Cl **00** *SC* **0** *P* *L* # 47

Anslow, Pete — Ciena

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

Many sections of this draft are making changes to clauses that are also being modified by other projects which are likely to be approved before P802.3bm such as P802.3bk and P802.3bj.

SuggestedRemedy

Keep the base text of the draft in line with the 802.3 standard as modified by these other amendments as they progress. Also, bring any new instances of "CAUI" that are added to these drafts in to the 802.3bm draft with changes to the name as appropriate.

Response *Response Status* **C**

ACCEPT.

Cl **00** *SC* **0** *P* **0** *L* **0** # 118

Brown, Matt — APM

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

WRT CAUI-4, there are various references of:
(a) "chip-chip" and "chip-to-chip" interface
(b) "chip-model" and "chip-to-module" and "chip to module"

SuggestedRemedy

Consolidate to one phrase for each interface type:
"chip-to-chip"
"chip-to-module"

Response *Response Status* **C**

ACCEPT.

Cl **00** *SC* **0** *P* **1** *L* **1** # 211

Dawe, Piers — IPtronics

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

Editorials

SuggestedRemedy

To follow, if I have time.

Response *Response Status* **C**

REJECT.
This is not a comment on the P802.3bm draft.

Cl **01** *SC* **1.4.73** *P* **20** *L* **45** # 130

Brown, Matt — APM

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

remove superfluous commas

SuggestedRemedy

Change: "(See IEEE Std 802.3, Annex 83A, and Annex 83B for CAUI-10 or Annex 83D, and Annex 83E for CAUI-4.)"
To: "(See IEEE Std 802.3, Annex 83A and Annex 83B for CAUI-10 or Annex 83D and Annex 83E for CAUI-4.)"

It may help to add a comma after "CAUI-10".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change to:
"See IEEE Std 802.3, Annex 83A and Annex 83B for CAUI-10, or Annex 83D and Annex 83E for CAUI-4"

Cl **01** *SC* **1.5** *P* **21** *L* **1** # 131

Brown, Matt — APM

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

The acronym applies generally to an N-lane CAUI.

SuggestedRemedy

Change definition to "N-lane 100 Gigabit Attachment Unit Interface".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Changing to "N-lane 100 Gigabit Attachment Unit Interface" would make the acronym inconsistent with the definition in 1.4.73.
Changing the definition too would move it to something like 1.4.266 which is far away from similar definitions such as 40 Gigabit Attachment Unit Interface.

Change the abbreviation expansion to:
"100 Gigabit Attachment Unit Interface over n lanes"

Change the first sentence of 1.4.73 to:
"A physical instantiation of the PMA service interface to extend the connection between 100 Gb/s capable PMAs over n lanes, used for chip-to-chip or chip-to-module interconnections."

Cl **45** *SC* **45.2.1.12.5a** *P* **30** *L* **1** # 78

Trowbridge, Steve — Alcatel-Lucent

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

Title of clause should be 100GBASE-SR4 rather than 40GBASE-SR4

SuggestedRemedy

Change 40G to 100G

Response *Response Status* **C**

ACCEPT.

Cl **69** *SC* **69.1.3** *P* **33** *L* **14** # 48

Anslow, Pete — Ciena

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

Now that P802.3bj D2.1 has added a new item g) to this subclause which references CAUI, make appropriate changes to it to account for the change of name from CAUI to CAUI-10.

SuggestedRemedy

Bring the new item g) in to the draft, change CAUI to CAUI-10, and add ten-lane to the name expansion

Response *Response Status* **C**

ACCEPT.

Cl **78** *SC* **78.1** *P* **37** *L* **11** # 75

Anslow, Pete — Ciena

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

The third paragraph of 78.1 as modified by P802.3bj D2.1 and P802.3bm now reads:
"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-10 or CAUI-4 for 100 Gb/s PHYs."
This does not include optical PHYs

SuggestedRemedy

Change to:
"Table 78-1 specifies clauses for EEE operation over twisted-pair cabling systems, twinax cable, electrical backplanes, and optical fiber; 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-10 or CAUI-4 for 100 Gb/s PHYs."

Response *Response Status* **C**

ACCEPT.

Cl **78** *SC* **78.1** *P* **37** *L* **8** # 50

McDermott, Thomas — Fujitsu

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

Need reference either to tables 80-2, 80-2a, and 80-2b and/or clauses 87-1, 88-1, and 89-1 as to which PHYs do and do not have optional EEE deep sleep capability.

SuggestedRemedy

Add reference to appropriate table(s).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
86.1, 87.1, 88.1, 89.1, and 95.1 all already contain the text: "The deep sleep mode of EEE is not supported."

For Clause 78, in the last paragraph of 78.1.3.3.1 change:
"deep sleep is an additional option for some of those PHYs." to:
"deep sleep is an additional option for some of those PHYs (the exceptions are noted in Table 78-1)."

Add a table footnote to all of the optical PHYs saying "aThe deep sleep mode of EEE is not supported for this PHY."

[Editors note: Clause changed from 78.1. to 78, Subclause set to 78.1, Page set to 37 and Line set to 8]

Cl **78** *SC* **78.1.3.3.1** *P* **37** *L* **30** # 79

Trowbridge, Steve — Alcatel-Lucent

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

Deep sleep is optional for all electrical PHYs, but is not supported for any optical PHY

SuggestedRemedy

Change "an additional option for some of those PHYs" to "an additional option for electrical PHYs"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
It seems better to be specific about which PHYs do not support deep sleep since part of all optical PHYs are electrical.
See response to comment #50

Cl **78** *SC* **78.5** *P* **39** *L* **48** # 52

McDermott, Thomas Fujitsu

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

Table 78-4 "Case 1" and "Case 2" - these have different meanings depending on the particular PHY. There is no text in 802.3az that defines the meaning of Case 1 and Case 2 for 40G and 100G PHYs.

SuggestedRemedy

Define Case 1 and Case 2 for 40G and 100G PHY types.

Response *Response Status* **C**

REJECT.
The rows that are being added by P802.3bm do not include any of these "cases".
As is pointed out in the editing instruction referring to Table 78-4, this table is being modified by the P802.3bj draft amendment.
The definitions of Case-1, Case-2 and Case-3 for the copper PHY types added by P802.3bj can be found in subclause 78.5 of the P802.3bj draft.

[Editors note: Clause changed from 78.1. to 78, Subclause changed from "Table 78-4" to 78.5, Page set to 39 and Line set to 48]

Cl **80** *SC* **80.2.3** *P* **43** *L* **28** # 77

Anslow, Pete Ciena

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

The first paragraph of 80.2.3 as modified by P802.3bj D2.1 now reads:
"A Forward Error Correction sublayer is available for all 40GBASE-R and 100GBASE-R copper and backplane PHYs. It is optional for 40GBASE-KR4, 40GBASE-CR4 and 100GBASE-CR10 PHYs and mandatory for 100GBASE-CR4, 100GBASE-KR4 and 100GBASE-KP4 PHYs."
This text neeeds to be modified to account for 100GBASE-SR4 using FEC

SuggestedRemedy

Change to:
"A Forward Error Correction sublayer is available for all 40GBASE-R and 100GBASE-R copper and backplane PHYs as well as 100GBASE-SR4. It is optional for 40GBASE-KR4, 40GBASE-CR4 and 100GBASE-CR10 PHYs and mandatory for 100GBASE-CR4, 100GBASE-KR4, 100GBASE-KP4 and 100GBASE-SR4 PHYs."

Response *Response Status* **C**

ACCEPT.

Cl **83** *SC* **83.1.4** *P* **56** *L* **15** # 23

Marris, Arthur Cadence Design Syste

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

PMA multiplexor is wrong in Figure 83-2. The RS-FEC layer produces 4 FEC lanes from 20 PCS lanes.

SuggestedRemedy

On line 15 change:
PMA (20:4)
to
PMA (4:4)

Response *Response Status* **C**

ACCEPT.
[Editor's note: Subclause set to 83.1.4]

Cl **83** *SC* **83.5.6** *P* **59** *L* **48** # 24

Marris, Arthur Cadence Design Syste

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

Annex 83E is for chip-module applications.

SuggestedRemedy

Change to:
Annex 83E, which specifies the CAUI-4 interface for chip-to-module applications.

Response *Response Status* **C**

ACCEPT.

Cl **83** *SC* **83.5.6** *P* **59** *L* **48** # 28

Dove, Dan AppliedMicro

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

Annex 83E is for chip-module applications.

SuggestedRemedy

Change to:
Annex 83E, which specifies the CAUI-4 interface for chip-to-module applications.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See comment # 24

Cl **83** *SC* **83.5.6** *P* **59** *L* **48** # 185

Dudek, Mike QLogic

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

Annex 83E is for chip to module applications not chip to chip

SuggestedRemedy

Change from "chip-to-chip" to "chip-to-module"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See comment # 24

Cl **83** *SC* **83.5.6** *P* **59** *L* **48** # 51

McDermott, Thomas Fujitsu

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

Text refers to annex 83E as CAUI-4 chip-to-chip. Should be CAUI-4 chip-to-module.

SuggestedRemedy

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See comment # 24
[Editors note: Clause changed from 83.5. to 83, Subclause set to 83.5.6, Page set to 59 and Line set to 48]

Cl **83** *SC* **83.5.6** *P* **59** *L* **51** # 29

Dove, Dan AppliedMicro

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

Question: If PSM4 or CWDM adopted, would we not include the reference into this line?

SuggestedRemedy

If adopted, make necessary inclusion.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The PMD service interface for any new PHY would be added here if it was a physically instantiated interface (i.e. an un-retimed, exposed interface). There have been no proposals for an unretimed PMD service interface at 25G for any new SMF PHY.

If any new PHY proposal is adopted, then there are many changes to the draft that would be required. These would be appropriate to be made via editorial licence in the adopting motion.

Make no change to the draft due to this comment.
[Editor's note: Page changed from 60 to 59]

Cl **83C** *SC* **83C.1a.2** *P* **136** *L* **21** # 178

Dudek, Mike QLogic

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

My understanding is that the RS-FEC operates with a 20 lane inteface on both it's input and output.

SuggestedRemedy

In Figure 83C-2b change the PMA below the RS-FEC from 4:4 to 20:4.

Response *Response Status* **C**

REJECT.
The RS-FEC sublayer has a four lane interface below it in the diagram. See Figures 83C-2a and 83C-2b in P802.3bj Draft 2.1

Cl **83C** *SC* **83C.1a.2** *P* **136** *L* **7** # 177

Dudek, Mike QLogic

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

The figure 83C-2b is only showing an example with CAUI-10 whereas the section title and figure title say CAUI-n.

SuggestedRemedy

Either change the title and figure title from CAUI-n to CAUI-10 or better add an alternate stack with CAUI-4. Make the same changes in section 83C.2.2 and figure 83C-4.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the title of 83C.1a.2 to "Single CAUI-4 with RS-FEC"
Change the title of Figure 83C-2b to "Example single CAUI-4 with RS-FEC"
Change Figure 83C-2b to have a PMA 20:4, CAUI-4 , PMA 4:20 above the RS-FEC
Change the title of 83C.2.2 to "Single XLAUI/CAUI-10 without FEC"
Change the title of Figure 83C-4 to "Example single XLAUI/CAUI-10 without FEC"

Cl **83D** *SC* **83D** *P* **149** *L* **2** # 126

Brown, Matt APM

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

Several parameters in the COM parameters table defined in 802.3bj Annex 93A were added, changed, and/or modified in Draft 2.1.

SuggestedRemedy

Update the table to match the coefficients in 802.3bj draft 2.1 Annex 93A and add/modify values appropriately.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See also comment 66, 135

Update Table 93-9 per P802.3bj draft 2.1:

Transmit Equalizer, pre and post =TBD
Continuous time filter DC gain =TBD
Random Jitter RMS =TBD
Dual Dirac jitter, peak =TBD
DFE length = 0
Target detector error ratio = 10^-15

Cl **83D** *SC* **83D.1** *P* **139** *L* **30** # 179

Dudek, Mike QLogic

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

My understanding is that the RS-FEC has a 20 lane input and a 20 lane output.

SuggestedRemedy

Insert a PMA (4:20) immediately above the RS-FEC in Figure 83D-1

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #26

Cl **83D** *SC* **83D.1** *P* **139** *L* **31** # 26

Marris, Arthur Cadence Design Syste

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

PMA multiplexor is wrong in Figure 83D-1. The RS-FEC layer produces 4 FEC lanes from 20 PCS lanes.

SuggestedRemedy

On line 31 change:
PMA (20:4)
to
PMA (4:4)

Insert additional PMA sublayer above RS_FEC layer:
PMA (4:20)

Response *Response Status* **C**

ACCEPT.
See also comment #179

Cl **83D** *SC* **83D.1** *P* **139** *L* **31** # 180

Dudek, Mike QLogic

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

The RX-FEC is not a required interface.

SuggestedRemedy

Either add a table footnote 1 to RS-FEC. Footnote 1 to say "Note 1 RS-FEC and is conditional depending on the PMD type." or better show an alternative with the CAUI-4 just going to a PMA(4:4) above the PMD.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

add a note to the RS-FEC:
NOTE1-CONDITIONAL BASED ON PHY TYPE

Cl **83D** *SC* **83D.1** *P* **140** *L* **18** # 149

Ghiasi, Ali — Broadcom

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

Editor note TBC

SuggestedRemedy

Remove the editor note with
CAUI-4 C2C informative channel loss budget is given by equation 83D-1. The normative channel compliance is through CAUI-4 COM Matlab Code, where the actual channel loss could be higher or lower due to the channel ILD, return loss, and crostalk.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See also comment 61

Add:

The normative channel compliance is through CAUI-4 COM as described in 83D.4. Actual channel loss could be higher or lower due to the channel ILD, return loss, and crosstalk.

[Editors note: Clause changed from 93D to 83D, Subclause changed from 4.1 to 83D.1, Page changed from 148 to 140]

Cl **83D** *SC* **83D.1** *P* **140** *L* **4** # 61

Latchman, Ryan — Mindspeed

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

CAUI-4 chip-chip channel loss still TBC

SuggestedRemedy

See latchman_03_0713

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment 149, also see latchman_01_070313_caui

Cl **83D** *SC* **83D.1** *P* **140** *L* **8** # 117

Brown, Matt — APM

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

Figure 83D-2, a diagram of the chip-chip CAUI-4 channel includes host, connector, and module. It looks like this is a cut and paste of the Chip-Module CAUI-4.

SuggestedRemedy

Remove connector and show single PCB section.

Response *Response Status* **C**

REJECT.

CAUI-4 chip-chip supports 1 connector

Cl **83D** *SC* **83D.3.1** *P* **141** *L* **18** # 150

Ghiasi, Ali — Broadcom

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

Wrong reference name

SuggestedRemedy

Replace TP1a with TP0a through the chapter

Response *Response Status* **C**

ACCEPT.
[Editor's note: Subclause changed from 3.1 to 83D.3.1]

Cl **83D** *SC* **83D.3.1** *P* **141** *L* **30** # 222

Dawe, Piers — IPtronics

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

To keep this VSR-compatible (chip-module CAUI compatible) the far end pk-pk voltage must not exceed 900 mV.

SuggestedRemedy

In 83D.3.1.1, The peak-to-peak differential output voltage shall be less than or equal to 900 mV for the "low" transmit equalizer setting. The VMA shall not exceed 900 mV for any transmit equalizer setting.

Response *Response Status* **C**

REJECT.
1200mVpp is consistent with 802.3bj and OIF SR. We are also increasing the channel loss by at least 5dB relative to chip-module. Amplitude is measured at the near end.

If the commenter wants to have an additional reduced amplitude setting, then a complete proposal for this is invited.

[Editor's note: This comment was sent after the close of the comment period]

Cl **83D** *SC* **83D.3.1** *P* **141** *L* **31** # 15

Arumugham, Vinu Cisco

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

Specify measurement condition.

SuggestedRemedy

Change "Amplitude peak-to-peak (max)" to "Maximum differential pk-pk output voltage", to match line 23.
Condition: Measured with no de-emphasis, using a repeating 8-zeroes, 8-ones test pattern.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Use similar style as 802.3bj.
Change line 23 to:
Differential peak-to-peak output voltage (max.)
Transmitter disabled: 30
Transmitter enabled: 1200

Remove line 30

Add:
Differential and common-mode signal levels are measured with a PRBS9 test pattern.

To 83D.3.1.1

Cl **83D** *SC* **83D.3.1** *P* **141** *L* **33** # 1

Arumugham, Vinu Cisco

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

Common-mode output return loss (max)

SuggestedRemedy

Change to: Common-mode output return loss (min)

Response *Response Status* **C**

ACCEPT.

See also comment #181

Cl **83D** *SC* **83D.3.1** *P* **141** *L* **33** # 181

Dudek, Mike QLogic

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

The common mode output return loss should be a minimum not a maximum (like the differential output return loss)

SuggestedRemedy

Change "max" to "min"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #1

Cl **83D** *SC* **83D.3.1** *P* **141** *L* **37** # 62

Latchman, Ryan Mindspeed

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

Reference CTLE not needed for DJ and TJ measurements given compliance points

SuggestedRemedy

remove "with reference CTLE" and note b
delete section 83D.3.1.4.1 Reference receiver for transmitter jitter evaluation

Response *Response Status* **C**

ACCEPT.
See also comments #157 and #2

Cl **83D** *SC* **83D.3.1** *P* **141** *L* **43** # 63

Latchman, Ryan Mindspeed

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

Output waveform TBD

SuggestedRemedy

see latchman_03_0713

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add:
transmitter eye mask definition X1: 0.14
transmitter eye mask definition X2: 0.4
transmitter eye mask definition Y1: 200
transmitter eye mask definition Y2: 600

Also see comment #151
Also see latchman_01_070313_caui

Cl **83D** *SC* **83D.3.1** *P* **141** *L* **44** # 151

Ghiasi, Ali Broadcom

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

Output waveform TBD

SuggestedRemedy

Eye mask coordinates are
(0.14 UI,0), (0.4 UI, +/-0.2 V) (0.6 UI, +/-0.2UI), (0.86 UI, 0)

The above eye mask is defiend at BER 1E-15, transmitter FFE may be adjusted for optimum response
See ghaisi_01_0713_optx

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See responses to comments #63, #158.
Reconcile with COM

text for section 83D.3.1.5 in comment 158

[Editors note: Clause changed from 83d to 83D, Subclause changed from 3.1 to 83D.3.1]

Cl **83D** *SC* **83D.3.1** *P* **141** *L* **46** # 152

Ghiasi, Ali Broadcom

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

De-emphasis range TBD

SuggestedRemedy

Transmitter FIR shall provide post-cursor with minimum de-emphais of 6 dB in addition to any amount applied for optimum setting in 83D.3.1.5. The transmitter FIR shall provide pre-cursor with minimum de-emphasis of 3 dB in to any amount applied for optimum setting in 83D.3.1.5.

See ghaisi_01_0713_optx

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Minimum de-emphasis(a):
Post Cursor: TBD dB
Pre Cursor: TBD dB

(a) independent of optimal setting used for transmitter jitter and output waveform measurements

Add to section 83D.3.1.6
The CAUI-4 chip-to-chip transmitter includes programmable equalization to compensate for the frequency-dependent loss of the channel and to facilitate data recovery at the receiver. The functional model for the transmit equalizer is the three tap transversal filter shown in TBD. The minimum pre cursor equalization (c(-1)) is TBD. The minimum post cursor equalization (c(1)) is TBD.

The transmitter output equalization is characterized using the procedure described in TBD. [Editors will add a placeholder section on transmitter equalization characterization]

Additional implementation discussion required. Consider COM setting requirements and characterization.

Cl **83D** *SC* **83D.3.1** *P* **141** *L* **48** # 119

Brown, Matt APM

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

Table footnotes are redundant. Each row in the table reference to a subclause which fully defines the parameter and/or test method and conditions. Random jitter is not defined just by "BER" limit, but also by an extrapolation methodology which by extension should also be included in the footnotes.

SuggestedRemedy

Delete footnotes a, b, and c.

Response *Response Status* **C**

ACCEPT.

Cl **83D** *SC* **83D.3.1** *P* **41** *L* **46** # 64

Latchman, Ryan Mindspeed

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

De-emphasis range is TBD

SuggestedRemedy

see latchman_03_0713

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #152
Also see latchman_01_070313_caui

Cl **83D** *SC* **83D.3.1.2** *P* **142** *L* **32** # 120

Brown, Matt APM

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

Regarding the sentence "This output impedance requirement applies to all valid output levels."

The specification is for return loss not impedance, granted there is direct mapping between the two. Should refer to either return loss or just the requirement.

The phrase "all valid output levels" implies that the return loss should be measure with the output being active. If thats the case then it should be more clearly stated and the conditions of "active" should be more explicit. Also, if relevant for all output levels it should also apply to all equalization settings, or as a minimum the intended equalization setting (e.g., EQ disabled) should be explicit.

SuggestedRemedy

Change the sentence to:
The return loss is measured with the output active with a PRBS9 pattern and with any valid output level or de-emphasis setting.

Change 83E.3.1.3 similarly.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
"This output requirement applies to all valid output levels."

See also comment #108

Cl **83D** *SC* **83D.3.1.2** *P* **142** *L* **48** # 153

Ghiasi, Ali Broadcom

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

Common mode return loss is tighter than differential above 6 GHz

SuggestedRemedy

Replace with
RLcm=9.05-f (dB) 0.05<=f<=6 GHz
= 3.45-0.075*f 6<=f<=19 GHz

Common mode return loss will follow differential but will be 3 dB more relax

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace with
RLcm = 6 (dB) 0.05<=f<=10 GHz
= 4 (dB) 10<f<=19 GHz

[Editors note: Subclause changed from 3.1.2 to 83D.3.1.2]

Cl **83D** *SC* **83D.3.1.2** *P* **143** *L* **21** # 121

Brown, Matt APM

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

Figure 83D-5 is the differential return loss (as opposed to common mode return loss).

SuggestedRemedy

Change Figure 83D-5 to "Transmitter output differential return loss"

Do the same for Figure 83E-7.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change Figure 83D-5 to "Transmitter differential return loss"

Do the same for Figure 83E-7.

Cl **83D** *SC* **83D.3.1.4** *P* **144** *L* **10** # 154

Ghiasi, Ali Broadcom

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

Differential amplitude of TBd

SuggestedRemedy

Replace TBD with 400 mV

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change:
All co-propagating and counter propagating CAUI-4 lanes are active as crosstalk sources using a PRBS31 test pattern with target differential peak-to-peak amplitude of TBD mV and transition time of TBD ps.

To
All co-propagating and counter propagating CAUI-4 lanes are active using a PRBS31 test pattern. The the counter propagating lanes have a target differential peak-to-peak amplitude of 800 mV and transition time of 8 ps.

The editors will reconcile the changes due to this comment with those due to comment #16

[Editors note: Subclause changed from 3.1.4 to 83D.3.1.4]

Cl **83D** *SC* **83D.3.1.4** *P* **144** *L* **10** # 155

Ghiasi, Ali Broadcom

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

Transition time of TBD

SuggestedRemedy

Repalce transmition time with "meeting eye maskper 83D.3.1.5"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Since 8ps is the minimum in table 83D-1

Replace TBD with 8 ps

[Editors note: Subclause changed from 3.1.4 to 83D.3.1.4]

Cl **83D** *SC* **83D.3.1.4** *P* **144** *L* **13** # 156

Ghiasi, Ali — Broadcom

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

Test pattern TBD

SuggestedRemedy

Replace test pattern TBD with PRBS9

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace test pattern TBD with PRBS31

[Editors note: Subclause changed from 3.1.4 to 83D.3.1.4]

Cl **83D** *SC* **83D.3.1.4** *P* **144** *L* **7** # 16

Arumugham, Vinu — Cisco

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

Add more conditions on the crosstalk sources.

SuggestedRemedy

Add "All counter-propagating signals shall be asynchronous to the co-propagating signals. Each signal shall use a different PRBS31 seed."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add "All counter-propagating signals shall be asynchronous to the co-propagating signals using pattern 5 (with or without FEC encoding) pattern 3 or a valid 100GBASE-R signal. For the case of pattern 3, with at least 31 UI delay between the PRBS31 patterns on one lane and any other lane."

With editorial license.

Add PICS

Cl **83D** *SC* **83D.3.1.4** *P* **144** *L* **7** # 182

Dudek, Mike — QLogic

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

With the Transmitter being measured at TP0 close to the Transmitter there will be little need for measuring with the CTLE and with de-emphasis in the transmitter there is likely to be a need for some loss in the measurement instead.

SuggestedRemedy

Delete the reference to the CTLE and add an editors note to be removed prior to publication that the method for measuring the jitter in the presence of the de-emphasis required for maximum loss channels is under study.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See responses to comment #62, #63 and #152

Cl **83D** *SC* **83D.3.1.4.1** *P* **144** *L* **15** # 17

Arumugham, Vinu — Cisco

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

Specifying a reference receiver affects measurement quality due to restrictions on pattern type, no. of samples, etc., imposed by the need to post-process the captured waveform.

SuggestedRemedy

Since the eye is open in this case, it may be best to specify jitter measurements without using a reference receiver.
Follow CEI-28G-SR approach.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See responses to comments #62, #63 and #152

Cl **83D** *SC* **83D.3.1.4.1** *P* **144** *L* **16** # 157

Ghiasi, Ali — Broadcom

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

This section is not needed

SuggestedRemedy

Since the transmitter already has 3 tap FFE then the FFE should be used for optimum eye measurement at TP0a, save the section and move it for TP5 measurement

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #62

[Editor's note: Comment Type set to T, Subclause changed from 3.1.4.1 to 83D.3.1.4.1]

Cl **83D** *SC* **83D.3.1.4.1** *P* **144** *L* **17** # 2

Arumugham, Vinu Cisco

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

This comment applies if the line 15 comment is not accepted.
The reference receiver is used to measure host jitter.

SuggestedRemedy

Change to "The reference receiver is used to measure transmitter jitter."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #62

Cl **83D** *SC* **83D.3.1.4.1** *P* **144** *L* **24** # 122

Brown, Matt APM

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

The use of angular frequency for the poles and zeros makes equation 83D-4 unnecessarily cluttered. Also, Table 83D-2 defines the poles in GHz, not Grad/s.

SuggestedRemedy

In Equation 83D-4, delete all instances of 2*pi.

Change the units for P1, P2, and Z1 (lines 31 and 32) to GHz.

In table 83D-2, change the headings of columns 3 to 5 to P1, P2, and P3.

Do the same in 83E.3.1.6.

Response *Response Status* **C**

REJECT.

Methodology consistent with other industry documents. Table 82D-2 is being removed (see comment 62)

Cl **83D** *SC* **83D.3.1.4.2** *P* **145** *L* **28** # 3

Arumugham, Vinu Cisco

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

(the difference the lowest and highest values)

SuggestedRemedy

Change to "(the difference of the lowest and highest values)"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change to "(the difference between the lowest and highest values)"

Cl **83D** *SC* **83D.3.1.5** *P* **145** *L* **54** # 158

Ghiasi, Ali Broadcom

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

Eye mask is TBD

SuggestedRemedy

Add eye mask definition per
Eye mask coordinates are
(0.14 UI,0), (0.4 UI, +/-0.2 V) (0.6 UI, +/-0.2UI), (0.86 UI, 0)

The above eye mask is defiend at BER 1E-15, transmitter FFE may be adjusted for optimum response
See ghaisi_01_0713_optx

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See also comment #151.
Add figure depicting eye mask.

Add figure showing hexagon eye mask and below description:

The eye mask shown in Figure xxx is defined at a BER of 10^-15, using the methodology described in TBD. Transmitter de-emphasis may be adjusted for optimum mask results.

[Editors note: Subclause changed from 3.1.5 to 83D.3.1.5]

Cl **83D** *SC* **83D.3.1.6** *P* **146** *L* **7** # 159
Ghiasi, Ali Broadcom

Comment Type **TR** *Comment Status* **A**
De-emphasis range

SuggestedRemedy
Extend method of 83A.3.3.1 to have minimum of
6 dB post cursor in maximum increments 0.5 dB
3 dB of pre cursor in maximum increment of 0.5 dB

Also update De-emphasis range in table 83D-3

see ghiasi_01_0713_optx for the details

Response *Response Status* **C**
ACCEPT IN PRINCIPLE.

See response to comment #152.

[Editors note: Subclause changed from 3.1.6 to 83D.3.1.6]

Cl **83D** *SC* **83D.3.2** *P* **146** *L* **10** # 161
Ghiasi, Ali Broadcom

Comment Type **TR** *Comment Status* **R**
Receiver characteristics are measured at TP5 not TP5a

SuggestedRemedy
Replace TP5a with TP5

Response *Response Status* **C**
REJECT.

We are using 802.3bj KR4 compliance points. See:
93.8.2 Receiver characteristics
Receiver characteristics measured at TP5a are summarized in Table 93-6

[Editors note: Subclause changed from 3.2 to 83D.3.2]

Cl **83D** *SC* **83D.3.2** *P* **146** *L* **19** # 160
Ghiasi, Ali Broadcom

Comment Type **TR** *Comment Status* **A**
Input amplitude max

SuggestedRemedy
Max input range 1000 mV differential p-p to futuer proof with smaller geometry CMOS

Response *Response Status* **C**
ACCEPT IN PRINCIPLE.

Maximum swing for the transmitter is 1200mV.

Replace TBD with 1000 mV

Editors will add an additional requirement for:
The receiver shall be able to tolerate without damage exposure to a maximum differential voltage of +/- 600 mV.

With editorial licence.

[Editors note: Subclause changed from 3.2 to 83D.3.2]

Cl **83D** *SC* **83D.3.2** *P* **146** *L* **21** # 65
Latchman, Ryan Mindspeed

Comment Type **T** *Comment Status* **A**
De-emphasis range not a spec for a receiver

SuggestedRemedy
delete from Table 83D-3-CAUI-4 receiver characteristics at TP5a

Response *Response Status* **C**
ACCEPT.

Cl **83D** *SC* **83D.3.2.1** *P* **147** *L* **44** # 4
Arumugham, Vinu Cisco

Comment Type **E** *Comment Status* **A**
Figure 83D-9-Receiver input return loss

SuggestedRemedy
Change to "Figure 83D-9-Receiver differential to common mode return loss"

Response *Response Status* **C**
ACCEPT.

Cl **83D** *SC* **83D.3.2.2** *P* **147** *L* **49** # 162

Ghiasi, Ali Broadcom

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

Receiver interference toelrnace compliance point need to be defiend

SuggestedRemedy

Receiver inteference toelrnace is applied at TP5a, TP5a is a point with PCB trace loss of 1.2-1.6 dB @12.87 GHz from the receiver chip

Please duplicate 93.8.2.1
Add digram showing where TP0, TP0a, TP5, TP5a are, please see ghiasi_01_0714_optx

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See also comment #163

83D.2 points to 93.8.2.1 so duplicating should not be necessary. For the interference tolerance compliance, reference to TP0/0a should not be necessary since we can define the output from the pattern generator with appropriate characteristics. A definition which focuses on the eye opening at the reference receiver would be most similar to CAUI-4 chip-module (per comment 163)

Add to Figure 83D-10 showing TP5a

[Editors note: Subclause changed from 3.2.2 to 83D.3.2.2]

Cl **83D** *SC* **83D.3.2.2.1** *P* **148** *L* **5** # 123

Brown, Matt APM

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

As shown, BER has units of dB.

SuggestedRemedy

Delete "dB".

Response *Response Status* **C**

ACCEPT.

Cl **83D** *SC* **83D.3.2.2.1** *P* **148** *L* **5** # 163

Ghiasi, Ali Broadcom

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

Table 83D-4 missing paramters

SuggestedRemedy

Adjust pattern generator such that the out has 0.14 UI of dual dirac DJ, then apply borad band noise source till total jitter at output of pattern generator is 0.28 UI at BER 1e-15.

Channel insertion loss at 12.89 GHz=15 dB (reference channel)

Optimize the output eye for maximum eye opening by selecting the optimum CTLE from 1 dB to 15 dB.

Adjust inteference generator if needed to have 1E-15 eye opening of 40 mV at TP5. The target eye width at TP5 recomended to be 0.45 UI. To meet the target eye opening at TP5 pattern generator randon jitter and determinisitic jitter may need to be adjsuted.

See ghiasi_01_0713_optx

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace the text in 83D.3.2.2.1 with:

The interference tolerance test is performed with the setup shown in Figure 83D-10. A reference CRU with a high-frequency corner bandwidth of 10 MHz and a slope of –20 dB/decade is used to characterize the stress signal using a PRBS9 pattern. The reference receiver includes a selectable software CTLE given by Equation xxxx and Table xxxx. The stressed signal is generated by adding sinusoidal jitter to a clean pattern, followed by frequency dependent attenuation, and interference injection. The amount of applied peak-to-peak sinusoidal jitter, broad band noise, and random jitter used in the interference tolerance test is given in Table 83D-4. Frequency dependent attenuation is applied using a channel with insertion loss and COM value given in Table 83D-4. Broadband noise is added via the interference generator and is added such that the eye opening using the reference receiver and optimal CTLE setting is 40 mV (TBC) eye height and 0.45 UI (TBC) eye width. The minimum level of broad band noise applied is given in Table 83D-3. Eye height and eye width are measured using the reference CTLE setting which maximizes the product of eye height and eye width based on the eye measurement methodology given in 83E.4.2.
Counter propagating crosstalk channels are asynchronous with target amplitude of TBD mV peak-to-peak differential.
The pattern is changed for the interference tolerance test to pattern 5 (with or without FEC encoding), pattern 3, or a valid 100GBASE-R signal. For the case of pattern 3, with at least 31 UI delay between the PRBS31 patterns on one lane and any other lane. All lanes are active during the stressed receiver test.

With editorial licence

[Editors note: Subclause changed from 3.2.2.1 to 83D.3.2.2.1]

Cl **83D** *SC* **83D.3.2.2.1** *P* **148** *L* **6** # 124

Brown, Matt APM

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

Why 5x105/f? Can we simplify to 525/f?

SuggestedRemedy

Change 5*105/f to 525/f.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Equation is supposed to be 5x10^5/f per table 88-13

change to refer toTable 88-13

See also comments #5, #10, #12

Cl **83D** *SC* **83D.3.2.2.1** *P* **148** *L* **9** # 5

Arumugham, Vinu Cisco

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

Add footnote for LB.

SuggestedRemedy

b LB = loop bandwidth; upper frequency bound for added sine jitter should be at least 10 times the loop bandwidth of the receiver being tested.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #124

Cl **83D** *SC* **83D.3.3.2.1** *P* **148** *L* **22** # 134

Ghiasi, Ali Broadcom

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

Missing CTLE pole /zero

SuggestedRemedy

Add section for reference CTLE for measurement of eye at TP5 as well as caliburation of the inteference sigal at TP5a. The CTLE gain are normalized to 0 dB with filter loss from 1-15 dB, please see ghaisi_01_0714_optx for the pole zero response

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add reference receiver section:

The reference receiver is used to measure interference tolerance jitter and eye height. The reference receiver includes a selectable continuous time linear equalizer (CTLE) which is described by Equation xxx with coefficients given in Table xxx and illustrated in Figure xxx. The equalizer may be implemented in software, however the measured signal is not averaged. Any of the TBD equalizer settings may be used to meet the transmitter jitter and eye height requirement.

[Editor's note: Subclause changed from 3.3.2.1 to 83D.3.3.2.1]

Cl **83D** *SC* **83D.4** *P* **148** *L* **51** # 66

Latchman, Ryan Mindspeed

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

COM parameters and value TBD

SuggestedRemedy

see latchman_03_0713

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #126
Also see latchman_01_070313_caui

Cl **83D** *SC* **83D.4** *P* **148** *L* **52** # 125

Brown, Matt APM

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

The value of COM must also take into the receiver de-emphasis step size specified in 83D.3.1.4.1. Based on the title and content of 83D.3.1.6 the transmitter equalization is defined by pre-emphasis setting not coefficient settings; also, it is not clear that the standard imposes a particular step size. Assuming the transmitter minimum and maximum pre-emphasis is configurable and that the step size minimum and maximum between setting is specified then this must be taken into consideration.

SuggestedRemedy

Change: "This minimum value allocates margin for practical limitations
on the receiver implementation as well as the largest step size allowed for transmitter equalizer coefficients."
To: "This minimum value allocates margin for practical limitations
on the receiver implementation, largest step size allowed for receiver pre-emphasis, and largest step size allowed for transmitter pre-emphasis.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change: "This minimum value allocates margin for practical limitations
on the receiver implementation as well as the largest step size allowed for transmitter equalizer coefficients."

To: "This minimum value allocates margin for practical limitations
on the receiver implementation as well as the allowed transmitter equalization settings."

Cl **83D** *SC* **83D.4** *P* **149** *L* **11** # 135

Ghiasi, Ali Broadcom

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

Device cpacitance missing

SuggestedRemedy

0.25 pf

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See also comment 126

Update device package model:

Single-ended device capacitance: 0.25 pF
Transmission line length: 12 mm
Single-ended board capacitance: 0.18 pF

[Editor's note: Subclause changed from 4 to 83D.4]

Cl **83D** *SC* **83D.4** *P* **149** *L* **24** # 136

Ghiasi, Ali Broadcom

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

Transmitter equalizer, pre cursor missing

SuggestedRemedy

May have range of 1-7 dB in 0.5 dB step (assume the 1 dB is necessary to meet TP0a eye mask)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Use similar terms as 802.3bj:

Transmitter equalizer, post-cursor coefficient
Minimum value TBD
Maximum value TBD
Step size TBD

[Editor's note: Subclause changed from 4 to 83D.4]

Cl **83D** *SC* **83D.4** *P* **149** *L* **31** # 138

Ghiasi, Ali — Broadcom

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

Continous time filter paramters are missing

SuggestedRemedy

Replace DC gain with AC gain = 0 dB
Minimum DC gain = -15 dB
Maximum DC gain = -1 dB
Step size = 1 dB

For the pole/zeor please see ghiasi_01_0713_optx

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Make no change to the draft
Additional detail required on pole/zero. Compare with COM

[Editor's note: Subclause changed from 4 to 83D.4]

Cl **83D** *SC* **83D.4** *P* **149** *L* **32** # 137

Ghiasi, Ali — Broadcom

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

Transmitter pre-cursor missing

SuggestedRemedy

Transmitter pre-curosr may have range of 0-3 dB in 0.5 dB increment

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Use similar terms as 802.3bj:

Transmitter equalizer, pre-cursor coefficient
Minimum value TBD
Maximum value TBD
Step size TBD

[Editor's note: Subclause changed from 4 to 83D.4]

Cl **83D** *SC* **83D.4.1** *P* **149** *L* **50** # 139

Ghiasi, Ali — Broadcom

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

Missing channel return loss

SuggestedRemedy

Channel return loss is 3 dB beter than CL92 host IC return loss or

15 - 0.5*f, 0.01<=f<=8 GHz
8.65-9.71*log10(f/14), 8Ghz<f<=19 GHz

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change to:

15 0.05<=f<=6.4 GHz
15-15*log10(4f/25.78), 6.4GHz<f<=19 GHz

[Editor's note: Subclause changed from 4.1 to 83D.4.1]

Cl **83E** *SC* **83E.1** *P* **155** *L* **30** # 27

Marris, Arthur — Cadence Design Syste

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

PMA multiplexor is wrong in Figure 83E-1. The RS-FEC layer produces 4 FEC lanes from 20 PCS lanes.

SuggestedRemedy

On line 30 change:
PMA (20:4)
to
PMA (4:4)

Response *Response Status* **C**

ACCEPT.

Cl **83E** *SC* **83E.1** *P* **156** *L* **13** # 216

Dawe, Piers IPtronics

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

This annex uses "transmit" and "receive" in two different senses, e.g. "independent transmit and receive data paths" at line 5 and "Transmitter,
Receiver" in Figure 83E-2. This needs clearing up. 802.3ba had a similar problem in Annex 86A, which was resolved by using the terms host and module, input and output, for electrical ports and "transmit" and "receive" in the sense of line 5 (which I believe aligns with Clause 83 "Tx side, Rx side".

SuggestedRemedy

Throughout 83E, change transmitter to output, receiver to input.
It would be advisable to do the same in 83D, although 83D might not distinguish between Tx side and Rx side.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Throughout Annex 83D and Annex 83E change:
"independent transmit and receive data paths" to:
"independent data paths in each direction"

Cl **83E** *SC* **83E.2** *P* **157** *L* **20** # 140

Ghiasi, Ali Broadcom

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

TP1a and TP4a lie

SuggestedRemedy

Proposed Response *Response Status* **Z**

PROPOSED REJECT.

This comment was WITHDRAWN by the commenter.

[Editor's note: Subclause changed from 2 to 83E.2]

Cl **83E** *SC* **83E.3.1** *P* **158** *L* **15** # 105

Petrilla, John Avago Technologies

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

Differential output voltage (max) should be stated as either peak-to-peak or absolute value. See also table 83E-3.
Further, an apparently similar parameter in tables 83D-1 and 83D-3 is labeled Amplitude peak-to-peak (max). If these are different names for the same characteristic, it would reduce complexity and improve carity to use the same name.

SuggestedRemedy

Change, "Differential output voltage (max)" to either "Peak-to-peak differential output voltage (max)" or "Differential output voltage, absolute value (max)" and establish consistency with 83D as appropriate. Repeat in table 83E-3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change to:

Differential peak-to-peak output voltage (max.)
Transmitter disabled: 35mV
Transmitter enabled: 900mV
(consolidates row 9 and row 15)

See also comment #107 and for 83D see comment #15

Cl **83E** *SC* **83E.3.1** *P* **158** *L* **16** # 141

Ghiasi, Ali Broadcom

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

Ouput total jitter TBD

SuggestedRemedy

Output total jitter at 1e-15 = 0.56 UI
Also add note to measuremnt method using referene CTLE of section 3.1.6.1 and eye contour method of 83E.4.2

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #53.
Reference CTLE and eye contour method referred to in section 83E.3.1.6

[Editor's note: Subclause changed from 3.1 to 83E.3.1]

Cl **83E** *SC* **83E.3.1** *P* **158** *L* **16** # 142

Ghiasi, Ali — Broadcom

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

Eye height miimum is missing

SuggestedRemedy

Eye Height EH 1e-15 = 95 mV
Also add note to measuremnt method using referene CTLE of section 3.1.6.1 and eye contour method of 83E.4.2

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #53

[Editor's note: Subclause changed from 3.1 to 83E.3.1]

Cl **83E** *SC* **83E.3.1** *P* **158** *L* **17** # 53

Latchman, Ryan — Mindspeed

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

Output total jitter max and eye height differential (min) is TBD.
Output jitter specification should be eye width to be consistent with other industry documents

SuggestedRemedy

change Output total jitter (max) to eye width (min) with value 0.46UI
change eye height (min) value from TBD to 95mV
make associated change to TBDs in section 83E.3.1.6

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See also comments #141 and #142

change Output total jitter (max) to eye width (min) with value 0.46 UI
change eye height (min) value from TBD to 95 mV
make associated change to TBDs in section 83E.3.1.6

Add subclause reference: 83E.3.1.6

Cl **83E** *SC* **83E.3.1** *P* **158** *L* **2** # 104

Petrilla, John — Avago Technologies

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

Table 83E-1 does not include single-ended output voltage specs that would define the min input withstand capability of devices, e.g. module receiver, connected to the host transmitter. Differential and common mode specs are provided but neither are as meaningful.

SuggestedRemedy

Add to Table 83E-1 single-ended output voltage specs, one a max with a value of 2.8 V and another a min with a value of -0.3 V.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add to Table 83E-1 single-ended output voltage specs, one a max with a value of 3.3 V and another a min with a value of -0.8 V.

Cl **83E** *SC* **83E.3.1** *P* **158** *L* **20** # 6

Arumugham, Vinu — Cisco

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

max or min?

SuggestedRemedy

Change to "Differential output return loss (min)" and "Common to differential mode conversion (min)"

Response *Response Status* **C**

ACCEPT.

Cl **83E** *SC* **83E.3.1** *P* **161** *L* **3** # 217

Dawe, Piers — IPtronics

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

Note that transition time is defined as observed in a particular filter response. Clause 86's choice will be too slow. 802.3bj uses 33 GHz, OIF VSR following CEI uses 40 GHz which is too high for a representative measurement (much higher than real input bandwidths, expensive instrument). InfiniBand EDR is considering 30 GHz. For 25G lanes, 802.3ba and P802.bm optical specs use 19.34 GHz. This topic is open in P802.3bj.

SuggestedRemedy

Specify a suitable measurement bandwidth (33 GHz or below), adjusting the transition time if necessary to keep the same effect as OIF VSR's 10 ps in 40 GHz.
This affects several parameters, so it's best stated in a definition-of-parameters section.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add the following statement:

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.

To sections:
83D.3.1, 83E.3.1, 83E.3.2

Cl **83E** *SC* **83E.3.1.2** *P* **158** *L* **35** # 106

Petrilla, John — Avago Technologies

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

83E.3.1.2 defines "differential output voltage vdi" that is never used except in the accompanying Figure 83E-6. However "peak-to-peak differential output voltage" is used in several places but never defined as well as vdi.

SuggestedRemedy

Delete the sentence defining vdi and the associated equation in Figure 83E-6 unless some use is made of this term.
Add a definition for "peak-to-peak differential output voltage".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

The differential output voltage is stated to be "vdi" in the first sentence of 83E.3.1.2:

However, change the start of the first sentence from:

"The differential output voltage vdi is defined .." to:
"The peak-to-peak differential output voltage vdi is defined .."

[Editor's note: Subclause changed from 8e#.3.1.2 to 83E.3.1.2]
Similar methodology used in 802.3bj

Cl **83E** *SC* **83E.3.1.2** *P* **159** *L* **1** # 107

Petrilla, John — Avago Technologies

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

In the first sentence of the paragraph, "The peak-to-peak differential output voltage shall be less than or equal to 900 mV ..." isn't consistent with Table 83E-1, where the 900 mV limit is associated with "Differential output voltage (max)". Further in the second sentence, "The peak-to-peak differential output voltage shall be less than or equal to 35 mV ..." isn't consistent with "Maximum differential pk-pk output voltage when transmitter is disabled" in Table 83E-1. See another comment regarding whether "Differential output voltage (max)" in Table 83E-1 should be peak-topeak or just differential. Please make these consistent

SuggestedRemedy

Pick a name for this attribute, e.g. differential peak-to-peak output voltage, and use only it in 83D and 83E.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #105. After implementing table change, text will be consistent

Cl **83E** *SC* **83E.3.1.3** *P* **159** *L* **10** # 108

Petrilla, John — Avago Technologies

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

In the sentence, "This output impedance requirement applies to all valid output levels.", the word, "impedance" apparently referring to return loss is inappropriate.

SuggestedRemedy

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

Response *Response Status* **C**

ACCEPT.

See also comment #120

Cl **83E** *SC* **83E.3.1.3** *P* **159** *L* **26** # 183

Dudek, Mike — QLogic

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

It is not clear what the Common to differential mode conversion is

SuggestedRemedy

Either add another sentence. "It is the ratio of the reflected differential signal to an incident common mode signal (cf SDC22)."
Or include return loss in the parameter name ie rename as "Common to Differential output return loss conversion"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change:
Common to differential mode conversion...

to

Common to differential output conversion return loss.

Cl **83E** *SC* **83E.3.1.5** *P* **161** *L* **3** # 38

Dove, Dan — AppliedMicro

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

Exposing my ignorance, the spec says "The transition time shall be greater than or equal to 10 ps." There are many values that would fit that spec yet lead to failure of operation. Am I mis-reading this?

SuggestedRemedy

Reconsider the wording to limit rise-time more clearly. If appropriate, revise all instances and PICs items as required.

Response *Response Status* **C**

REJECT.

Maximum rise fall time is limited by output jitter and eye height. Minimum is specified to limit crosstalk.

[Editor's note: Clause changed from 85E to 83E]

Cl **83E** *SC* **83E.3.1.6** *P* **161** *L* **12** # 18

Arumugham, Vinu — Cisco

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

Add more conditions on the crosstalk sources.

SuggestedRemedy

Add "All counter-propagating signals shall be asynchronous to the co-propagating signals. Each signal shall use a different PRBS31 seed."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add "All counter-propagating signals shall be asynchronous to the co-propagating signals using pattern 5 (with or without FEC encoding) pattern 3 or a valid 100GBASE-R signal. For the case of pattern 3, with at least 31 UI delay between the PRBS31 patterns on one lane and any other lane."

With editorial license.

Add PICS

See also comment #218

Cl **83E** *SC* **83E.3.1.6** *P* **161** *L* **13** # 218

Dawe, Piers IPtronics

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

Allowable test patterns should be as for similar parameters in Table 95-10.
For crosstalk generators, any of 3, 5, valid 100GBASE-R signal or valid RS-FEC encoded 100GBASE-R signal will be fine.
In the remedy, Pattern 6 would be RS-FEC encoded idle.

SuggestedRemedy

Change "a PRBS31 test pattern" to "a suitable mixed-frequency signal, e.g. Pattern 3, Pattern 5, Pattern 6, a valid 100GBASE-R signal or a valid RS-FEC encoded 100GBASE-R signal.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #18.

Cl **83E** *SC* **83E.3.1.6.1** *P* **161** *L* **51** # 213

Dawe, Piers IPtronics

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

It would be better to define the reference receiver just once, in the parameter definitions section.

SuggestedRemedy

Move the definition of the reference receiver to 83E.4.2. Include the fourth-order Bessel-Thomson filter (see another comment).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Reference receiver is different for host and module.

Replace Table 83E-4 with a reference to the first two rows of Table 83E-2

See comment #217 for BT filter consideration

Cl **83E** *SC* **83E.3.1.6.1** *P* **162** *L* **1** # 54

Latchman, Ryan Mindspeed

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

Number of reference equalizer settings for host transmitter are TBD

SuggestedRemedy

change TBD to 9 for host transmitter. Remove note that CTLE coefficients are TBC. Add to Z1/2pi significant digits per below:
8. 31
7.1
5.68
4.98
4.35
3.82
3.43
3
2.67

Response *Response Status* **C**

ACCEPT.

Cl **83E** *SC* **83E.3.1.6.1** *P* **162** *L* **6** # 212

Dawe, Piers IPtronics

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

Gratuitous clutter.

SuggestedRemedy

Remove 2pi (6 times in this section, 3 times in 83E.3.2.1.1), change Grad/s to GHz (twice in this section).

Response *Response Status* **C**

REJECT.

Consistent with other industry documents. Avoids additional equation (s = j2pif)

Cl **83E** *SC* **83E.3.1.6.1** *P* **163** *L* **23** # 109

Petrilla, John Avago Technologies

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

The caption for Figure 83E-10 seems misaligned.

SuggestedRemedy

Center the caption for Figure 83E-10

Response *Response Status* **C**

ACCEPT.

Cl **83E** *SC* **83E.3.1.6.1** *P* **163** *L* **23** # 7

Arumugham, Vinu Cisco

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

Figure description not centered.

SuggestedRemedy

Center it.

Response *Response Status* **C**

ACCEPT.

See comment 109

Cl **83E** *SC* **83E.3.2** *P* **163** *L* **43** # 55

Latchman, Ryan Mindspeed

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

Output total jitter max and eye height differential (min) is TBD.
Output jitter specification should be eye opening to be consistent with other industry documents

SuggestedRemedy

Change Output total jitter (max) to eye width (min) with a value of 0.57UI
Change Eye height TBD to 228mV
make associated change in section 83E.3.2.1

Response *Response Status* **C**

ACCEPT.

Cl **83E** *SC* **83E.3.2** *P* **163** *L* **46** # 60

Latchman, Ryan Mindspeed

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

Vertical eye closure measurements and simulations show 6.5dB is overly relaxed, increasing the burden on the host

SuggestedRemedy

change VEC from 6.5dB to 5.5dB

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #184

Cl **83E** *SC* **83E.3.2** *P* **163** *L* **46** # 184

Dudek, Mike QLogic

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

OIF has done a significant amount of work showing that the Vertical eye closure of 6.5dB over-stresses the receiver and is not needed by modules.

SuggestedRemedy

Reduce the value from 6.5dB to 5.5dB (the value chosen by OIF.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Reduce the value from 6.5 dB to 5.5 dB.

Add:

A host input test signal should have a vertical eye closure in the range of 4.5 dB to 5.5 dB with a target value of 5 dB.

At the end of: 83E.3.3.3.1 Host stressed receiver test procedure

---

Cl **83E** *SC* **83E.3.2** *P* **163** *L* **49** # 8

Arumugham, Vinu Cisco

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

Common to differential mode conversion (max)

SuggestedRemedy

Change to "Common to differential mode conversion (min)".

Response *Response Status* **C**

ACCEPT.

Cl **83E** *SC* **83E.3.2.1** *P* **164** *L* **7** # 19

Arumugham, Vinu Cisco

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

Add more conditions on the crosstalk sources.

SuggestedRemedy

Add "All counter-propagating signals shall be asynchronous to the co-propagating signals. Each signal shall use a different PRBS31 seed."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add "All counter-propagating signals shall be asynchronous to the co-propagating signals using pattern 5 (with or without FEC encoding) pattern 3 or a valid 100GBASE-R signal. For the case of pattern 3, with at least 31 UI delay between the PRBS31 patterns on one lane and any other lane."

With editorial license.

Cl **83E** *SC* **83E.3.2.1.1** *P* **164** *L* **50** # 56

Latchman, Ryan Mindspeed

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

number of reference equalizer settings for module transmitter are TBD

SuggestedRemedy

change TBD to 2 for module transmitter. Remove note that CTLE coefficients are TBC.
Add to Z1/2pi significant digits per below:
8. 31
7.10

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change TBD to 2 for module transmitter. Remove note that CTLE coefficients are TBC.
In Table change 8.3 to 8.31

Cl **83E** *SC* **83E.3.3** *P* **165** *L* **20** # 144

Ghiasi, Ali Broadcom

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

Missing Eye Height at TP4

SuggestedRemedy

Please add EH 1E-15 to the table with value of 228 mV

Response *Response Status* **C**

REJECT.

Eye height is not an appropriate parameter for a reciever.

Eye height is already a parameter for the stressed receiver test in Table 83E-6

[Editor's note: Subclause changed from 3.3.1 to 83E.3.3]

Cl **83E** *SC* **83E.3.3** *P* **165** *L* **28** # 147

Ghiasi, Ali Broadcom

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

Vertical Eye Clousure Penalty missing

SuggestedRemedy

Please add VECP with max value of 5.5 dB

Response *Response Status* **C**

REJECT.

This is a module output spect a receiver spec.
For the VEC for the module, see response to comment #184

[Editor's note: Subclause changed from 3.3.1 to 83E.3.3]

Cl **83E** *SC* **83E.3.3** *P* **165** *L* **34** # 146

Ghiasi, Ali — Broadcom

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

Tranistion time missing

SuggestedRemedy

Add minimum transition time of 9.5 ps 20-80%

Response *Response Status* **C**

REJECT.

Transition time is a module transmitter spec which can be found in table 83E-3.

The transition time for the stressed receiver test is already specified in 83E.3.3.3.1

[Editor's note: Subclause changed from 3.3.1 to 83E.3.3]

Cl **83E** *SC* **83E.3.3** *P* **165** *L* **35** # 148

Ghiasi, Ali — Broadcom

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

Common Mode volate missing

SuggestedRemedy

Please add common mode voltage with min value of -0.3 V and max value of 2.8 V

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Since AC coupling is included in the module, CM voltage tolerance for the host receiver is not needed, but add a common mode generation spec:
Common Mode Voltage, min -0.3 V, max 2.8 V
Referred to host ground. Common mode voltage is generated by host
with editorial licence

[Editor's note: Subclause changed from 3.3.1 to 83E.3.3]

Cl **83E** *SC* **83E.3.3.1** *P* **165** *L* **20** # 145

Ghiasi, Ali — Broadcom

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

Missing Eye Width at TP4

SuggestedRemedy

Please add EW 1E-15 to the table with value of 0.57 UI

Response *Response Status* **C**

REJECT.

Eye width is not an appropriate parameter for a reciever.

Total input jitter tolerance is already a parameter for the stressed receiver test in Table 83E-6

[Editor's note: Subclause changed from 3.3.1 to 83E.3.3.1]

Cl **83E** *SC* **83E.3.3.1** *P* **165** *L* **23** # 219

Dawe, Piers — IPtronics

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

A BER spec of 1e-15 is too expensive to measure (takes too long), is not consistent with the project BER objective of 1e-12, and is completely wrong for 100GBASE-SR4 which uses FEC. Even 1e-13 is overkill because it's not feasible to manufacture links with consistently bad and uniform SNR, so links approaching the spec limit will be rare, so the chances of seeing several at-limit links in series are negligible. Hence the limit for CAUI-4 is 1e-12. But if folks aren't convinced by that, then a spec of 1e-13 means a test time of "only" several minutes rather than days.
The existence of a market for more-than-Ethernet equipment is no excuse for us getting this wrong.

SuggestedRemedy

Change 1e-15 to two options: 1e-13 for non-RS-FEC use and 1e-6 for with-RS-FEC use.

Response *Response Status* **C**

REJECT.

Extrapolating to 1E-15 can be performed relatively quickly. 1e-6 is not the BER for the CAUI-4 electrical link
Motion #3 from the Victoria meeting in May 2013 set the BER objective for CAUI-4 as per slide 4 of latchman_02_0513_optx

The task force conducted the straw poll:
Do you support changing the BER requirement in 83E.3.3.1 away from 1E-15?
Yes:2
No:7

Cl **83E** *SC* **83E.3.3.1** *P* **165** *L* **27** # 110

Petrilla, John — Avago Technologies

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

In Table 83E-5 the attribute, "Differential pk-pk input amplitude tolerance (min)", while useful for signal integrity considerations is not as useful for voltage breakdown or withstand considerations. A differential voltage tolerance is better in this regard. By the way, here the word "amplitude" is used, why not "voltage" as in table 83E-1?

SuggestedRemedy

Add to table 83E-5 a "Differential input voltage tolerance, absolute value (min)," with a min of 450 mV
Change, "Differential pk-pk input amplitude tolerance (min)" to "Differential pk-pk input voltage tolerance (min)"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change:
"Differential pk-pk input amplitude tolerance (min)" to:
"Differential pk-pk input voltage tolerance (min)"

Cl **83E** *SC* **83E.3.3.1** *P* **165** *L* **37** # 111

Petrilla, John — Avago Technologies

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

The statement, "The CAUI-4 receiver shall operate at a bit error ratio (BER) better than 10-15." needs qualifications. See also 83E.3.4.1.

SuggestedRemedy

Change, "The CAUI-4 receiver shall operate at a bit error ratio (BER) better than 10-15." to "The CAUI-4 chip-module host receiver shall operate at a bit error ratio (BER) better than 10-15 for signals defined by Table 83-5 and 83E.3.3.3."
Repeat in 83E.3.4.1 with appropriate adjustments for chip-module module receiver.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change:
"The CAUI-4 receiver shall operate at a bit error ratio (BER) better than 10-15." to:
"The CAUI-4 chip-to-module host receiver shall operate at a bit error ratio (BER) better than 10-15 for an input signal defined by 83E.3.3.3."

Repeat in 83E.3.4.1 with appropriate adjustments for module receiver.

Cl **83E** *SC* **83E.3.3.1** *P* **165** *L* **37** # 20

Arumugham, Vinu — Cisco

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

Add MTTFPA statement.

SuggestedRemedy

Add "Maximum BER assumes errors are not correlated to ensure a sufficiently high mean time to false packet acceptance (MTTFPA) assuming 64B/66B coding. Actual implementation of the receiver is beyond the scope of the standard"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add "Maximum BER assumes errors are not correlated to ensure a sufficiently high mean time to false packet acceptance (MTTFPA) assuming 64B/66B coding. Actual implementation of the receiver is beyond the scope of this standard"

to table 83E-5 and 83E-8

Also, in note a to Table 83D-4 change "the standard" to "this standard"

Cl **83E** *SC* **83E.3.3.2** *P* **165** *L* **42** # 9

Arumugham, Vinu — Cisco

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

Remove unrelated sentence.

SuggestedRemedy

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

Response *Response Status* **C**

ACCEPT.

Cl **83E** *SC* **83E.3.3.2** *P* **167** *L* **36** # 10

Arumugham, Vinu — Cisco

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

Reference to Table 88-13. Table does not seem to exist?

SuggestedRemedy

Should it refer to table 83D-4 instead?

Response *Response Status* **C**

REJECT.

Table 88-13 exists in IEEE Std 802.3-2012

Cl **83E** *SC* **83E.3.3.3** *P* **167** *L* **32** # 220

Dawe, Piers IPtronics

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

Need a sensible spec for use with RS-FEC.

SuggestedRemedy

Use two columns with BER max 1e-6 and 1e-13.
For 1e-6, specify EW6 and EH6. For now, use the limits that OIF uses for EW15 and EH15 - this gives all the benefit of a more reasonable BER limit to the input, but at least it's better than doing nothing.
For 1e-13, specify EW13 and EH13. Also use the limits that OIF uses for EW15 and EH15.
Similarly for module stressed input (Table 83E-9).

Response *Response Status* **C**

REJECT.

See also the response to comment #219 for a straw poll on a similar issue

Electrical interface specifications are independent of RS-FEC.
Motion #3 from the Victoria meeting in May 2013 set the BER objective for CAUI-4 as per slide 4 of latchman_02_0513_optx

Cl **83E** *SC* **83E.3.3.3** *P* **167** *L* **34** # 57

Latchman, Ryan Mindspeed

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

Table 83E-6-Host stressed receiver parameters are TBD. Minimum total input jitter tolerance should be changed to eye width

SuggestedRemedy

Change Minimum total input jitter tolerance to eye width with a value of 0.57UI
Change eye height value from TBD to 228mV
make associated change to section 83E.3.3.3.1 Host stressed receiver test procedure:
...and minimum input jitter tolerance given in Table 83E-6 using the reference receiver...
to
...and eye width given in Table 83E-6 using the reference receiver...

Response *Response Status* **C**

ACCEPT.

Cl **83E** *SC* **83E.3.3.3.1** *P* **168** *L* **39** # 214

Dawe, Piers IPtronics

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

Table has an entry for DCD. Do you mean DCD or EOJ? Anyway, how is this to be generated?

SuggestedRemedy

Delete the row. Similarly in Table 83E-10.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

DCD is the intended term
Change:
"DCD" to "Max DCD"
In both Table 83E-7 and 83-10

Cl **83E** *SC* **83E.3.3.3.1** *P* **168** *L* **47** # 11

Arumugham, Vinu Cisco

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

Add a condition to the crosstalk sources.

SuggestedRemedy

Add "Each signal shall use a different PRBS31 seed."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change:
The pattern is changed to PRBS31 for the stressed receiver test

to

The pattern is changed to pattern 5 (with or without FEC encoding) pattern 3 or a valid 100GBASE-R signal for the stressed receiver test. For the case of pattern 3, with at least 31 UI delay between the PRBS31 patterns on one lane and any other lane."

With editorial license (include any one is sufficient)

Cl **83E** *SC* **83E.3.4** *P* **169** *L* **10** # 127

Brown, Matt APM

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

Table 83E-8 is a summary table. It is not normative. Each summarized parameter requires a relevant description and normative requirement statement.

Signalling rate and unit interval refer to a subclause for transmitter requirements. The subclause is written generically (not refering to receiver or transmitter) so this might be okay.

Input amplitude tolerance refers to transmitter output requirements, written very specifically as such. A receiver input subclause with appropriate normative language must be add.

A reference to the stressed receiver test in 83.3.4.2 should be include in the table. The value and units can be left blank.

The differential mismatch refers to a transmitter specification. This is written generically, so may be okay.

SuggestedRemedy

Write new subclause for "Differential pk-pk input amplitude tolerance" and update subclause reference in Table 83E-8.

Add new row and add a reference to "module stressed receiver test" with reference to 83E.3.4.2 and with value/units left blank.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add new row for "Module stressed receiver test" with reference to 83E.3.4.2 and with value "See 83E.3.4.2" and units left blank.

Make Tables 83D-1, 83D-3, 83D-4, 83E-1, 83E-3, 83E-5, 83E-6, 83E-8 and 83E-9 normative.
Adjust PICS
with editorial licence

Cl **83E** *SC* **83E.3.4** *P* **169** *L* **13** # 114

Petrilla, John Avago Technologies

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

In Table 83E-8 the attribute, "Differential pk-pk input amplitude tolerance (min)", while useful for signal integrity considerations is not as useful for voltage breakdown or withstand considerations. A differential voltage tolerance is better in this regard. By the way, here the word "amplitude" is used, why not "voltage" as in table 83E-1?

SuggestedRemedy

Add to table 83E-8 a "Differential input voltage tolerance, absolute value (min)," with a min of 450 mV
Change, "Differential pk-pk input amplitude tolerance (min)" to "Differential pk-pk input voltage tolerance (min)"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change, "Differential pk-pk input amplitude tolerance (min)" to "Differential pk-pk input voltage tolerance (min)"

Cl **83E** *SC* **83E.3.4** *P* **169** *L* **14** # 115

Petrilla, John Avago Technologies

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

Table 83E-8 does not include single-ended voltage tolerance specs that would define the min input withstand capability of the module receiver. Differential and common mode specs are provided but neither are as meaningful.

SuggestedRemedy

Add to Table 83E-8, single-ended voltage tolerance specs, one a max with a value of 2.8 V and another a min with a value of -0.3 V.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add to Table 83E-8, single-ended voltage tolerance specs, one a max with a value of 3.3 V and another a min with a value of -0.8 V. Subclause reference: 83E.3.1.2

Cl **83E** *SC* **83E.3.4.2** *P* **169** *L* **42** # 58

Latchman, Ryan — Mindspeed

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

Table 83E-9-Module stressed receiver parameters are TBD. Minimum total input jitter tolerance should be changed to eye width

SuggestedRemedy

Change Minimum total input jitter tolerance to eye width with a value of 0.46UI
Change eye height value from TBD to 95mV
make associated change to section 83E.3.4.2.1 Module stressed receiver test procedure:
Random jitter and variable gain are adjusted to result in the minimum eye height and minimum
total input jitter tolerance given in Table 83E-9 using the reference receiver.
to
Random jitter and variable gain are adjusted to result in the minimum eye height and eye width given in Table 83E-9 using the reference receiver

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change Minimum total input jitter tolerance to eye width with a value of 0.46 UI
Change eye height value from TBD to 95 mV
make associated change to section 83E.3.4.2.1 Module stressed receiver test procedure:
Random jitter and variable gain are adjusted to result in the minimum eye height and minimum total input jitter tolerance given in Table 83E-9 using the reference receiver.
to
Random jitter and variable gain are adjusted to result in the eye height and eye width given in Table 83E-9 using the reference receiver.

See also comment #143

Cl **83E** *SC* **83E.3.4.2** *P* **169** *L* **42** # 143

Ghiasi, Ali — Broadcom

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

Table 83E-9 module stress receiver paramters missing

SuggestedRemedy

Minimum total input jitter 1E-15 = 0.54 UI
Eye Height 1E-15 = 95 mV

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #58

[Editor's note: Subclause changed from 3.4.2 to 83E.3.4.2]

Cl **83E** *SC* **83E.3.4.2** *P* **169** *L* **43** # 12

Arumugham, Vinu — Cisco

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

Reference to Table 88-13. Table does not seem to exist?

SuggestedRemedy

Should it refer to table 83D-4 instead?

Response *Response Status* **C**

REJECT.

Table 88-13 exists in IEEE Std 802.3-2012

Cl **83E** *SC* **83E.3.4.2.1** *P* **170** *L* **52** # 21

Arumugham, Vinu — Cisco

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

Add a condition to the crosstalk sources.

SuggestedRemedy

Add "Each signal shall use a different PRBS31 seed."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change:
The pattern is changed to PRBS31 for the stressed receiver test

to

The pattern is changed to pattern 5 (with or without FEC encoding) pattern 3 or a valid 100GBASE-R signal for the stressed receiver test. For the case of pattern 3, with at least 31 UI delay between the PRBS31 patterns on one lane and any other lane."

With editorial license (include any one is sufficient)

Cl **83E** *SC* **83E.4** *P* **171** *L* **13** # 128

Brown, Matt APM

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

section should be subclause (or should it be subannex?)

in 802.3-2012, section is a volume of subclauses

SuggestedRemedy

On line 13, change "section" to "subclause".

On line 14 delete two instance of "section".

Elsewhere...

On page 123, line 43, change "section" to "subclause"

On age 141, lines 5 and 7, delete "section" (two instances)

In figure 83D-1, footnote b, delete "section"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the text in 83E.4 to:
"This subclause describes common measurement tools and methodologies to be used for the CAUI-4 chip-to-module interface. Details of HCB and MCB characteristics are given in 83E.4.1 and details of the eye diagram measurement methodology are given in 83E.4.2".

On page 123, line 43, change "section" to "subclause"
On age 141, lines 5 and 7, delete "section" (two instances)
Table 83D-1, footnote b is proposed to be removed by comment #62. If it is not deleted, then delete "section"

Cl **83E** *SC* **83E.4.2** *P* **171** *L* **27** # 221

Dawe, Piers IPtronics

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

Reference receiver also includes a fourth-order Bessel-Thomson filter (see another comment).

SuggestedRemedy

Include the fourth-order Bessel-Thomson filter.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add the following statement to 83E.4.2:

Change:
Eye diagrams in CAUI-4 chip to module are measured using a reference receiver which contains a selectable
continuous time linear equalizer (CTLE) to measure eye height and width.

To:

Eye diagrams in CAUI-4 chip-to-module are measured using a reference receiver. The reference receiver includes a fourth-order Bessel-Thomson low-pass filter response with 33 GHz 3 dB bandwidth, and a selectable
continuous time linear equalizer (CTLE) to measure eye height and width.

Cl **83E** *SC* **83E.4.2** *P* **171** *L* **28** # 13

Arumugham, Vinu Cisco

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

width spelling.

SuggestedRemedy

Change "eye with" to "eye width".

Response *Response Status* **C**

ACCEPT.

See also comment #113

Cl **83E** *SC* **83E.4.2** *P* **171** *L* **28** # 113

Petrilla, John Avago Technologies

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

"eye with" should be "eye width"

SuggestedRemedy

Change "eye with" to "eye width"

Response *Response Status* **C**

ACCEPT.
see also comment #13

Cl **83E** *SC* **83E.4.2** *P* **171** *L* **32** # 59

Latchman, Ryan Mindspeed

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

Number of bits to generate CDF is TBD

SuggestedRemedy

change to "Collect sufficient
samples equivalent to at least 4 million bits to allow..."

Response *Response Status* **C**

ACCEPT.

Cl **83E** *SC* **83E.4.2** *P* **171** *L* **33** # 129

Brown, Matt APM

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

I am not clear on what "equivalent to at least TBD bits means". Its the word "equivalent" that is throwing me off. Does this mean spanning at least TBD bits? Or there an assumption of a non-continuous (e.g., not real time) sampling such as when using a sampling scope?

SuggestedRemedy

Express "equivalent to at least TBD bits" more clearly.

Response *Response Status* **C**

REJECT.

Please suggest clearer wording

Cl **83E** *SC* **83E.4.2** *P* **171** *L* **36** # 112

Petrilla, John Avago Technologies

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

Item 3) states, "Use the differential equalized signal from step 2 ...", but step 2 doesn't provide instruction, e.g. maximize eye height, regarding equalization. This can lead to inconsistent results.

SuggestedRemedy

Change Item 2 from "Apply respective reference receiver CTLE to captured signal" to "Apply respective reference receiver CTLE to captured signal to maximize the eye opening, e.g. normalized eye height + normalized eye width"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change Item 2 from:
"Apply respective reference receiver CTLE to captured signal" to:
"Apply respective reference receiver CTLE to captured signal. Any single CTLE setting which meets both eye width and eye height requirements is acceptable."

Cl **83E** *SC* **83E.4.2** *P* **171** *L* **41** # 14

Arumugham, Vinu Cisco

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

CDRFR

SuggestedRemedy

Change "CDRFR" to "CDFR".

Response *Response Status* **C**

ACCEPT.

Change "CDRFR" to "CDFR".

Cl **83E** *SC* **83E.4.2** *P* **171** *L* **48** # 215

Dawe, Piers — IPtronics

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

The project's overall BER objective is 1e-12, so 1e-13 is more than good enough for CAUI (see another comment) and it has been difficult to find suitable eye height and width limits for a non-OIF BER. But we can adjust the extrapolation to be more appropriate.

SuggestedRemedy

Instead of using EW15, use EW13 (extrapolated by same method, change 3.19 to 2.60) if not protected by RS-FEC, use EW6 (no extrapolation need) if protected by RS-FEC.

Response *Response Status* **C**

REJECT.

See Response to comment #219 for a straw poll on a similar issue.

CAUI-4 chip-to-module electrical interface specifications are independent of RS-FEC. Motion #3 from the Victoria meeting in May 2013 set the BER objective for CAUI-4 as per slide 4 of latchman_02_0513_optx

---

Cl **83E** *SC* **83E.5.4.1** *P* **174** *L* **32** # 35

Dove, Dan — AppliedMicro

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

References 83E.3.3.2

SuggestedRemedy

Reference 83E.3.1.3

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the subclause for item TH7 to 83E.3.1.3

Cl **83E** *SC* **83E.5.4.1** *P* **174** *L* **40** # 36

Dove, Dan — AppliedMicro

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

References 83E.3.3.2

SuggestedRemedy

Reference 83E.3.1.5

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the subclause for item TH10 to 83E.3.1.5

Cl **83E** *SC* **83E.5.4.2** *P* **175** *L* **15** # 30

Dove, Dan — AppliedMicro

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

References 83E.3.3.2

SuggestedRemedy

Reference 83E.3.1.3

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change the subclause for item TM5 to 83E.3.1.3
[Editor's note: Page changed from 174 to 175]

Cl **83E** *SC* **83E.5.4.2** *P* **175** *L* **22** # 31

Dove, Dan — AppliedMicro

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

References 83E.3.3.2

SuggestedRemedy

Reference 83E.3.1.5

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the subclause for item TM8 to 83E.3.1.5
[Editor's note: Page changed from 174 to 175]

Cl **83E** *SC* **83E.5.4.2** *P* **175** *L* **22** # 32

Dove, Dan — AppliedMicro

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

Exposing my ignorance, the spec says "The transition time shall be greater than or equal to 9.5 ps." There are many values that would fit that spec yet lead to failure of operation. Am I mis-reading this?

SuggestedRemedy

Reconsider the wording to limit rise-time more clearly. If appropriate, revise all instances and PICs items as required.

Response *Response Status* **C**

REJECT.

Maximum rise fall time is limited by output jitter and eye height. Minimum is specified to limit crosstalk.
See also comment 38
[Editor's note: Subclause changed from 4 to 83D.4]

Cl **83E** *SC* **83E.5.4.3** *P* **175** *L* **42** # 33

Dove, Dan AppliedMicro

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

References 83E.3.1.2

SuggestedRemedy

Reference 83E.3.3.2

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the subclause for item RH4 to 83E.3.3.2

Cl **83E** *SC* **83E.5.4.4** *P* **176** *L* **12** # 34

Dove, Dan AppliedMicro

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

References 83E.3.1.2

SuggestedRemedy

Reference 83E.3.3.2

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the subclause for item RM4 to 83E.3.3.2

Cl **85** *SC* **85.13** *P* **63** *L* **44** # 37

Dove, Dan AppliedMicro

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

Item=CAUI Should that not say CAUI-n?

SuggestedRemedy

If appropriate, change to CAUI-n?

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
While the PICS item identifiers are simply short identifying codes for the PICS items, comment #170 has changed the equivalent item identifiers for Clauses 92, 93, and 94 to CAUI-10. Also, comment #186 has changed the Feature to CAUI-10.

In 85.13.3, change the Item to "CAUI-10"

Cl **85** *SC* **85.13.3** *P* **63** *L* **44** # 164

Dudek, Mike QLogic

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

If the CAUI-n extension is used for the system it would be useful to know whether the system is capable of CAUI-10 or CAUI-4 or both.

SuggestedRemedy

Change the item to read "CAUI-10" and if my comment 2 (for line 25 and 26) on this page is not accepted then insert another row for CAUI-4. that is also optional.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #186

Cl **85** *SC* **85.3** *P* **63** *L* **25** # 186

Dudek, Mike QLogic

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

It would be rather strange to use CAUI4 for the 10 lane 100GBASE-CR10, and Table 85-1 does not refer to CAUI-4

SuggestedRemedy

Consider whether this should be changed from "CAUI-n" to "CAUI-10" on lines 25 and 26.
If this is not changed to CAUI-10 then in table 85-1 add an additional row 83D-CAUI-4, Not applicable, Optional.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
In 85.3 change 2 instances of CAUI-n to CAUI-10

In 85.13.3 change CAUI-n to CAUI-10

Cl **86** *SC* **86.8.4.7** *P* **66** *L* **10** # 165

Dudek, Mike QLogic

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

There is an inconsistency between Table 86-1 and this paragraph. Table 86-1 allows for the use of CAUI-4, but that is not covered in this paragraph.

SuggestedRemedy

Either change "CAUI-10" to "CAUI-4" on line 10 and add "or the requirements in table 83-3 for CAUI-4" to the end of the paragraph.
Or
Delete the CAUI-4 row from Table 86-1

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change item h) to:
"Where nPPI or XLAUI/CAUI-n is exposed, a PMD receiver is considered compliant if it meets the module electrical output specifications at TP4 given in Table 86A-3 for nPPI, or the requirements in Table 83B-3 for XLAUI/CAUI-10, or the requirements in Table 83E-3 for CAUI-4."

Cl **87** *SC* **87.1** *P* **67** *L* **34** # 166

Dudek, Mike QLogic

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

XLPPI should be optional for 40GBASE-ER4. It certainly isn't required and there is no reason that it would not be optional.

SuggestedRemedy

Replace the "TBD" with "Optional"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
This comment was discussed on the June 25 SMF Ad Hoc call with the consensus of the meeting being that since the specification for 40GBASE-ER4 is already challenging and there have been no presentations to date which show that operation with unretimed interfaces is practical for this PMD:

Replace "TBD" with "Not applicable"

Cl **87** *SC* **87.1** *P* **67** *L* **48** # 39

Dove, Dan AppliedMicro

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

"fast wake Low Power Idle (LPI) mode" I cannot find a reference to this FWLPI mode. I can find various references to fast wake, fast wake mode, etc. It seems like inconsistent terminology related to fast wake Low Power Idle (LPI) mode.

SuggestedRemedy

Define Deep Sleep and Fast Wake LPI mode in an appropriate definition table/location and then use consistent naming for each.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The terms "deep sleep", "fast wake" and "LPI" are all defined in Clause 78 as modified by the P802.3bj draft and Clause 78 is already referenced in this paragraph.
To clarify the wording, change:
"... PHYs with the optional Energy Efficient Ethernet (EEE) capability may optionally enter the fast wake Low Power Idle (LPI) mode to ..." to:
"... PHYs with the optional Energy Efficient Ethernet (EEE) fast wake capability may optionally enter the Low Power Idle (LPI) mode to …"

Cl **87** *SC* **87.11.1** *P* **77** *L* **25** # 93

Maguire, Valerie Siemon

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

Missing a noun.

SuggestedRemedy

Insert "optical fiber" as shown:

"Using 0.5 dB/km optical fiber may not support operation at 10 km for 40GBASE-LR4 or 40 km for 40GBASE-ER4."

Response *Response Status* **C**

REJECT.
This text is from the base standard and is consistent with that in Table 52-25, Table 53-14, and Table 88-15.
If this text is to be changed, then this would be more appropriate to be via a maintenance request against all four instances and should propose text in line with maintenance request 1213 to be clear that this is a cabled fiber loss.
[Editor's note: Clause changed from 00 to 87]

Cl **87** *SC* **87.3.1** *P* **68** *L* **51** # 167

Dudek, Mike QLogic

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

The sum of the delays shouldn't be for 40GBASE-LR4 AND 40GBASE-ER4, as this implies the delay of two concatenated links.

SuggestedRemedy

Change "and" to "or".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the wording to be consistent with that in Clause 88:
"... by the 40GBASE-LR4 or 40GBASE-ER4 PMD including 2 m of fiber ..."

Cl **87** *SC* **87.7** *P* **70** *L* **17** # 40

Dove, Dan AppliedMicro

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

I'm not sure I agree with "(e.g., a 40GBASE-LR4 PMD operating at 12.5 km meets the operating range requirement of 2 m to 10 km)."

SuggestedRemedy

Restate: "(e.g., a 40GBASE-LR4 PMD capable of operating on a 12.5 km channel meets the operating range requirement of 2 m to 10 km)."

Response *Response Status* **C**

REJECT.
The existing wording comes from the base standard and is consistent with the wording in 52.5, 86.7, 88.7, 89.6, and 95.7

Cl **87** *SC* **87.7** *P* **70** *L* **20** # 76

Anslow, Pete Ciena

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

The editor's note:
[Editor's note (to be removed prior to publication) - conditions for inter-working between LR4 and ER4 to be added here.]
should be replaced by appropriate text.

SuggestedRemedy

Add text to describe the requirements for interworking between 40GBASE-LR4 and 40GBASE-ER4.

See associated presentation from the SMF Ad Hoc

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
This comment was discussed on the June 25 SMF Ad Hoc call in association with anslow_02a_0613_smf. The consensus of the meeting was as below:

Insert text in 87.7 that points to a new subclause 87.12 saying that this is an engineered link and the requirements are as for 40GBASE-LR4 with the exception of the channel insertion losses max and min which are in a new table similar to that on page 5 of anslow_02a_0613_smf, all with editorial licence.

Cl **87** *SC* **87.7.1** *P* **71** *L* **10** # 92

Maguire, Valerie Siemon

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

Incorrect receive reference in table header.

SuggestedRemedy

Change: "Table 87-8-40GBASE-LR4 and 100GBASE-ER4 transmit characteristics" to "Table 87-8-40GBASE-LR4 and 40GBASE-ER4 transmit characteristics"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
In the title of Table 87-7 change "100GBASE-ER4" to "40GBASE-ER4"

[Editor's note: Clause changed from 00 to 87]

Cl **87** *SC* **87.7.1** *P* **71** *L* **5** # 89

Maguire, Valerie — Siemon

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

Merging the two sentences in this clause would read more clearly and reinforce the idea that the same specifications and definitions apply to both transmitters.

SuggestedRemedy

Change line 5 to: The 40GBASE-LR4 transmitter and 40GBASE-ER4 transmitter shall meet the specifications defined in Table 87-7 per the definitions in 87.8.

Delete the second sentence beginning on line 6.

Response *Response Status* **C**

REJECT.
This matches the equivalent sentences in 88.7.1. The two separate "shall" statements correspond with two separate PICS items:
XLLR1 in 87.12.4.3 for 40GBASE-LR4
XLER1 in 87.12.4.3a for 40GBASE-ER4

[Editor's note: Clause changed from 00 to 87]

Cl **87** *SC* **87.7.2** *P* **72** *L* **22** # 80

King, Jonathan — Finisar

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

Table 87-8, "Average receive power, each lane (max)" and "Receive power each lane (OMA) (max)", and Table 87-14 "channel insertion loss (min)".

To allow APD implementations, the max receive power values in Table 87-8 need to be reduced to accommodate the practical limitations of APD receivers. The proposed remedy was described and discussed in the smf ad hoc (see king_02_0613_smf) and met with no objections.

SuggestedRemedy

Table 87-8: Reduce 40GBASE-ER4 'Receive power, each lane (OMA) (max)' value to -4 dBm (from -1 dBm); Reduce 40GBASE-ER4 'Average receive power, each lane (max)' value to -4.5 dBm (from -1.5 dBm)
Table 87-14: Increase 'Channel insertion loss (min)' to 9 dB.

Response *Response Status* **C**

ACCEPT.
This proposal was discussed on the SMF Ad Hoc calls 28 May, 11 June and 18 June, with no objection to the values proposed.

Implement as Suggested Remedy

Cl **87** *SC* **87.7.2** *P* **72** *L* **5** # 90

Maguire, Valerie — Siemon

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

Merging the two sentences in this clause would read more clearly and reinforce the idea that the same specifications and definitions apply to both receivers.

SuggestedRemedy

Change line 5 to: The 40GBASE-LR4 receiver and 40GBASE-ER4 receiver shall meet the specifications defined in Table 87-8 per the definitions in 87.8.

Delete line 6.

Response *Response Status* **C**

REJECT.
This matches the equivalent sentences in 88.7.2. The two separate "shall" statements correspond with two separate PICS items:
XLLR2 in 87.12.4.3 for 40GBASE-LR4
XLER2 in 87.12.4.3a for 40GBASE-ER4

[Editor's note: Clause changed from 00 to 87]

Cl **87** *SC* **87.7.2** *P* **72** *L* **9** # 91

Maguire, Valerie — Siemon

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

Incorrect receive reference in table header.

SuggestedRemedy

Change: "Table 87-8-40GBASE-LR4 and 100GBASE-ER4 receive characteristics" to "Table 87-8-40GBASE-LR4 and 40GBASE-ER4 receive characteristics"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
In the title of Table 87-8 change "100GBASE-ER4" to "40GBASE-ER4"

[Editor's note: Clause changed from 00 to 87]

Cl **87** *SC* **87.7.3** *P* **73** *L* **14** # 49

Anslow, Pete — Ciena

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

The value for the "Power budget (for max TDP)" is missing for 40GBASE-ER4.
This should be 18.5 + 2.6 = 21.1 dB

SuggestedRemedy

add the value "21.1" to the cell (in underline font)

Response *Response Status* **C**

ACCEPT.

Cl **87** *SC* **87.7.3** *P* **73** *L* **14** # 168

Dudek, Mike — QLogic

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

The power budget should be included for 40GBASE-ER4 in table 87-9

SuggestedRemedy

Insert 21.1 for the power budget row for 40GBASE-ER4 (This is the sume of the channel insertion loss plus the allocation for penalties.)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #49

Cl **87** *SC* **87.7.3** *P* **73** *L* **18** # 169

Dudek, Mike — QLogic

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

In table 87-9 the channel insertion loss is not calculated per footnote b for the 40km link and therefore it is incorrect to apply footnote b to the parameter column.

SuggestedRemedy

Move footnote b reference to the LR4 and 30km columns of this row. Add footnote a to the 40km row. Consider deleteing footnote a from the distance row.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Apply the footnote b reference to the "6.7" and "16.5" values in the Channel insertion loss row instead of the parameter name.

Leave footnote a applied to the "40" for 40GBASE-ER4 operating distance and also apply it to the "18.5" value in the Channel insertion loss row.

Cl **88** *SC* **88.1** *P* **81** *L* **41** # 41

Dove, Dan — AppliedMicro

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

"fast wake Low Power Idle (LPI) mode" I cannot find a reference to this FWLPI mode. I can find various references to fast wake, fast wake mode, etc. It seems like inconsistent terminology related to fast wake Low Power Idle (LPI) mode.

SuggestedRemedy

Define Deep Sleep and Fast Wake LPI mode in an appropriate definition table/location and then use consistent naming for each.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The terms "deep sleep", "fast wake" and "LPI" are all defined in Clause 78 as modified by the P802.3bj draft and Clause 78 is already referenced in this paragraph.
To clarify the wording, change:
"... PHYs with the optional Energy Efficient Ethernet (EEE) capability may optionally enter the fast wake Low Power Idle (LPI) mode to ..." to:
"... PHYs with the optional Energy Efficient Ethernet (EEE) fast wake capability may optionally enter the Low Power Idle (LPI) mode to …"

Cl **91** *SC* **91.5.2.7** *P* **85** *L* **22** # 22

Marris, Arthur — Cadence Design Syste

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

Remove space

SuggestedRemedy

Change:
RS(528, 514).
to:
RS(528,514).

Change:
RS(544, 514).
to:
RS(544,514).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
These two changes will be made as part of aligning the base text of the P802.3bm draft with changes made to the P802.3bj draft as it progresses. These two spaces were removed by comment #45 against D2.0 of P802.3bj.

Cl **92** *SC* **92.14.3** *P* **87** *L* **45** # 170

Dudek, Mike QLogic

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

It would be helpful to know whether the system is capable of supporting CAUI-10 or CAUI-4 or both.

SuggestedRemedy

Change "CAUI-n" to "CAUI-10" and add a row for CAUI-4 in the table. Do the same for clauses 93 and 94.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
In 92.14.3, change the Item code "CAUI" to "CAUI-10", change "CAUI-n" to "CAUI-10". Insert a new row immediately below that is the same except that "Item" is "CAUI-4" and "Feature" is "CAUI-4".
Make equivalent changes in 93.11.3 and 94.6.3

Cl **93** *SC* **93.3** *P* **89** *L* **44** # 42

Dove, Dan AppliedMicro

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

Item=CAUI Should that not say CAUI-n?

SuggestedRemedy

If appropriate, change to CAUI-n?

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #170

Cl **94** *SC* **94.3** *P* **91** *L* **44** # 43

Dove, Dan AppliedMicro

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

Item=CAUI Should that not say CAUI-n?

SuggestedRemedy

If appropriate, change to CAUI-n?

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #170

Cl **95** *SC* **95** *P* **93** *L* **1** # 203

Dawe, Piers IPtronics

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

We have now made enough decisions to see that 100GBASE-SR4 will have almost everything in common with 40GBASE-SR4.
It is essential that 100GBASE-SR4 and 40GBASE-SR4 are compatible and consistent with no unnecessary differences, which would add cost. The best way to ensure and demonstrate consistency is to use common specifications where appropriate. A careful review of Clause 95 and Clause 86 shows that almost everything can be common - in fact, 100GBASE-SR4 can be slotted into Clause 86 by adding columns to tables 86-1 2 6 (7) 8 9 12 and 13. (To show that this is practical, note that Fibre Channel habitually uses a PMD clause and tables with up to three signalling rates when the specification methodology is similar). It would still be practical to add any future 16 x 25G PMD into Clause 86.

SuggestedRemedy

Move the technical content of Clause 95 into Clause 87.

Response *Response Status* **C**

REJECT.
Clause 87 defines a single mode fibre PMD. But assuming clause 86 was intended : 40GBASE-SR4 and 100GBASE-SR4 run at different lane rates, they do not need to be compatible or spec aligned unless there is a compelling reason to do so (eg it would lead to lower cost, power, size of the PMD).

Most of the optical specs differ: Lane rate, use of RS-FEC, spectral width, TDP, SRS, SRS test conditions, TDP test conditions, retimed vs unretimed, BER, reach. It would be confusing and unnecessarily complex for the reader to combine 86 and 95.

Cl **95** *SC* **95** *P* **93** *L* **1** # 204

Dawe, Piers IPtronics

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

There are a variety of minor differences between the specification for 40GBASE-SR4 and this draft for 100GBASE-SR4. It looks like some are intentional, some are not (material copied from 40GBASE-LR4 that doesn't suit -SR4), and very few are necessary.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, find all these differences using a comparison tool, review each one, align Clause 95 to Clause 86 wherever practical, submit maintenance requests for Clause 86 where an improvement is desired. Also make greater use of references to Clause 86 rather than (not quite?) copying material.

Response *Response Status* **C**

REJECT.
The comments are noted and the editor looks forward to specific suggestions for changes to the content of the draft.

Cl **95** *SC* **95.1** *P* **93** *L* **46** # 205

Dawe, Piers IPtronics

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

Engineers hate 802.3 documents: very long and fragmented, full of jargon, hard to relate to their work. Leaving out the signposting text will make our efforts even less appreciated.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, insert the same signposting text as in Clause 86, in the equivalent place:
"Further relevant information may be found in Clause 1 (terminology and conventions, references, definitions and abbreviations) and Annex A (bibliography, referenced as [B1], [B2], etc.)."

At the end of 95.1 before 95.1.1, insert:
This clause is arranged as follows: following the overview and an abstract description of the PMD service interface, delay and Skew specifications, control and status variables and registers, a block diagram and high-level specification of the PMD functions, and lane assignments, 95.7 contains the optical specifications for 100GBASE-SR4. 95.8 defines optical parameters. 95.9 addresses safety, installation, environment and labeling, 95.10 defines the optical channel, and 95.11 contains the PICS.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
add
"Further relevant information may be found in Clause 1 (terminology and conventions, references, definitions and abbreviations) and Annex A (bibliography, referenced as [B1], [B2], etc.)."
to 95.1

Excellent signposting is included in the detailed list of contents.

Cl **95** *SC* **95.1** *P* **93** *L* **47** # 206

Dawe, Piers IPtronics

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

Give the reader a break! Put the key facts near the beginning of the clause, as in 86.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, insert:
The 100GBASE-SR4 PMD sublayer provides point-to-point 100 Gb/s Ethernet links over four pairs of multimode fiber, up to at least 100 m. Table 92-2 shows the primary attributes of this PMD type.
Table 95-2-Summary of 100GBASE-SR4

	100GBASE-SR4	Unit
Fiber type	50/125 um multimode, type A1a.2 a (OM3) or A1a.3 b (OM4)	
Number of fiber pairs	4	
Nominal wavelength	850	nm
Required operating range	0.5 to 70 for OM3	m
	0.5 to 100 for OM4 c	
Signaling rate, each lane	25.78125 +/-100 ppm	GBd

a Type A1a.2 (OM3) specified in IEC 60793-2-10. See 95.11.
b Type A1a.3 (OM4) specified in IEC 60793-2-10. See 95.11.

Response *Response Status* **C**

REJECT.
The suggested remedy appears to duplicate material which appears within the next few pages. Keeping the structure of this PMD clause the same as the structure of all of the other 40 and 100G PMD clauses (except Clause 86) helps the reader.

Cl **95** *SC* **95.1** *P* **93** *L* **48** # 44

Dove, Dan AppliedMicro

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

"fast wake Low Power Idle (LPI) mode" I cannot find a reference to this FWLPI mode. I can find various references to fast wake, fast wake mode, etc. It seems like inconsistent terminology related to fast wake Low Power Idle (LPI) mode.

SuggestedRemedy

Define Deep Sleep and Fast Wake LPI mode in an appropriate definition table/location and then use consistent naming for each.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
The terms "deep sleep", "fast wake" and "LPI" are all defined in Clause 78 as modified by the P802.3bj draft and Clause 78 is already referenced in this paragraph.

To clarify the wording, change:
" ... PHYs with the optional Energy Efficient Ethernet (EEE) capability may optionally enter the fast wake Low Power Idle (LPI) mode to ... " to:
" ... PHYs with the optional Energy Efficient Ethernet (EEE) fast wake capability may optionally enter the Low Power Idle (LPI) mode to … ".

Cl **95** *SC* **95.1.1** *P* **94** *L* **35** # 210

Dawe, Piers IPtronics

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

It's only in the receiver spec that BER shows up.

SuggestedRemedy

Move 95.1.1 to the definition of stressed receiver sensitivity.

Response *Response Status* **C**

REJECT.
The requirement for Clause 91 RS-FEC is referred to in Table 95-1 and Figure 95-1, so it makes sense to introduce the PMD BER requirement at this point in the clause. It is also consistent with the performance requirement appearing at this point in Clause 92, Clause 93 and Clause 94 in P802.3bj D2.1.

Cl **95** *SC* **95.1.1** *P* **94** *L* **40** # 132

Brown, Matt APM

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

The term "frame loss ratio" is used only once or twice in each clause. Use of an acronym is unnecessary. The acronym FLR is not defined in subclause 1.5. Clauses 92, 93, and 94 do not make use of the acronym FLR.

Also, in keeping with the style for clauses 92, 93, and 94 in 802.3bj, add a reference to the definition of frame loss ratio.

SuggestedRemedy

On line 40 change "frame loss ratio (FLR)" to "frame loss ratio (see 1.4.210a)"

On line 44 change "FLR" to "frame loss ratio".

Response *Response Status* **C**

ACCEPT.

Cl **95** *SC* **95.1.1** *P* **94** *L* **40** # 67

Warland, TIm AppliedMicro

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

Editor suggests a BER that will result in "error statistics that are sufficiently random" but provides no further guidance. Are we to take a vendor at their word when they say the error statistics are sufficiently random or shall we provide some guidance like the maximum number of consecutive errors or other requirements?

SuggestedRemedy

Provide guidance as to what constitutes sufficiently random error statistics

Response *Response Status* **C**

REJECT. [Editors note: Subclause changed from 1.1 to 95.1.1]
See also comment #188

95.1.1 says:
"The bit error ratio (BER) shall be less than 5 × 10^-5 provided that the error statistics are sufficiently random that this results in a frame loss ratio (FLR) of less than 6.2 × 10^-10 for 64-octet frames with minimum interpacket gap when processed according to Clause 91."

The FLR after Clause 91 processing is the defining criteria which determines whether the errors are 'sufficiently random'. If this was to be stated as a statistical requirement, it would be that the number of errored 10 bit symbols in a FEC codeword only exceeds 7 with a certain probability (calculated from the FLR). This does not seem to be any more helpful than the existing text.

In practice, the errors are expected to be random because receiver noise is expected to dominate error generation. If a vendors word is doubted, then applying Clause 91 FEC and counting lost frames is the way to check.

Cl **95** *SC* **95.1.1** *P* **94** *L* **43** # 188

Dawe, Piers IPtronics

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

Can we help the PMD implementor understand when his errors "are not sufficiently random"?

SuggestedRemedy

Add more text or references to help the PMD implementor.

Response *Response Status* **C**

REJECT.

See response to comment 67.

Cl **95** *SC* **95.10** *P* **10** *L* **38** # 202

Dawe, Piers IPtronics

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

The interaction between 95.10, Fiber optic cabling model, and 95.11, Characteristics of the fiber optic cabling (channel), seems un-optimum. 86.10, Optical channel, attempts to clean this up.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, reconcile the differences.

Response *Response Status* **C**

REJECT.

The relationship between these two subclauses is the same as for many existing PMD clauses.
The editor looks forward to specific suggestions for changes to the content of the draft.

Cl **95** *SC* **95.10** *P* **107** *L* **22** # 81

King, Jonathan Finisar

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

Table 95-10 , note a, "An additional 300 ps Skew Variation ..." : the 300 ps value was teleported in from clause 86. Recent analysis for 100m OM$ reach is shown in (kolesar_01_0613_mmf)

SuggestedRemedy

Change note a from "An additional 300 ps of Skew Variation ...." to "An additional X ps of Skew Variation ...." where X is the skew variation for 100m OM4 calculated in kolesar_01_0613_mmf

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment 86

Cl **95** *SC* **95.10** *P* **107** *L* **22** # 86

Kolesar, Paul CommScope

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

The value of 300 ps stated in Note "a" to table 95-12 is too low. This value must account for the maximum channel length of 100 m and the effect of maximal wavelength shift across lanes. See kolesar_01_0613_mmf for more details. Further, the units in Note "a" should ideally match those for the other skew parameters in Table 95-12. Also the sum of the Note "a" value and the value in Table 95-12 for Cabling Skew Variation must sum to the 2.8 ns allocation described in clause 95.3.2.

SuggestedRemedy

In Note "a" replace "300 ps" with "0.4 ns". Change the 2.5 ns value in Table 95-12 to 2.4 ns.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE. [Editor's note: Subclause changed from 10 to 95.10]
In Note "a" replace "300 ps" with "400 ps". Change the 2.5 ns value in Table 95-12 to 2.4 ns.

Cl **95** *SC* **95.11.3.2** *P* **109** *L* **20** # 87

Kolesar, Paul CommScope

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

The inset caption under right portion of the figure is made obsolete by the revision of IEC 61754-7 which is recast in part as 61754-7-1. This revision is in FDIS and defines new device receptacle interfaces that obsolete the current description in the caption which creates a device receptacle from an adapter interface. Recommend replacing the curent description with one that is directly intended for this purpose.

SuggestedRemedy

Replace inset caption on the right "MDI as a PMD receptacle meeting MPO adapter interface" with "MDI as active device receptacle with flat interface". Change the figure caption to "Figure 95-5 - MPO female plug with flat interface and MDI as an active device receptacle with flat interface".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace inset caption on the right "MDI as a PMD receptacle meeting MPO adapter interface" with "MDI". Change the figure caption to "Figure 95-5 - MPO female plug with flat interface and MDI".

[Editor's note: Clause changed from 96 to 95, Subclause changed from "Figure 95-5" to 95.11.3.2]

Cl **95** *SC* **95.11.3.2** *P* **109** *L* **25** # 88

Kolesar, Paul CommScope

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

A referenced performance specification has been revised and renumbered. IEC 61753-1-1 is now IEC 61753-1 and is a general and guidance document that defines environmental categories used by IEC 61753-022-2.

SuggestedRemedy

Change "IEC 61753-1-1" to "IEC 61753-1".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE. [Editor's note: Subclause changed from 11.3.2 to 95.11.3.2]

Change "IEC 61753-1-1" to "IEC 61753-1".

Also, insert a new reference in 1.3:
"IEC 61753-1:2007, Fibre optic interconnecting devices and passive components performance standard-Part 1: General and guidance for performance standards.".

Cl **95** *SC* **95.11.3.2** *P* **109** *L* **3** # 85

Kolesar, Paul CommScope

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

The reference to the IEC specificaiton is soon to be obsolete. A revised standard is currently entering FDIS stage. The interface designations in the FDIS are different from those currently stated. New interfaces for device receptacles are now defined that may be more appropriate. The new device receptacle for flat interface makes the present description of Figure 95-5 suboptimal.

SuggestedRemedy

Throughout this paragraph make the following changes. Replace all instances of "IEC 61754-7" with "IEC 61754-7-1". Replace "interface 7-3, the MPO adapter interface" with "interface 7-1-3: MPO adaptor interface - opposed keyway configuration, or interface 7-1-10: MPO active device receptacle, flat interface". Replace "interface 7-4, MPO female plug connector flat interface" with "interface 7-1-4: MPO female plug connector, flat interface for 2 to 12 fibres". All descriptive text folowing the interface numbers should be italicized for clarity. On line 7 delete "using an MPO adapter interface".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE. [Editor's note: Subclause changed from 11.3.2 to 95.11.3.2]

Implement the suggested remedy except on line 7 delete "as a PMD receptacle using an MPO adapter interface"

Also, insert a new reference in 1.3:
IEC 61754-7-1:201x, Fibre optic interconnecting devices and passive components-Fibre optic connector interfaces-Part 7-1: Type MPO connector family-Single fibre row.
With an Editor's note:
[Editor's note (to be removed prior to publication) - IEC 61754-7-1 is currently in IEC approval process, expected publication May 2014].

Cl **95** *SC* **95.12.4.1** *P* **112** *L* **9** # 200

Dawe, Piers IPtronics

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

The PMD is insulated from the PCS by the RS-FEC.

SuggestedRemedy

Change "Compatible with 100GBASE-R PCS and PMA" to "Compatible with 100GBASE-R RS-FEC and PMA".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change to:
"Compatible with 100GBASE-R RS-FEC, PCS, and PMA"

Cl **95** *SC* **95.12.4.4** *P* **114** *L* **30** # 201

Dawe, Piers IPtronics

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

As 95.8.1.1 says, stressed receiver sensitivity and receiver jitter tolerance are defined for an interface at the BER specified in 95.1.1 - not each lane separately. Need this for low test time/cost and ability to do FEC-aware testing.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, change "Each lane" to something appropriate, e.g. "Method of 52.9.9 with exceptions listed".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change "each lane" to "See 95.8.8"

Cl **95** *SC* **95.2** *P* **95** *L* **14** # 69

Warland, TIm AppliedMicro

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

". . . the PMA continuously sends four parallel bit streams to the PMD.". This is correct but insufficient. It would be more appropriate to say "The PMA continuously sends four parallel bit streams to the PMD. These four lanes operate synchronously to each other although the streams are not necessarily correlated."

SuggestedRemedy

Change text to: "The PMA continuously sends four parallel bit streams to the PMD. These four lanes operate synchronously to each other although the streams are not necessarily correlated."

Response *Response Status* **C**

REJECT. [Editors note: Subclause changed from 2 to 95.2]

This is a functional description rather than an analogue description. This section should not define the signals except in functional terms.

See also response to comment #68

Cl **95** *SC* **95.2** *P* **95** *L* **9** # 68

Warland, TIm AppliedMicro

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

". . . the PMA continuously sends four parallel bit streams to the PMD.". This is correct but insufficient. It would be more appropriate to say "The PMA continuously sends four parallel bit streams to the PMD. These four lanes operate synchronously to each other although the streams are not necessarily correlated."

SuggestedRemedy

Change text to "The PMA continuously sends four parallel bit streams to the PMD. These four lanes operate synchronously to each other although the streams are not necessarily correlated."

Response *Response Status* **C**

REJECT.
[Editor's note: Comment Type set to "T", Subclause changed from 2 to 95.2]

This is a functional description rather than an analogue description. This section should not define the signals except in functional terms.

See also response to comment #69

Cl **95** *SC* **95.3.2** *P* **95** *L* **40** # 207

Dawe, Piers IPtronics

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

Figure 80-4 and Figure 80-5 don't apply: we need Clause 91 "RS-FEC" and not more than 4 PMA lanes below it.

SuggestedRemedy

Change "Figure 80-4 and Figure 80-5" to Figure 80-5a".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change:
"and specified at the points SP1 to SP6 shown in Figure 80-4 and Figure 80-5." to:
"and specified at the points SP0 to SP7 shown in Figure 80-5a.".

Cl **95** *SC* **95.3.2** *P* **96** *L* **2** # 116

Petrilla, John — Avago Technologies

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

Subclause 87.8.2 which defines WDM PMD is referenced for skew & skew variation for a parallel PMD and 87.8.2 includes a reference to 86.8.3.2 (86 is also for a parallel PMD). It would be more relevant, simpler and less confusing to reference 86 instead of 87.

SuggestedRemedy

Change "measurements of Skew and Skew Variation are defined in 87.8.2 ..." to "measurements of Skew and Skew Variation are defined in 86.8.3.1 ..."

Response *Response Status* **C**

ACCEPT.

Cl **95** *SC* **95.5.1** *P* **97** *L* **13** # 133

Brown, Matt — APM

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

It is not ever specified or described whether the optical signals transmitted across a single fiber for all lanes or one fiber for each lane or over fiber at all.

Also, in figure 95-2, what appears to be four fibers are not labelled as such nor is the medium labelled.

Finally, in figure 95-2 it is redundant to put an ampersand (presumably) to represent the logical-and function inside of an AND symbol.

SuggestedRemedy

Add text explaining that each lane is transmitted across one of four fibers. As an example add the following between the first and second sentence: "The 100GBASE-SR4 PMD uses 4 lanes in each direction utilizing multiple-pair optics on multi-mode fiber."

In figure 95-2, add text labelling the four fibers as such including that this is the medium.

In figure 95-2, delete "&" in the AND block.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
In Figure 95-2, add label "Optical fiber cable"
(Ed note: this was omitted from Clause 86 in Figure 86-2).

Insert a new second sentence in 95.1:
"This PMD sublayer provides a point-to-point 100 Gb/s Ethernet link over four pairs of multimode fiber, up to at least 100 m."

The ampersand (&) within the AND symbol was introduced in clause 86, 87 , 88.
Since the document is to be used by readers with a range of disciplines and languages, a little redundancy is probably helpful.

Cl **95** *SC* **95.5.1** *P* **97** *L* **16** # 70

Warland, TIm — AppliedMicro

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

Figure 95-2 explicitly shows a retimer function. Table 95-1 calls the PMA 'Required' for 100GBASE-SR4. Does this mean that a retimer is always required as part of a 100GBASE-SR4 implementation? Will there ever be a case where the retimer is no longer required or integrated with the PCS layer?

SuggestedRemedy

Remove the text "part of PMA" for the retimer function in figure 95-2

Response *Response Status* **C**

REJECT.
[Editors note: Subclause changed from 1.1 to 95.5.1]

A PMA is always required, the layer diagram does not imply where this function resides.

Integrating the PMA with the PCS and RS-FEC functions is an allowed implementation but there is still a PMA sublayer present.

Cl **95** *SC* **95.5.2** *P* **97** *L* **50** # 71

Warland, TIm — AppliedMicro

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

"Higher optical power level in each signal stream shall correspond to tx_bit = one. This can be interpreted to be the logical one or the first bit in the bit stream. Correct to "Higher optical power level in each signal stream shall correspond to tx_bit = logic one"

SuggestedRemedy

Correct to "Higher optical power level in each signal stream shall correspond to tx_bit = logic one"

Response *Response Status* **C**

REJECT.
[Editors note: Subclause changed from 5.2 to 95.5.2]
Clause 95 follows the format of clauses 52, 68, 86, 87, 88.

Cl **95** *SC* **95.5.3** *P* **98** *L* **6** # 72

Warland, TIm — AppliedMicro

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

"Higher optical power level in each signal stream shall correspond to tx_bit = one." This can be interpreted to be the logical one or the first bit in the bit stream

SuggestedRemedy

Correct to "Higher optical power level in each signal stream shall correspond to tx_bit = logic one"

Response *Response Status* **C**

REJECT.
Since this refers to 95.5.3, the Editor assumes that commenter means rx_bit = one.
[Editor's note: Subclause changed from 5.3 to 95.5.3]
See response to comment 71.

Cl **95** *SC* **95.5.4** *P* **98** *L* **31** # 171

Dudek, Mike — QLogic

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

There is no parameter "receiver sensitivity (max)" in table 95-7. For clarity this should be changed to "stressed receiver sensitivity (max)" which is in table 95-7.

SuggestedRemedy

As per comment.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See also comments #208 and #94.

A compliant link can operate satisfactorily with receiver input powers below the stressed receiver sensitivity (max), so it is not appropriate to use this power as the threshold for SIGNAL_DETECT.

In Table 95-4 change:
"receiver sensitivity (max) in OMA in Table 95-7" to:
"average receive power, each lane (min) in Table 95-7".

Cl **95** *SC* **95.5.4** *P* **98** *L* **31** # 94

Petrilla, John — Avago Technologies

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

In Table 95-4, for OK, there's a condition, "Optical power at TP3 >/= receiver sensitivity (max) in OMA in Table 95-7" but there is no receiver sensitivity (max) in OMA in Table 95-7 or elsewhere in clause 95.

SuggestedRemedy

Add receiver sensitivity to table 95-7 or 95-8 and update the table 95-4 reference or delete this condition from the OK case.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to 171.

Cl **95** *SC* **95.5.4** *P* **98** *L* **31** # 208

Dawe, Piers — IPtronics

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

The maximum signal detect threshold should be the minimum compliant signal power at the receiver, which is not "receiver sensitivity (max) in OMA in Table 95-7)" - and Table 95-7 intentionally does not contain a "receiver sensitivity (max) in OMA".

SuggestedRemedy

If a
Table m-n-Characteristics of signal within, and at the receiving end of, a compliant optical channel
is available, change "receiver sensitivity (max) in OMA in Table 95-7" to "Minimum OMA, each lane, in Table m-n)", else to "stressed receiver sensitivity (OMA), each lane (max) in Table 95-7)".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to 171.

Cl **95** *SC* **95.5.4** *P* **98** *L* **33** # 95

Petrilla, John — Avago Technologies

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

In Table 95-4 for OK there's a condition,"compliant 100GBASE-R signal input", but above in row 19 there's an apparently contradiction statement, "PMD receiver is not required to verify whether a compliant 100GBASE-SR4 signal is being received"

SuggestedRemedy

Restate the OK condition to avoid the appartent conflict or remove the condition from Table 95-4.

Response *Response Status* **C**

REJECT.
See also comment #73.

The signal detect OK definition in Table 95-4 has an AND condition; the PMD is not required to assert SIGNAL_DETECT if the power is above the threshold when it is presented with a signal having strange characteristics (e.g. a large imbalance in the number of ones and zeros). In other words the SIGNAL_DETECT is only required to work properly when given a normal 100GBASE-R signal to detect - it doesn't have to work with any possible optical signal above that power.

Clause 95 follows the same format for this section as clauses 52, 86, 87, 88, and 89.

Cl **95** *SC* **95.5.4** *P* **98** *L* **33** # 73

Warland, TIm — AppliedMicro

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

Signal detect OK assigned when the input is a compliant 100GBASE-R signal input. While I understand the authors intention, implementers can not be required to check valid signal protocol for 100GBASE-R compliance.

SuggestedRemedy

Suggest changes to reflect a signal at the correct wavelength and operating rate as defined in table 95-6, but not full compliance with 100GBASE-R.

Response *Response Status* **C**

REJECT. [Editor's note: Subclause changed from 5.4 to 95.5.4]

See response to comment 95.

Cl **95** *SC* **95.6** *P* **100** *L* **5** # 25

Marris, Arthur — Cadence Design Syste

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

It is the RS-FEC that does lane re-ordering not the PCS.

SuggestedRemedy

Change to:
as the FEC is capable of receiving the lanes in any arrangement

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See also comment #172.

Change:
"as the PCS is capable of receiving the lanes in any arrangement" to:
"as the RS-FEC sublayer is capable of receiving the lanes in any arrangement".

Cl **95** *SC* **95.6** *P* **100** *L* **5** # 172

Dudek, Mike — QLogic

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

This system uses FEC and it is important that the FEC is capable of receiving the lanes in any arrangement.

SuggestedRemedy

Change "as the PCS is" to "as the PCS and RS-FEC are"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #25.

Cl **95** *SC* **95.7** *P* **100** *L* **15** # 209

Dawe, Piers — IPtronics

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

Missing signposting text.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, insert:
The optical signal at the transmit and receive side of the MDI is specified in 95.7.1 and 95.7.3. The range of optical signals within the optical medium is defined in 86.7.2, and an illustrative link power budget is provided in 95.7.4.

Response *Response Status* **C**

REJECT.
Repeating the contents list just before the optical Tx Rx and link budget tables appear just gets in the readers way.

Cl **95** *SC* **95.7** *P* **100** *L* **21** # 187

Ghiasi, Ali — Broadcom

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

It is assumed that RS-FEC latency is acceptable for all application and/or RS-FEC implementation has no impact in large system configuration. Also in HPC and high frequency trading market, customer will end up engineering their own link by turning off the FEC.

SuggestedRemedy

Add following reach reaches to table 95-5, 0.5-20 m for OM3 fiber when RS-FEC is off and 0.5-30 m on OM4 fiber when RS-FEC is off

Response *Response Status* **C**

REJECT. [Editors note: Subclause changed from 7 to 95.7]

A presentation with broad support showing modeling and/or experiments that demonstrate a working link can be guaranteed without FEC is invited.

Cl **95** *SC* **95.7** *P* **100** *L* **40** # 45

Abbott, John — Corning Incorporated

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

The RMS spectral width is given as 0.6nm
The spectral character of VCSEL lasers is not well characterized by an RMS spectral width. It consists of 'lines' with a certain spacing.
The models of the effect of spectral width do not necessarily take this into account. Some thought should be given to eventually Improving on RMS spectral width to characterize lasers

SuggestedRemedy

None. Comment is for reference/discussion only. Thanks!

Response *Response Status* **C**

REJECT.
No specific remedy; RMS spectral width has been used successfully as a link budget parameter for defining specifications of previous MMF PMDs.

Cl **95** *SC* **95.7.1** *P* **100** *L* **48** # 189

Dawe, Piers — IPtronics

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

40GBASE-SR4 has a peak power spec, which protects the receiver from overload. For compatibility as well as for 100GBASE-SR4 use, this spec should have the same limit.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, insert:
Peak power, each lane (max) 4 dBm
(as in Table 86-6). Also add it to Table 95-7 (receiver table).
If a clearer definition of peak power is needed, define peak power as the level at which an eye mask measurement would give the usual hit ratio (5e-5).

Response *Response Status* **C**

REJECT.
The need for a peak power spec has not been established, contributions on the need and the specification are invited.

Cl **95** *SC* **95.7.1** *P* **100** *L* **52** # 96

Petrilla, John — Avago Technologies

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

In Table 95-6 the constraint, "Difference in launch power between any two lanes (max)" is unnecessary and may increase the complexity and cost of transmitter tests. Removal of this constraint results in setting the aggressors (currently not defined) during the stressed receiver sensitivity test to max OMA.

SuggestedRemedy

Delete "Difference in launch power between any two lanes (max)" from Table 95-6 and insert into Table 95-7 as a "Conditions of stressed receiver sensitivity test: "OMA of each aggressor lane" the max OMA from Table 95-6.

Response *Response Status* **C**

ACCEPT.

Cl **95** *SC* **95.7.1** *P* **100** *L* **52** # 190

Dawe, Piers IPtronics

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

Put the rows in a more logical order and/or the same as Clause 86.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, move "Difference in launch power between any two lanes (max)" to just after the launch power max and min rows. Consider keeping "Average launch power of OFF transmitter, each lane (max)" just after it.

Response *Response Status* **C**

REJECT.
"Difference in launch power between any two lanes (max)" has been removed from table 95_7, by comment 96).

The existing ordering was based on the format of clauses 87 and 88.

Cl **95** *SC* **95.7.1** *P* **101** *L* **16** # 191

Dawe, Piers IPtronics

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

Table note b, first sentence "Average launch power, each lane (min) is informative and not the principal indicator of signal strength." is not true for these spec limits

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, delete table note b in this Table 95-6 and in Table 95-7 (receiver table).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Since the Average launch power, each lane (min) is higher than the OMA min limiting power with infinite extinction ratio, this is a normative requirement for the transmitter.
Delete footnote b in Table 95-6 but not in Table 95-7.

Cl **95** *SC* **95.7.1** *P* **101** *L* **7** # 97

Petrilla, John Avago Technologies

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

In Table 96-6, the Tx eye mask coordinates are TBD. See associated contribution, petrilla_01_0713_optx.

SuggestedRemedy

Replace Tx eye mask TBD with 0.23, 0.34, 0.43, 0.31, 0.39, 0.4

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace Tx eye mask TBD with X1 = 0.28 UI, X2 = 0.34 UI, X3 = 0.43 UI, Y1 = 0.36 UA, Y2 = 0.44 UA , Y3 = 0.4 UA

Cl **95** *SC* **95.7.2** *P* **101** *L* **42** # 98

Petrilla, John Avago Technologies

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

In Table 95-7 there are TBDs for stressed Rx sensitivity and its conditions. See associated contribution, petrilla_01_0713_optx.

SuggestedRemedy

Replace the TBD for Stressed receiver sensitivity (OMA) with -5.6.
Replace the TBD for Vertical eye closure penalty with 3.6
Replace, "Stressed eye jitter, each lane TBD" with "Stressed eye J2 jitter, each lane 0.41 UI" and add
"Stressed receiver 5E-5 eye mask definition {X1, X2, X3, Y1, Y2, Y3}" with values 0.21, 0.5, 0.5, 0.28, 0.28, 0.4

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See also comment #192.

Replace the TBD for Stressed receiver sensitivity (OMA) with -5.6.
Replace the TBD for Vertical eye closure penalty with 3.6
Replace, "Stressed eye jitter, each lane TBD" with "Stressed eye J2 jitter, each lane 0.41 UI" and add:
"Stressed eye J4 jitter, each lane 0.55 UI"
"Stressed receiver 5E-5 eye mask definition {X1, X2, X3, Y1, Y2, Y3}" with values 0.28, 0.5, 0.5, 0.33, 0.33, 0.4
with editorial licence.

Cl **95** *SC* **95.7.2** *P* **101** *L* **48** # 99

Petrilla, John — Avago Technologies

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

Table 95-7 (unlike Clause 86.7.3 Table 86-8) does not include a definition for receiver jitter tolerance rather in 95.8.8 jitter tolerance is included in the stressed receiver sensitivity test method. Combining jitter tolerance and stressed reciever test may lead to undesired overstress and not having all the receiver requirements in a single table results in an unnecessarily complex clause. The practice established in clause 86 should be followed.

SuggestedRemedy

For jitter tolerance definition follow the practice established in clause 86. Specifically, add to Table 95-7 the "Receiver jitter tolerance in OMA, ..." requirement and "Conditions of reciever jitter tolerance test: ...", modified as appropriate for signal rate and also modifying the aggressor OMA to Tx max OMA per comment on Table 95-6, Difference in launch power ...
In 95.8.8 delete exception a) and delete Table 95-11.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See comment #84.

Cl **95** *SC* **95.7.2** *P* **101** *L* **48** # 192

Dawe, Piers — IPtronics

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

Add at least placeholders for the other stressed receiver sensitivity parameters.

SuggestedRemedy

Stressed eye J2 Jitter, each lane,
Stressed eye J4 Jitter, each lane,
OMA of each aggressor lane.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment 98 .

Cl **95** *SC* **95.7.2** *P* **101** *L* **49** # 193

Dawe, Piers — IPtronics

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

Add conditions of receiver jitter tolerance test.

SuggestedRemedy

Conditions of receiver jitter tolerance test:
Jitter frequency and peak-to-peak amplitude - (190, 5) (kHz, UI)
Jitter frequency and peak-to-peak amplitude - (940, 1) (kHz, UI)
But compare with the equivalent test in 802.3bj.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #84.

Cl **95** *SC* **95.7.3** *P* **102** *L* **21** # 100

Petrilla, John — Avago Technologies

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

To be consistent with the link model, in Table 95-8 the allocation for penalties (for max TDP) should be 6.3 dB. See associated contribution, petrilla_01_0713_optx.

SuggestedRemedy

In Table 95-8 change the Allocation for penalties (for max TDP) to 6.3 for both OM3 and OM4.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

In Table 95-8 change the Allocation for penalties (for max TDP) to "6.3 (TBC)" for both OM3 and OM4.

See also, comment #173.

Cl **95** *SC* **95.7.3** *P* **102** *L* **21** # 173

Dudek, Mike QLogic

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

The Power budget does not add up and also the TDP test does not include the effects of Mode Partition noise and Modal Noise so the allocation of penalties should be larger than the max TDP.

SuggestedRemedy

Change the Power budget value to equal the sum of Channel Insertion loss, allocation for penalties, and additional insertion loss allowed. Increase the allocation for penalties by 0.4dB above the TDP max value to account for the Modal noise, Mode Partition noise, and residual link penalties when the reference transmitter is going into the reference receiver in the TDP test, (These are not present in the TDP test.)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment 100.

Cl **95** *SC* **95.8** *P* **102** *L* **32** # 194

Dawe, Piers IPtronics

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

Most of 95.8 Definition of optical parameters and measurement methods is already stated in 86.8.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, refer to 68.6 (use Table 95-10-Test-pattern definitions and related subclauses, perhaps with a name change) and list only the exceptions. Add rows for Skew, Skew Variation, eye mask. Delete most of the text in 95.8.

Response *Response Status* **C**

REJECT.
No specific remedy proposed (that results in intelligible text). A more specifc remedy in comments against future drafts would be appreciated.

Cl **95** *SC* **95.8.1** *P* **102** *L* **41** # 195

Dawe, Piers IPtronics

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

A PMD such as this that uses Clause 91 "RS-FEC" encoded signals needs an equivalent of Pattern 5, scrambled idle.

SuggestedRemedy

Add pattern 6, RS-FEC encoded scrambled idle, and refer to it in place of Pattern 5 as appropriate. Point out that the "valid 100GBASE-R signal" is RS-FEC encoded.
Coordinate with 802.3bj as necessary.
Consider if an RS-FEC encoded scrambled Remote Fault would be an acceptable additional alternative (RF is what a transmitter will emit by default when it doesn't detect an input).
Editorial: as
Table 86-12/95-10-Test patterns and related subclauses
is getting unwieldy, consider making a column for each pattern and populating with yes/no in the style of Table 80-2.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment 174.

Cl **95** *SC* **95.8.1** *P* **103** *L* **11** # 174

Dudek, Mike QLogic

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

By the time the scrambled idle reaches the PMD it should have been RS-FEC encoded.

SuggestedRemedy

In Table 95-9 change "Scrambled idle" to "RX-FEC encoded scrambled idle".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See also comment #195.

In Table 95-9 change "Scrambled idle" to "RS-FEC encoded scrambled idle"
Add a footnote to the Defined in value "82.2.10":
"The pattern defined in 82.2.10 as encoded by Clause 91 RS-FEC for 100GBASE-SR4"
Also, in 95.8.1.1 change "scrambled idle" to "RS-FEC encoded scrambled idle".

Cl **95** *SC* **95.8.1** *P* **103** *L* **25** # 101

Petrilla, John — Avago Technologies

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

In Table 95-10.the patterns for Extinction Ratio are 3, 5 or valid 100GBASE-R signal and the patterns for OMA are Square wave or 4. This mismatch in patterns between the OMA and ER test is unnecessary and problematic in that it breaks the relationship between average power and OMA, RIN and RINoma leading to needless additional complexity in manufacturing test and calibration.

SuggestedRemedy

In table 95-10 for Extinction Ratio change "3, 5 or valid 100GBASE-R signal" to "Square wave or 4" and change 95.8.6 as appropriate, e.g. delete the note, 'Extinction ratio and OMA are defined with different test patterns (see Table 95-10)'.

Response *Response Status* **C**

REJECT.
Suggested remedy would differ from previous clauses, and would allow very low worst case ER for high ISI transmitters.

Cl **95** *SC* **95.8.1** *P* **103** *L* **31** # 83

King, Jonathan — Finisar

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

Table 95-10
Calibration of OMA for receiver tests, subclause reference is marked TBD.
Vertical eye closure penalty calibration, subclause reference is marked TBD.

MMF ad hoc agreed to reference clause 52 for SRS testing with exceptions appropriate to clause 95.

Consequently, in Table 95-10, the rows for Calibration of OMA for receiver tests, and Vertical eye closure penalty calibration are part of the SRS test and should reference the relevant SRS sub clause 52.9.9

SuggestedRemedy

In Table 95-10:
in the row for "Calibration of OMA for receiver tests" change "TBD" to 52.9.9
in the row "Vertical eye closure penalty calibration" change "TBD" to 52.9.9

Response *Response Status* **C**

ACCEPT.

Cl **95** *SC* **95.8.1.1** *P* **103** *L* **43** # 74

Warland, TIm — AppliedMicro

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

Aggressor patterns are not defined. Suggest changing sentence to "All aggressor lanes are operated as specified and can not contain the same pattern unless an multi-UI offset is applied between the two patterns".

SuggestedRemedy

Suggest changing sentence to "All aggressor lanes operated as specified and can not contain the same pattern unless an multi-UI offset is applied between the two patterns".

Response *Response Status* **C**

REJECT. [Editor's note: Subclause changed from 8.1.1 to 95.8.1.1]

Aggressor lane patterns are defined in 95.8.1.1 :
"While the lanes in a particular direction may share a common clock, the Tx and Rx directions are not synchronous to each other. If Pattern 3 is used for the lanes not under test using a common clock, there is at least 31 UI delay between the PRBS31 patterns on one lane and any other lane.".

Cl **95** *SC* **95.8.3** *P* **104** *L* **11** # 196

Dawe, Piers — IPtronics

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

The test setup in Figure 53-6 isn't right for a parallel-fibre PMD.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, delete ", per the test setup in Figure 53-6".

Response *Response Status* **C**

ACCEPT.

Cl **95** *SC* **95.8.5** *P* **104** *L* **19** # 175

Dudek, Mike — QLogic

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

To complete the description of the TDP test it is important to include a description of the Reference Transmitter.

SuggestedRemedy

Add description of the reference transmitter. Suggest this is scaled from the one in Clause 86.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #82.

Cl **95** *SC* **95.8.5** *P* **104** *L* **20** # 82

King, Jonathan Finisar

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

TDP test definition reference is TBD. (line 20)
The reference receiver bandwidth for TDP testing is TBD Hz. (line 26)

MMF ad hoc agreed to reference clause 52 for TPD testing with exceptions appropriate to clause 95.
This was discussed in the MMF ad hoc, and proposed text was agreed for the TDP test section, and is recorded in king_01_0613_mmf-TDP.
The test definition reference should point to clause 52.
The reference receiver bandwidth should be 11.7 GHz

SuggestedRemedy

Change "Transmitter and dispersion penalty (TDP) shall be as defined in TBD with the following exceptions:" to
"Transmitter and dispersion penalty (TDP) shall be as defined in 52.9.10 with the following exceptions:"

Change "The reference receiver (including the effect of the decision circuit) has a fourth-order Bessel-Thomson filter response with a bandwidth of TBD Hz"
to
"The reference receiver (including the effect of the decision circuit) has a fourth-order Bessel-Thomson filter response with a bandwidth of 11.7 GHz".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See also comments #175 and #103.

Make changes to sub clause 95.8.5 as shown in slide 2 of king_01_0613_mmf_TDP with the exception that the Bessel-Thomson filter response bandwidth is 12.6 GHz

Cl **95** *SC* **95.8.5** *P* **104** *L* **30** # 103

Petrilla, John Avago Technologies

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

Item f) calls for a +/- 0.15 UI offset, while the link budget was calculated for a +/- 0.11 UI offset. See associated contribution, petrilla_01_0713_optx.

SuggestedRemedy

In item f) change '+/- 0.15 UI offset' to '+/- 0.11 UI offset'

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See response to comment #82.

Cl **95** *SC* **95.8.5** *P* **104** *L* **38** # 46

Anslow, Pete Ciena

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

"the BER specified in Table 95.1.1" should be "the BER specified in 95.1.1"

SuggestedRemedy

Change the cross-reference format to Section thereby removing the spurious text "Table"

Response *Response Status* **C**

ACCEPT.

Cl **95** *SC* **95.8.8** *P* **105** *L* **13** # 84

King, Jonathan Finisar

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

"Stressed receiver sensitivity shall be within the limits given in Table 95-7 if measured using the method defined in TBD with the following exceptions:"

This was discussed in the MMF ad hoc, proposed text for the SRS test section is recorded in king_02_0613_mmf-SRS.

SuggestedRemedy

Replace the text in section 95.8.8 (lines 13 to 21) with the proposed text shown on slide 6 of king_02_0613_mmf-SRS.

Add section 95.8.8.1 Receiver Jitter Tolerence as shown on slide 7 of king_02_0613_mmf-SRS.

Make changes to Table 95-7 as shown on slide 8 of king_02_0613_mmf-SRS.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See also comments #197, #99, #193.

Replace the text in section 95.8.8 (lines 13 to 21) with the proposed text shown on slide 2 of king_02_0613_mmf-SRS with the exception that the sinusoidal jitter is at a fixed 100 MHz

Add section 95.8.9 Receiver Jitter Tolerence as shown on slide 3 of king_02_0613_mmf-SRS. Remove Table 95-11.

Make additions and changes to Table 95-7 (bottom four rows) as shown on slide 4 of king_02_0613_mmf_SRS but with values as given in comment #98 Change footnote c, and add footnote e, as shown on slide 4 of king_02_0613_mmf_SRS.

Cl **95** *SC* **95.8.8** *P* **105** *L* **16** # 197

Dawe, Piers IPtronics

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

I don't remember a LF SJ mask in the SRS definition in the baseline. Anyway, it's probably preferable to use a separated jitter tolerance test for the same reasons that 86, 92, 93 and 94 do: SRS and SJ tolerance test different parts of a product, should be applied with different sampling strategies for cost-effectiveness, and each one makes the implementation of the other more complicated and expensive.
TR because it might take more than one meeting cycle to make a good decision if difficulties are found.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, consider a separated jitter tolerance test. Compare to 802.3bj.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment 84

Cl **95** *SC* **95.9** *P* **105** *L* **35** # 198

Dawe, Piers IPtronics

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

Don't re-invent the wheel. Safety, installation, environment, and labeling should be just the same as for 40GBASE-SR4. However, 40GBASE-SR4 is Hazard Level 1M and this draft 100GBASE-SR4 has Hazard Level 1; surely they should be the same.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, replace 95.9 with a reference to 86.9.
Resolve the Hazard Level discrepancy, making a maintenance request for 86.9.2 Laser safety if appropriate.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Much of the text of the clauses in 802.3 is similar to other clauses. In this case the section is short and it is not worth re-directing the reader to another Clause for this.

Since there have been no presentations establishing that the new limits in IEC 60825-2 2010 allow classification as Hazard level 1, change "Hazard Level 1" to "Hazard Level 1M" both in 95.9.2 and in 95.9.7

Cl **95** *SC* **95.9** *P* **108** *L* **23** # 199

Dawe, Piers IPtronics

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

The specs for Medium Dependent Interface (MDI) have got to be the same for 100GBASE-SR4 as for 40GBASE-SR4 as they can connect to the same fibre plant.

SuggestedRemedy

If Clause 95 is kept as a separate specification for 100GBASE-SR4, replace 95.11.3 Medium Dependent Interface (MDI) with a reference to 86.10.3 as for 40GBASE-SR4.
Nit: NOTE-Transmitter compliance testing is performed at TP2 as defined in 86.5.1/95.5.1, not at the MDI.

Response *Response Status* **C**

REJECT.
Since the contents of this subclause is proposed to be modified by Comments #85 and #88, leave it here.

Cl **95** *SC* **95.9.2** *P* **105** *L* **43** # 102

Petrilla, John Avago Technologies

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

Clause 95.9.2 calls for Hazard Level 1 conformity, while in Clause 86.9.2 40GBASE-SR4 and 100GBASE-SR10, Class 1 M is acceptable. There have been no contributions identifying a need to tighten this requirement. A tighter restriction than that acceptable for 40GBASE-SR4 and 100GBASE-SR10 will lead to higher than necessary manufacturing costs.

SuggestedRemedy

In Clause 95.9.2 change Hazard Level 1 to Hazard Level 1M

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
See response to comment #198.

Cl **95** *SC* **95.9.2** *P* **105** *L* **54** # 176

Dudek, Mike
QLogic

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

The footnote has been separated from the reference to it.

SuggestedRemedy

Adjust page breaks etc. to ensure the footnote is on the same page as the reference.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
While significant changes are being made to the draft, the position of many tables will change with respect to the page breaks. Forcing the position of tables to keep footnotes with their reference for early drafts is a waste of precious editorial effort and has a tendency to litter the draft with unneeded overrides from standard formatting. As the draft progresses to a more stable form, the editors will ensure that formatting issues such as this are corrected.