87

Ran, Adee Intel

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

The transmitter specs have changed to be BUJ up to 0.1 UI and RJ up to 0.01 UI RMS. The stress in this test should not be higher.

Also, it is preferred to specify an RMS value for RJ, instead of ptp at 1e-12; this will be more meaningful for this test and easier to measure accurately.

*SuggestedRemedy*

Change applied SJ ptp value to 0.1 in both tests.
change applied RJ definition to RMS, value to 0.01 UI, and delete note c.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Use suggested remedy.

*Cl* **92** *SC* **92.8.4.4.4** *P* **209** *L* **52** # 108

Dawe, Piers — Mellanox

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

93.8.1.5 doesn't define transition time.
Is this 19 ps as seen through the 33 GHz Bessel-Thomson response mentioned on p206?
If so, it may need to be adjusted if 33 GHz is changed.

*SuggestedRemedy*

Refer to 86A.5.3.3.
Explicitly say whether this 19 ps is as seen through the Bessel-Thomson response or not.
Adjust the 19 ps if it is as seen through the Bessel-Thomson response and the 33 GHz is changed.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

Suggested remedy lacks sufficiently defined problem statement to support implementing in the draft.

See 92.8.3 - A test system with a fourth-order Bessel-Thomson low-pass response with 33 GHz 3 dB bandwidth is to be used for all transmitter signal measurements, unless otherwise specified.

*Cl* **92** *SC* **92.8.4.5** *P* **210** *L* **25** # 54

Moore, Charles — Avago Technologies

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

Interference tolerance test specified RS-FEC symbol error ratio but here we spec BER.
Lets be consistent.

*SuggestedRemedy*

change BER to RS-FEC symbol error ratio and 1e-5 to 1e-4.

While we are at it, change BER in second paragraph of 92.8.4.4.5 to RS-FEC symbol error ratio

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See comment #86.

*Cl* **92** *SC* **92.9** *P* **210** *L* **54** # 130

Dudek, Mike — QLogic

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

The boards are not provided in the annex.

*SuggestedRemedy*

change "boards" to "board parameters"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Use suggested remedy.

---

*Cl* **92A** *SC* **92A.7** *P* **338** *L* **45** # 82

Ran, Adee — Intel

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

Table 93-8 referred here includes recommendations for minimum frequency of 50 MHz and frequency step of 10 MHz. Also, all frequency domain specifications in this annex and in clause 92 start at 10 MHz, so it is likely that measurements will use this frequency step. This may not be sufficient to capture reflections in a a 5 meter cable.

A 10 MHz frequency step enables calcualtion of the time domain impulse response to a duration of 100 ns. Some methods for causality correction (required to correct prevalent measurement errors at low frequencies) may shorten the effective duration by a factor of 2, so only 50 ns of pulse response may be available.

The propagation delay in 5 meters of copper cable plus some PCB length can be close of 30 ns. To observe the effect of reflections, the impulse response has to include at least 3 times the propagation delay, or 90 ns. This is not available with the recommended frequency step. To show the effect of reflections, measurement of 5 meter cables should have a frequency step of at most 5 MHz.

*SuggestedRemedy*

Add a note that the Delta_f parameter is recommended to be no larger than 0.025 GHz divided by the cable length in meters.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

Variable frequency spacing based on cable length is not practical nor necessary, methods such as oversampling can be applied for assemblies longer than 4 meters.

*Cl* **93** *SC* **93.11.4.2** *P* **265** *L* **27** # 142

Ran, Adee Intel

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

TC19 is not aligned with the new specification.

*SuggestedRemedy*

Change 0.8 to 0.71 as in the referenced text.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

Align TC19 to the referenced text.

---

*Cl* **93** *SC* **93.11.4.3** *P* **266** *L* **24** # 146

Ran, Adee Intel

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

Receiver jitter tolerance requirement is now defined in terms of RS-FEC symbol error ratio. RC9 should be updated accordingly.

*SuggestedRemedy*

Change BER to "RS_FEC symbol error ratio" and change value from 1e-5 to 1e-4.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Align RC9 to the referenced text.

---

*Cl* **93** *SC* **93.7.12** *P* **246** *L* **34** # 114

Lusted, Kent Intel

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

The changes introduced in D2.2 is problematic since it makes the 2 ms response timeout normative regardless of frame lock state. If frame lock is lost for more than 2 ms, there is no compliant behavior.

The text of draft 2.1 (where losing lock for any period, though hard to track, still didn't violate anything) is preferred.

*SuggestedRemedy*

Revert the text back to "...when frame_lock_i is TRUE for lane i
(where i represents the lane number in the range 0 to 3), the period from receiving a new request to responding to that request shall be less than 2 ms."

See accompanying presentation.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See #113.

*Cl* **93** *SC* **93.8.1.1** *P* **247** *L* **49** # 110

Dawe, Piers Mellanox

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

A specification should be precise and unambiguous. This spec has 0.4 dB of slop, that isn't necessary and will lead to misunderstanding and disputes. For return loss, it's at least 0.8 dB of slop. We don't want to have to make two test fixtures every time to cover the range: that's unnecessary expense. See D2.1 comment 133.

*SuggestedRemedy*

Define a reference insertion loss of the test fixture:
-0.0015+0.144sqrt(f)+0.069f from 0.05 GHz to 25 GHz. This is 1.2x eq.92-37, and gives 1.405 dB at 12.89 GHz.
Add the usual text (copied from 92.11.2):
"The effects of differences between the insertion loss of an actual test fixture and the reference insertion loss are to be accounted for in the measurements."
Similarly in 93.8.2.1 Receiver test fixture, referring back to this new equation.
Note for readers of the comment (not for adding to the draft): an implementer can "account for differences" by margining, but now he need only margin from actual to reference, not actual to far side of the range.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

This is a restatement of unsatisfied comment #133 against Draft 2.1 (from the same commenter) but with a new and more specific suggested remedy.

The definition of the test fixture insertion loss should span a broader range of frequencies (as the limit on test fixture return loss does). This will be subject to further consideration by the ballot resolution committee.

*Cl* **93** *SC* **93.8.1.1** *P* **248** *L* **30** # 109

Dawe, Piers — Mellanox

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

Now that Clause 93 doesn't have a transition time spec, it seems feasible to bring the observation bandwidth more in line with product receivers and the range of frequencies specified in the S-parameter specs. This will allow for lower cost, lower noise measurements and in some circumstances, measurements that correlate better to performance. I believe the only thing in Clause 93 that would to be adjusted is the linear fit pulse peak spec.

*SuggestedRemedy*

Change 33 GHz to a lower value: 31 GHz, 25 GHz, or if feasible, 19.34 GHz. Here and in 93.8.2.3, 92.8.3 and 92.8.4. If necessary, make small adjustments to the linear fit pulse peak limits.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

This is related to unsatisfied comment #130 against Draft 2.1 (from the same commenter).

The response of the filter is included to complete the definition of the signal measurement environment and avoid the interpretation that the observation bandwidth is infinite (see Draft 1.0 comment #146). It is not intended to represent the receiver. The bandwidth should be the smallest value that does not strongly influence the parameters to be measured.

The influence of noise on measurements can be mitigated in other ways such averaging or measurement of the baseline noise and subtraction (in an RSS sense). Both methods have been invoked in IEEE 802.3.

Several choices of observation bandwidth are provided in the suggested remedy. They may influence the linear fit pulse peak value and SNDR (depending on how it is measured). The influence must be evaluated before the value is chosen. This will be subject to further consideration by that ballot resolution committee.

*Cl* **93** *SC* **93.8.1.2** *P* **249** *L* **22** # 119

Moore, Charles — Avago Technologies

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

The paragraph:

If the optional EEE capability is supported the following requirements also apply. The peak-to-peak differential output voltage shall be less than 30 mV within 500 ns of the transmitter being disabled. When the transmitter is disabled, the peak-to-peak differential output voltage shall be greater than 720 mV within 500 ns of the transmitter being enabled. The transmitter is enabled by the assertion of tx_mode=ALERT and the preceding requirement applies when the transmitted symbols are the periodic pattern defined in 92.8.1 and the transmitter equalizer coefficients are assigned their preset values. The transmitter shall meet the requirements of 92.8.3 within 1 us of the transmitter being enabled. When the transmitter is disabled, the DC common-mode output voltage shall be maintained to within ±150 mV of the value for the enabled transmitter.

may be technically correct but it is clumsy and could mislead a careless reader.

*SuggestedRemedy*

Replace the paragraph with:

If the optional EEE capability is supported the following requirements also apply:

When the transmitter is disabled the DC common-mode voltage shall remain within +/-150 mV of the value for the enabled transmitter and the differential voltage be less than 35 mV within 500 ns.

A disabled transmitter is enabled by the assertion of tx_mode=ALERT. When transmitted symbols are the periodic pattern defined in 92.8.1 and the transmitter equalizer coefficients are assigned their preset values the output voltage shall be greater than 720 mV within 500 ns. The transmitter shall meet all the requirements of 92.8.3 within 1 us.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

The text is correct as written.

*Cl* **93** *SC* **93.8.1.3** *P* **249** *L* **33** # 69

Moore, Charles — Avago Technologies

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

The statement: "Differential and common-mode signal levels are measured with a PRBS9 pattern."

seems to conflict with the earlier statement: ". . . the preceding requirement applies when the transmitted symbols are the periodic pattern defined in 93.7.2 . . ."

*SuggestedRemedy*

Move the statement "Differential and common-mode signal levels are measured with a PRBS9 pattern." to before the EEE paragraph and change:

"the preceding requirement applies when the transmitted symbols are the periodic pattern defined in 93.7.2"

to

"the preceding requirement applies when the transmitted symbols are the periodic pattern defined in 93.7.2 rather than PRBS9"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

To avoid the interpretation that the specifications are in conflict, change the last sentence of the 93.8.1.2 (P249, L33) to:
"Unless otherwise noted, differential and common-mode signal levels are measured with a PRBS9 test pattern."

*Cl* **93** *SC* **93.8.1.5.2** *P* **251** *L* **45** # 120

Moore, Charles — Avago Technologies

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

No need to state twice:
"after the transmit equalizer coefficients have been set to the "preset" values."

*SuggestedRemedy*

Repalce:

"The steady-state voltage shall be greater than or equal to 0.4 V and less than or equal to 0.6 V after the transmit equalizer coefficients have been set to the "preset" values.

The peak value of p(k) shall be greater than 0.71 × vf after the transmit equalizer coefficients have been set to the "preset" values."

with:

"When the transmit equalizer coefficients are in the "preset" condition the The steady-state voltage shall be greater than or equal to 0.4 V and less than or equal to 0.6 V and the peak value of p(k) shall be greater than 0.71 × vf."

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

The text is correct as written.

*Cl* **93** *SC* **93.8.1.6** *P* **252** *L* **35** # 122

Ghiasi, Ali Broadcom

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

Current method to measure SNDR relies on single record captureof PRBS9, which is too short. For accurate measurement real time scope
would be required and capturing at least 16+ waveforms

*SuggestedRemedy*

An improved method would be to use method of85.8.3.3.5 with an averaged waveform to compute the distortion e(K). The
use scope voltage histogram with dual-dirac fit to compute noise component
e(n) for either pattern 8 ones 8 zeros or on PRBS9 as defined in CL 83.5.10.
v(f) is the mean signal amplitude for PRBS9.
SNDR= v(f)/sqrt(e(k)^2 + e(n)^2)

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

<Editor changed subclause from 8.1.6 to 93.8.1.6>

See comment #121.

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*Cl* **93** *SC* **93.8.1.6** *P* **252** *L* **36** # 136

Dudek, Mike QLogic

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

The choice of Vf as a replacement for Smin for 100GBASE-KR4 is appropriate

*SuggestedRemedy*

Remove the editors note.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

See also comment #121.

*Cl* **93** *SC* **93.8.1.6** *P* **253** *L* **10** # 124

Ghiasi, Ali Broadcom

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

There is no bases why SNDR for KR4 needs to be 29 dB muchtighter than KP4 which is 22 dB!

*SuggestedRemedy*

Suggest to relax the SNDR to 26 dB

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See comment #121. It should be noted that SNDR is based on "S_min" for 100GBASE-KP4 is which is roughly 1/3 of v_f and implies a 9.5 dB penalty. Therefore one expects the minimum SNDR to be larger for 100GBASE-KR4.

<Editor changed subclause from 8.1.6 to 93.8.1.6>

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*Cl* **93** *SC* **93.8.1.6** *P* **253** *L* **2** # 129

Ghiasi, Ali Broadcom

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

There appear to be an error in the equation 93-4 index

*SuggestedRemedy*

The error index in equation (93-4) should be "(modM(m-1) + nM + 1)", for each phase index m.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

<editor changed subclause from 8.1.6 to 93.8.1.6>

See #121. Note that the suggested remedy yields an index outside of the valid range [1, M*N] for the Nth sample e.g. m=1 gives N*M+1.

*Cl* **93** *SC* **93.8.1.6** *P* **253** *L* **2** # 156

Kimmitt, Myles — Emulex Corp

*Comment Type* **T** *Comment Status* **D** *late, SNDR*

Equation 93–4 has an incorrect modulus term of N where the correct value is M*N or MN in the format in use. The purpose of this equation is to sample the whole of the error waveform e(k) at specific 1 UI intervals.

*SuggestedRemedy*

Replace modulo term N by MN.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See #121.

<Late comment. The editor changed the CommentType from TR to T.>

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*Cl* **93** *SC* **93.8.1.6** *P* **253** *L* **7** # 154

Kimmitt, Myles — Emulex Corp

*Comment Type* **T** *Comment Status* **D** *late, SNDR*

Equation 93-5 calculates SNDR as a voltage ratio but the specifications for SNDR are in dB. Equation 93-5 should calculate SNDR in dB for consistency and also to avoid miscalculation by implementers not knowing if the ratio is in voltage or power.

*SuggestedRemedy*

Equation 93-5 should be modified to return the SNDR in dB by wrapping the existing expression in 20 Log to base10().

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See #121.

<Late comment.>

*Cl* **93** *SC* **93.8.1.6** *P* **253** *L* **8** # 121

Moore, Charles — Avago Technologies

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

The requirement that

SNDR = v_f/max(sigma_m)

is unreasonable, especially for all Tx equalizer settings.

sigma_m contains, among other things, ISI terms which are reasonable to expect, outside the range where the fitting method will handle them but within the range of the reference receiver DFE.

Also for some Tx equalizer settings v_f is very small and very little sigma_m is allowed.

*SuggestedRemedy*

A presentation will be made in support of this comment suggesting remedies.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Response is pending consideration of moore_3bj_01_0913.pdf and ran_3bj_01_0913.pdf.

If Equation (93-4) is kept, change mod_N(.) to mod_MN(.) per #129.
Delete editor's note per comment #136.

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*Cl* **93** *SC* **93.9.1** *P* **258** *L* **1** # 125

Kochuparambil, Beth — Cisco Systems

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

COM is too limiting for reasonable 30-35dB channels; extra margin is being held in the reference TX/RX used.

*SuggestedRemedy*

Change COM parameters in Table 93-8 per kochuparambil_3bj_01_0913

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

<Commenter did not submit a disapprove ballot. Editor changed CommentType from TR to T.>

Response is pending consideration of kochuparambil_3bj_01_0913.pdf.

*Cl* **93** *SC* **93.9.1** *P* **258** *L* **38** # 64

Healey, Adam LSI Corporation

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

The SNR_TX value for COM has been set to equal SNDR(min.). However, SNDR is a catch-all measure for a number of impairments such as ISI outside the defined exception window e.g. [-2, 8] for 100GBASE-KR4, amplitude noise resulting from jitter, crosstalk, and other uncorrelated noise sources.

If one adds broadband noise corresponding to the entire SNDR allowance, would the transmitter modeled by COM pass the SNDR requirement? This seems unlikely.

*SuggestedRemedy*

Adjust COM parameters and/or transmitter requirements so that the transmitter model in COM is [minimally] compliant.

100GBASE-KP4 requirements likely require similar adjustments.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See comment #153.

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*Cl* **93A** *SC* **93A.1.1** *P* **341** *L* **24** # 67

Moore, Charles Avago Technologies

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

We use the convention that k=0 for the data path but i do not see the convention spelled out. It would be nice to make it clear.

*SuggestedRemedy*

Add a sentence in the next to last paragraph of 93A.1.1 saying that by convention the channel refered to by k=0 is the actual signal (victim) path.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

The convention is defined in 93A.1.1. See P341, L4.

"The total number of paths for a given channel is denoted as K and, by convention, the path index k=0 corresponds to the victim path."

*Cl* **93A** *SC* **93A.1.2.3** *P* **342** *L* **37** # 66

Healey, Adam LSI Corporation

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

These polynomial models are based on a fit to the output of a detailed simulation. Therefore, they can only be expected to be valid over the frequency range covered by the fit. This frequency range should be noted.

*SuggestedRemedy*

Add a note the states the frequency range for which the model is valid.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Add a note to 93A.1.2.3.

"NOTE -- Equation (93A-9) and Equation (93A-10) are based on a fit to a detailed model of the transmission line. The fit is valid over the frequency range 0 to 40 GHz."

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*Cl* **93A** *SC* **93A.1.6** *P* **345** *L* **30** # 68

Moore, Charles Avago Technologies

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

computing h_ISS requires values for b(n) which are not included inpoint e)

*SuggestedRemedy*

change
"Compute h_ISI(n) per Equation(93A-25)" to
"Compute h_ISI(n) per Equation(93A-25) and Equation(93A-24)"

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

The expression for b(n) was introduced in step b) and it is unneccessary to refer to it again here.

Equation (93A-25) refers to other variables that were previously introduced e.g. t_s, T_b. Adding references to the definitions to such variables each time they are invoked will make the text unwieldy and difficult to read.

*Cl* **93A** *SC* **93A.1.7.2** *P* **347** *L* **41** # 153

Ran, Adee Intel

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

Transmitter noise shoud not include ISI and jitter effects which are already accounted for separately.

when these effects are excluded, the distribution of transmitter noise is typically bounded, so it is better modeled by a dual-dirac than a Gaussian.

Using a Gaussian distribution as currently assumed can degrade COM results and cause channels to fail although they would work with compliant transmitters.

*SuggestedRemedy*

A presentation will be supplied.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

Response pending consideration of the cited presentation.

*Cl* **93C** *SC* **93C.1** *P* **352** *L* **42** # 140

Dudek, Mike QLogic

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

It is important that the return loss of the Interference tolerance Test system is controlled so that uncontrolled double reflections are not created between the Test system and the device under test. It is best if this is an instrument grade return loss like equation 93-1 but it should at least meet the informative requirement for the system channel given in equation 93-8.

*SuggestedRemedy*

Add a paragraph at line 47. "The return loss of the test system measured at TP5 replica meets the requirements of equation 93-1."

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

Annex 93C provides intereference tolerance methodology common to both Clause 93 and 94. The return loss must be specified in the Clause that invokes the Annex 93C methodology.

In 93.8.2.4, in the paragraph starting on page 256 line 1 add the following sentence:
"The return loss of the test setup in Figure 93C-4 measured at TP5 replica meets the requirements of Equation 93-1"

In 94.3.13.3, in the paragraph starting on page 306 line 28 add the following sentence:
"The return loss of the test setup in Figure 93C-4 measured at TP5 replica meets the requirements of Equation 94-5"

Alternately, consider using the channel return loss requirements in Equation 93-8 and Equation 94-21, respectively.

*Cl* **93C** *SC* **93C.2** *P* **355** *L* **30** # 70

Mellitz, Richard — Intel Corporation

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

add SNDR to step 5 and step 8 for completeness.

*SuggestedRemedy*

Change step 5 to:
Measure the jitter parameters relevant to the PMD clause that invokes this method that are to be used to set the value of sigma_RJ, ADD, and SNDR in step 8.
Change step 8 text lines
from:
The value of sigma_RJ and ADD are set based on a transformation of measured parameters as specified in the PMD clause that invokes this method.
to:
The value of sigma_RJ, ADD, and SNDR are set based on a transformation of measured parameters as specified in the PMD clause that invokes this method.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

This needs discussion in the BRC

*Cl* **94** *SC* **94.2.1** *P* **270** *L* **6** # 65

Healey, Adam — LSI Corporation

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

The 100GBASE-KP4 PMA service interface must include the PMA:IS_RX_TX_MODE.indication primitive and the value of rx_tx_mode must be defined. This will be passed through the RS-FEC sublayer to enable a CAUI implementation that could exist above.

*SuggestedRemedy*

Add the primitive and a definition for the rx_tx_mode parameter.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

On page 270 line 2, change "three additional" to "four additional"

add:
PMA:IS_RX_TX_MODE.indication

at the bottom of page 272 add

94.2.1.7 PMA:IS_RX_TX_MODE.indication
The PMA:IS_RX_TX_MODE.indication primitive communicates the value of the rx_tx_mode parameter. This parameter indicates the value of tx_mode that the PMA sublayer has inferred from the received signal. Without EEE deep sleep capability, the primitive is never generated and the sublayers behave as if rx_tx_mode=DATA.

94.2.1.7.1 Semantics of the service primitive
PMA:IS_RX_TX_MODE.indication(rx_tx_mode)
The parameter rx_tx_mode is assigned one of the following values: DATA, QUIET, or ALERT. DATA is assigned when the PMA is reset or when PMA frames are being received. QUIET is assigned if PMA frame reception ceases. ALERT is assigned if rx_tx_mode = QUIET and PMD:IS_SIGNAL.indication(SIGNAL_OK) transitions from FAIL to OK.

94.2.1.7.2 When generated
This primitive is generated whenever there is change in the value of the rx_tx_mode parameter.

94.2.1.7.3 Effect of receipt
The RS-FEC sublayer passes this primitive through to the PMA sublayer that may exist above.

*Cl* **94** *SC* **94.3.10.7.5** *P* **292** *L* **21** # 115

Lusted, Kent Intel

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

The changes introduced in D2.2 is problematic since it makes the 2 ms response timeout normative regardless of frame lock state. If frame lock is lost for more than 2 ms, there is no compliant behavior.

The text of draft 2.1 (where losing lock for any period, though hard to track, still didn't violate anything) is preferred.

*SuggestedRemedy*

Revert the text back to "...when frame_lock_i is TRUE for lane i
(where i represents the lane number in the range 0 to 3), the period from receiving a new request to responding to that request shall be less than 2 ms."

See accompanying presentation.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See #113.

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*Cl* **94** *SC* **94.3.12** *P* **298** *L* **27** # 148

Ran, Adee Intel

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

Most of the "Output jitter and linearity" specifications are maximum values but SNDR is a minimum value. Neither is clearly stated.

*SuggestedRemedy*

Add (max.) and (min.) as in other parameters of this table.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, the suggested clarification is needed.

*Cl* **94** *SC* **94.3.12** *P* **298** *L* **30** # 147

Ran, Adee Intel

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

Transmitter minimum SNDR was supposed to change to 22 dB as a result of comment #97 against D1.1 (ran_3bj_02_0713 slide 6). It was changed in the text but not in the table nor in the PICS.

Note that I am submitting another comment that addresses feasibility of meeting SNDR with package effects, mainly for clauses 92 and 93, but this comment may become OBE.

*SuggestedRemedy*

Change "Signal-to-noise-and-distortion ratio" value to 22, in the table and in TC28.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

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*Cl* **94** *SC* **94.3.12.5** *P* *L* # 117

Lusted, Kent Intel

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

Transition time subclause from draft 2.1 was removed. I don't see instructions to do so in the resolved comments or supporting presentations (including ran_03bj_01a_0713.pdf and zivny_03bj_01a_0713.pdf).

(in the CMP version of draft 2.2, it appears that that transition time subclause anchor was inside the 94.3.12.4 common mode return loss equation which was delete and rewritten.)

*SuggestedRemedy*

Restore text if required.

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The approved response to D2.1 comment #98 included:
"According to material presented it is not possible for the measured rise time to be lower than or equal to the minimum specified value. Delete minimum rise time specification in Clauses 93 and 94."

The transition time subclause and the related parameter in Table 94-13 were deleted based on this instruction.

*Cl* **94** *SC* **94.3.12.5.1** *P* **301** *L* **39** # 137

Dudek, Mike QLogic

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

Here and in two other places RLM is called "level mismatch ratio" whereas in the three COM tables (eg 94-17) it is called "level separation mismatch ratio". We should use the same name consistently.

*SuggestedRemedy*

Change to "level separation mismatch ratio" throughout. (here, line 42 on this page and line 30 page 306.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

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*Cl* **94** *SC* **94.3.12.5.4** *P* **303** *L* **1** # 149

Ran, Adee Intel

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

Normalized Linear fit error specification was removed from clauses 92 and 93. There is no real benefit in keeping it here. (Should have been part of ran_3bj_02_0713 but was forgotten).

Also, It may be unfeasible to meet this requirement with a compliant transmitter which has ISI similar to the reference package effect, and the maximum jitter allowed (subject of another comment).

*SuggestedRemedy*

Remove this subclause and PICS TC19.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **94** *SC* **94.3.12.7** *P* **305** *L* **18** # 123

Ghiasi, Ali Broadcom

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

Current method to measure SNDR relies on single record captureof PRBS9, which is too short. For accurate measurement real time scope
would be required and capturing at least 16+ waveforms

*SuggestedRemedy*

An improved method would be to use method of85.8.3.3.5 with an averaged waveform to compute the distortion e(K). The
use scope voltage histogram with dual-dirac fit to compute noise component
e(n) for either pattern 8 ones 8 zeros or on PRBS9 as defined in CL 83.5.10.
v(f) is the mean signal amplitude for PRBS9.
SNDR= v(f)/sqrt(e(k)^2 + e(n)^2)

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

<editor changed subclause from 3.12.7 to 94.3.12.7>

The SNDR methodology uses the QPRBS13 pattern not the PRBS9 pattern.

This needs discussion in the BRC. See also comments 139, 84, 147, 149, 123, 122, 136, 124, 129, 121.

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*Cl* **94** *SC* **94.3.12.7** *P* **305** *L* **18** # 155

Kimmitt, Myles Emulex Corp

*Comment Type* **T** *Comment Status* **D** *late, SNDR*

Equation 94–18 calculates SNDR as a voltage ratio but the specifications for SNDR are in dB. Equation 94–18 should calculate SNDR in dB for consistency and also to avoid miscalculation by implementers not knowing if the ratio is in voltage or power.

*SuggestedRemedy*

Equation 94–18 should be modified to return the SNDR in dB by wrapping the existing expression in 20 Log to base10().

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

See #123.

<Late comment.>

*Cl* **94** *SC* **94.3.13.3** *P* **306** *L* **29** # 138

Dudek, Mike QLogic

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

Ran_3bj_01a_0713 states that if RLM is >.92 then the test will be under-stressed however by increasing SNDR the stress will be reducded further. Also the changes to the method of measuring SNDR reduce the effect of inaccuracies in the setting of the levels on the assumption that the receiver can adapt to these inaccuracies. However by allowing the interference test to be performed with RLM=1 there is no check that the receiver can actually adapt to this inaccuracy. The test should be performed with RLM at .92

*SuggestedRemedy*

Delete the end of the sentence "increased by 20log10 .....

Add. The RLM shall be 0.92. Alternatively revert back to the previous definition of SNDR using the levels (-1,-1/3, 1/3, 1).

*Proposed Response* *Response Status* **W**

PROPOSED REJECT.

The test adjusts the noise level to make up for better RLM (e.g., close to 1) by increasing the noise appropriately.

Also, see comment #150.

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*Cl* **94** *SC* **94.3.13.3** *P* **306** *L* **29** # 150

Ran, Adee Intel

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

As currently written, the test specificaiton might be interpreted to be under-stressed:

If the transmitter used has high SNDR and high linearity such that R_LM=1, and the SNDR is already high, then using an "increased SNDR" as specified has little effect; the target SNDR will be achieved by the same amount of additional noise. Therefore, no level mismatch "penalty" is added.

Instead of increasing the measured SNDR, the target SNDR should be decreased; this would increase the amount of noise required to meet the targe with a high-R_LM transmitter, while keeping it untouched if the R_LM is minimum.

*SuggestedRemedy*

Change the text to

The transmitter noise parameter is SNDR (see 94.3.12.7) with a target value of 22-20*log10(R_LM/0.92), where R_LM is the transmitter measured level mismatch ratio.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **94** *SC* **94.3.6.2** *P* **282** *L* **7** # 152

Ran, Adee Intel

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

The PMD service interface is defined in PAM-4 symbols ("encoded symbols") rather than bits.

Applies to

94.3.1.2.2
94.3.6.2
94.3.6.3
PICS items DFS11 and DFS15 (latter should be "electrical signals")

*SuggestedRemedy*

Change "bit streams" to "encoded symbol streams".
In DFS15 change "electrical bit streams" to "electrical signals"

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

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*Cl* **94** *SC* **94.4.1** *P* **310** *L* **36** # 151

Ran, Adee Intel

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

The R_LM value used for COM (0.91) is lower than the minimum specified for a transmitter (0.92). This was proposed in slide 10 of ran_3bj_01a_0713 in order to create margin, but discussion during presentation noted that there is no similar margin in any other parameter in COM, and I agreed that thesy should be aligned.

This should have been noted in ran_3bj_02_0713 but was missed.

*SuggestedRemedy*

Change R_LM value to 0.92.

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT.

*Cl* **99** *SC* *P* **4** *L* **20** # 14

Anslow, Pete
Ciena

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

Now that IEEE P802.3bk/D3.1 has been submitted to RevCom for approval (and is expected to be approved by the SASB before the York meeting), the summary of P802.3bk should be added to the frontmatter. It seems better to do this now rather than wait until Sponsor Ballot.

*SuggestedRemedy*

Add:
IEEE Std 802.3bk(TM)-201x
This amendment includes changes to EPON as defined in IEEE Std 802.3-2012 and adds the physical layer specifications and management parameters for EPON operation on point-to-multipoint passive optical networks supporting extended power budget classes of PX30 (29 dB for 1G-EPON), PX40 (33 dB for 1G-EPON), PRX40 (33 dB for 10/1G-EPON), and PR40 (33 dB for 10/10G-EPON).

*Proposed Response* *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.

The comment does not apply to the substantive changes made between Draft 2.1 and Draft 2.2 and hence is not within the scope of the recirculation ballot.

However, the comment pertains to necessary changes to the draft.

IEEE Std 802.3bk-2013 was approved as an IEEE Standard on Friday 23rd August, hence the suggested remedy should be implemented with the one change that IEEE Std 802.3bkT-201X should now read IEEE Std 802.3bkT-2013.