<table>
<thead>
<tr>
<th>Cl.</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>0</td>
<td>501</td>
<td>501</td>
<td>501</td>
</tr>
</tbody>
</table>

Anslow, Peter  Nortel Networks

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

The draft is not consistent in its use of significant digits. For example, Table 86-11 has limits of 4.0 V and 5.0 %. Why not 4 V or 5.0 %? The base standard is not consistent on this issue. Table 52.16 has "Transmitter and dispersion penalty (max)" of "3.0 dB" but, "Extinction ratio (min)" of "3 dB". It would be a good idea to decide on a format and use it consistently throughout the draft. Since the limits given do not have any associated tolerance, i.e. a Max limit of 3 dB is the same as one of 3.0 dB where 2.999999 is compliant and 3.000001 is not, it is proposed to only use as many digits as is required to express the number.

**Suggested Remedy**
Throughout the draft, only use as many significant digits as is required to express the number. Values less than 1 are shown with a leading 0.

Valid examples are:
- 0.1 nm
- 3 dB
- 100 m

Invalid examples are:
- 0.10 nm
- 3.0 dB
- 100.0 m

**Response**  C

ACCEPT IN PRINCIPLE.
Implement as feasible in D1.2 for new clauses. Maintain consistency with prior content in existing clauses.

---

<table>
<thead>
<tr>
<th>Cl.</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>0</td>
<td>622</td>
<td>622</td>
<td>622</td>
</tr>
</tbody>
</table>

Dawe, Piers  Avago Technologies

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

Nomenclature: D1.1 uses 'Total Skew' and 'Dynamic Skew'. D1.0 used 'skew' and 'dynamic skew'. I saw nothing in the comment database to justify 'Total Skew', and it isn't a total. It is not likely that what is called 'Dynamic Skew' will be dynamic (means fast-moving) and however slowly it changes, it still matters. Before this project, OIF-CEI-02.0 had defined 'Uncorrelated Wander' but they don't seem to have a good name for the largest skew between any two lanes in a group, either. Names like 'Maximum Skew' or 'Greatest Skew' could allow confusion between a maximum across lane-pairs and a maximum through time. I've made this a TR because it affects multiple clauses.

**Suggested Remedy**
Change 'Dynamic Skew' to 'Uncorrelated Wander' throughout.

**Response**  C

ACCEPT IN PRINCIPLE.
See response of #282.
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response</th>
<th>Response Status</th>
<th>Task Force Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>1.3</td>
<td>ER</td>
<td>A</td>
<td>Delete the Editor's note in 1.3</td>
<td>ACCEPT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>4.4.2</td>
<td>E</td>
<td>A</td>
<td>Change &quot;40 Gb/s and 100Gb/s&quot; to &quot;40 Gb/s and 100 Gb/s&quot;</td>
<td>ACCEPT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>E</td>
<td>A</td>
<td>Delete the Editor's note below Clause title.</td>
<td>ACCEPT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>30.2.5</td>
<td>E</td>
<td>A</td>
<td>Remove heading or pace in correct order if there are further changes to be inserted in this clause.</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td>See #341</td>
<td></td>
</tr>
</tbody>
</table>

TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched  A/accepted  R/rejected  RESPONSE STATUS: O/open  W/written  C/closed  U/unsatisfied  Z/withdrawn
SORT ORDER: Clause, Subclause, page, line

Page 2 of 141  27/09  4:23:30 PM
Comment Type: ER  Comment Status: A
Since there are no changes identified for 30.2.5 Capabilities, delete this subclause title.

SuggestedRemedy
Delete 30.2.5 Capabilities

Response  Response Status: C
ACCEPT.

Cl 30  SC 30.2.5  P 34  L 22  # 341
Ganga, Ilango  Intel

Cl 30  SC 30.5.1.1.15  P 32  L 44  # 545
Ganga, Ilango  Intel

Comment Type: E  Comment Status: A
Subclause 30.3.2.1.3 is missing an editing instruction

SuggestedRemedy
Add "Change 30.3.2.1.3 for PHY type list:

Response  Response Status: C
ACCEPT.

Cl 30  SC 30.2.5  P 34  L 22  # 341
Ganga, Ilango  Intel

Cl 30  SC 30.3.2.1.3  P 27  L 38  # 188
Anslow, Peter  Nortel Networks

Cl 30  SC 30.5.1.1.15  P 32  L 44  # 545
Ganga, Ilango  Intel

Comment Type: TR  Comment Status: A
30.5.1.1.15 aFECCorrectedBlocks counter needs to be enumerated for 4 lanes and 20 lanes for multilane BASE-R Phys
30.5.1.1.16 aFECUncorrectableBlocks counter is defined as a single counter, this needs to be enumerated for 4 and 20 lanes for multilane BASE-R PHYS

SuggestedRemedy
Update 30.5.1.1.15 and 30.5.1.1.16 to include multiple FEC counters for 4 and 20 lanes for BASE-R PHYS and update the text and cross references to registers in Clause 45 accordingly.

Response  Response Status: C
ACCEPT IN PRINCIPLE.
The commenter does not provide much detail in the remedy.

Change 30.5.1.1.15 as follows:
First sentence of SYNTAX to read: "Array of generalized nonresetable counters."
Add initial paragraph into BEHAVIOUR:
"An array of counters enumerated as counters 0 to N-1, where N is the number of PCS lanes in use. Each counter applies to the corresponding lane and behaves in the following manner."
Also change the references to:
45.2.8.5, 45.2.1.86 and 45.2.1.87a
Change 30.5.1.1.16 in the same manner, with the references changing to:
45.2.8.6, 45.2.1.87 and 45.2.1.87b
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>30.5.1.1.2</td>
<td>30</td>
<td>10</td>
<td>340</td>
</tr>
</tbody>
</table>

Ganga, Ilango, Intel

**Comment Type**: ER

**Comment Status**: A

Rephrase the PMD description in the list as follows to match the definition of PMDs in 1.4.

**Suggested Remedy**

Change the following definition in the list as suggested:

"40GBASE-R PCS/PMA over 4 WDM lane single mode fiber PMD, with long reach, as specified in Clause 87."

"100GBASE-R PCS/PMA over 4 WDM lane single mode fiber PMD, with long reach, as specified in Clause 88."

"100GBASE-R PCS/PMA over 4 WDM lane single mode fiber PMD, with extended reach, as specified in Clause 88."

**Response**: ACCEPT.

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>30.5.1.1.2</td>
<td>30</td>
<td>3</td>
<td>339</td>
</tr>
</tbody>
</table>

Ganga, Ilango, Intel

**Comment Type**: E

**Comment Status**: R

Add "cross-reference" links to Clause 84 through Clause 88 in the list (total of 10 instances from line 3 to line 30)

**Suggested Remedy**

As per comment

**Response**: ACCEPT.

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>30.5.1.1.2</td>
<td>30</td>
<td>32</td>
<td>372</td>
</tr>
</tbody>
</table>

Ganga, Ilango, Intel

**Comment Type**: E

**Comment Status**: A

Inserted text says "and the PCS control 2 register 45.2.3.6." - missing "specified in" and double ","

Also, some external links in this paragraph are not shown blue and some internal paragraphs are not cross-referenced.

**Suggested Remedy**

Change to "and the PCS control 2 register specified in 45.2.3.6."

Clause 22, clause 35, 22.2.4.1, Clause 28, Clause 37 should be dark blue.

45.2.3.6.1, 45.2.1.6.1, 45.2.1.1, 45.2.3.6, Clause 73 should be cross-references.

**Response**: ACCEPT.

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>30.5.1.1.2</td>
<td>30</td>
<td>31</td>
<td>189</td>
</tr>
</tbody>
</table>

Anslow, Peter, Nortel Networks

**Comment Type**: E

**Comment Status**: A

Delete double period at the end of sentence: "PCS control 2 register 45.2.3.6."

**Suggested Remedy**

As per comment

**Response**: ACCEPT.

See #189
Listing of PHYs defines the number of conductors or fibers for medium for simplex operation (includes 40GBASE-CR4, 40GBASE-SR4, 100GBASE-CR10, and 100GBASE-SR10), i.e. 40GBASE-CR4 is over 4 lane shielded copper balanced cable, when actually 40GBASE-CR4 uses 8 lanes, 4 in each direction.

Suggested Remedy

Two options:
1. use the number of lanes for full duplex operation
2. delete the number of lanes and leave in general terms

Example 40GBASE-CR4 over shielded copper balance cable

Response

ACCEPT IN PRINCIPLE.

Note that this is changing the text from the base document.
<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>45</td>
<td>35</td>
<td>3</td>
<td>191</td>
</tr>
<tr>
<td>45</td>
<td>45.2.1</td>
<td>37</td>
<td>12</td>
<td>316</td>
</tr>
</tbody>
</table>

**Anslow, Peter**  
Nortel Networks

**Comment Type**: E  
**Comment Status**: A  
**Suggested Remedy**: Remove note.  
**Response**:  
**Response Status**: C  
**ACCEPT.**

---

<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>45.2.1</td>
<td>37</td>
<td>12</td>
<td>316</td>
</tr>
<tr>
<td>45</td>
<td>45</td>
<td>35</td>
<td>3</td>
<td>191</td>
</tr>
</tbody>
</table>

**Ofelt, David**  
Juniper Networks

**Comment Type**: T  
**Comment Status**: A  
**Suggested Remedy**: The editors note asks if a figure describing the PMA numbering as well as possibly showing the system and line loopback definitions would be useful. I think it would be useful to have a figure in this section clearly showing the PMA addresses for each level. Pictorially showing what the "line" and "system" loopbacks are would also make the document clearer.

An alternative to adding a figure here would be to reference the figure 83-2 for the PMA numbering (and to add the numbers to the figure rather than just having them in the text in 83.1.4 p183 line 43) and figure 83-5 for the loopback definition. That said, a new figure would likely be better.  
**Response**:  
**Response Status**: C  
**ACCEPT IN PRINCIPLE.**  
(changed subclause designation)  
See comment #344 response.
Comment Type: T  Comment Status: A
Provide a diagram to show how multiple PMA sublayers are addressed and delete the Editor's note.

An example illustration will definitely help as this is the first time such multiple PMA instances are addressed.

Also clarify the second sentence in 45.2.1 on line 2 "These sublayers are all addressed by MMD 1 by default, but may also be instantiated in multiple addressable instances."

As per this statement if all sublayers can be addressed by MMD1 by default, provide explanation on how this is performed.

Suggested Remedy
Provide a diagram and additional clarification for second sentence in 45.2.1

Response  Response Status: C
ACCEPT IN PRINCIPLE.

Fig 83-2 shows the multiple sublayers.

Add a reference to fig 83-2 and Annex 83B and change:

"These sublayers are all addressed by MMD 1 by default, but may also be instantiated in multiple addressable instances."

to:

"By default, these sublayers are all implemented as one instance addressed by MMD 1. Alternatively they may be implemented in multiple addressable instances with separate MMD addresses."

Comment Type: E  Comment Status: A
Change "40Gb/s" to "40 Gb/s."
Also add cross-reference link to Clause 83 on line 4
Add cross-reference link to 45.2, Table 45-2 on line 9

Suggested Remedy
As per comment

Response  Response Status: C
ACCEPT.

See also #192

Comment Type: T  Comment Status: A
Register must support PRBS31 and PRBS9.

Suggested Remedy
Change register names from PRBS31 to PRBS

Response  Response Status: C
ACCEPT.

Comment Type: T  Comment Status: A
Two sets of registers are needed for PRBS error counters.

Suggested Remedy
Change PRBS31 error counters to PRBS Tx error counters
Add PRBS Rx error counters, lane 0 through lane 9 (registers 1.30 - 1.39)

Response  Response Status: C
ACCEPT.

Comment Type: E  Comment Status: A
Spaces missing, internal reference

Suggested Remedy
insert space in 40Gb/s (line 3) and MMD1 (line 9)
Table 45-2 should be cross reference (line 10)

Response  Response Status: C
ACCEPT.
124
Barrass, Hugh Cisco
Comment Type E Comment Status A
MMD1 - missingspace
SuggestedRemedy
add a space
Response Response Status C
ACCEPT.
See also #192

125
Barrass, Hugh Cisco
Comment Type E Comment Status A
45.2. Table 45-2.
SuggestedRemedy
Change to a reference - Table 45-2
Response Response Status C
ACCEPT.

195
Anslow, Peter Nortel Networks
Comment Type E Comment Status A
83.xxxx should be a cross-reference to 83.5.7
SuggestedRemedy
change 83.xxxx to a cross-reference to 83.5.7
Response Response Status C
ACCEPT.
Cl 45 SC 45.2.1.1.4a  P 42  L 11  # 194
Anslow, Peter  Nortel Networks

Comment Type E  Comment Status A
This says "the system loopback ability bit is specified in"
This should be "line loopback" if comment to re-name is rejected and "remote loopback" if comment to re-name is accepted.

Suggested Remedy
change to "the remote loopback ability bit is specified in" or "the line loopback ability bit is specified in"

Response  Response Status C
ACCEPT IN PRINCIPLE.

Cl 45 SC 45.2.1.12  P 51  L 33  # 373
Ganga, Ilango  Intel

Comment Type E  Comment Status A
Delete double period at the end of sentence: "shall read all zeroes."

Page 53, line 5: Similarly delete double period at the end of sentence in 45.2.1.77: "is shown in Table 45-54."

Also in Page 57, line 22

Suggested Remedy
As per comment

Response  Response Status C
ACCEPT.

Cl 45 SC 45.2.1.12a.9  P 51  L 21  # 549
Trowbridge, Stephen  Alcatel-Lucent

Comment Type ER  Comment Status A
Reference to 83.6.7 seems incorrect - 83.5.9 is test patterns, 83.6 is PMA MDIO function mapping. Same in line 22.

Suggested Remedy
Replace with 83.5.9 or 83.6 depending on what was intended.

Response  Response Status C
ACCEPT IN PRINCIPLE.

Replace with 83.5.9

Cl 45 SC 45.2.1.12b  P 50  L 46  # 129
Barrass, Hugh  Cisco

Comment Type E  Comment Status A
This comment cycle will resolve the issues raised by the editor's note

Suggested Remedy
Delete the editor's note

Response  Response Status C
ACCEPT.

Cl 45 SC 45.2.1.12b  P 50  L 49  # 130
Barrass, Hugh  Cisco

Comment Type T  Comment Status A
Title of register needs to change

Suggested Remedy
Change PRBS31 to PRBS

Register title, 3 instances in text and 1 in Table.

Response  Response Status C
ACCEPT IN PRINCIPLE.

Accept suggested remedy for specific comment.

Note that a square wave test control register also needs to be added (not common operation as in PRBS31/PRBS9)
Comment Type: T  Comment Status: A

Table 45-12b and associated text needs to change to accommodate PRBS31 & PRBS9, with generate and check in both directions.

**Suggested Remedy**
Change Table 45-12b so that the bit assignments are as follows:

- 15 - PRBS pattern ability
- 14 - PRBS31 ability
- 13 - PRBS9 ability
- 11 - Tx generator ability
- 10 - Tx checker ability
- 9 - Rx generator ability
- 8 - Rx checker ability
- 7 PRBS31 enable
- 6 PRBS9 enable
- 3 Tx generator enable
- 2 Tx checker enable
- 1 Rx generator enable
- 0 Rx checker enable

Replace the text following the table as follows:

Register 1.19, bit 14 indicates that the device supports PRBS31 generation or checking. Register 1.19, bit 13 indicates that the device supports PRBS9 generation or checking. In both cases, if the device indicates support for the PRBS type, then it shall support that test for all of the generator and checker types that are indicated by the assertion of bits 11:8.

Register 1.19, bit 11 indicates that the device supports PRBS generation in the transmit direction. Register 1.19, bit 10 indicates that the device supports PRBS checking in the transmit direction. Register 1.19, bit 9 indicates that the device supports PRBS generation in the receive direction. Register 1.19, bit 8 indicates that the device supports PRBS checking in the receive direction.

Register 1.19, bit 7 enables testing with the PRBS31 pattern defined in 83.6.7. Register 1.19, bit 6 enables testing with the PRBS9 pattern defined in 83.6.7. The assertion of register 1.19, bits 7 and 6 works in conjunction with register 1.19, bits 3:0. If none of the bits 3:0 are asserted then bits 7 and 6 have no effect.

Register 1.19, bit 3 enables PRBS generation in the transmit direction. Register 1.19, bit 2 enables PRBS checking in the transmit direction. Register 1.19, bit 1 enables PRBS generation in the receive direction. Register 1.19, bit 0 enables PRBS checking in the receive direction.

Register 1.19, bit 15 cannot always be 1. MMDs are expected to return zero for addresses they don’t use - and e.g. 10G MMDs don’t use this address. In other words, the register is implemented even if the feature isn’t.

**Suggested Remedy**
Change table entry and text to the usual 1 for able, 0 for not able.

Register 1.19, bit 14 indicates that the device supports PRBS31 generation or checking. Register 1.19, bit 13 indicates that the device supports PRBS9 generation or checking. In both cases, if the device indicates support for the PRBS type, then it shall support that test for all of the generator and checker types that are indicated by the assertion of bits 11:8.

Register 1.19, bit 11 indicates that the device supports PRBS generation in the transmit direction. Register 1.19, bit 10 indicates that the device supports PRBS checking in the transmit direction. Register 1.19, bit 9 indicates that the device supports PRBS generation in the receive direction. Register 1.19, bit 8 indicates that the device supports PRBS checking in the receive direction.

Register 1.19, bit 7 enables testing with the PRBS31 pattern defined in 83.6.7. Register 1.19, bit 6 enables testing with the PRBS9 pattern defined in 83.6.7. The assertion of register 1.19, bits 7 and 6 is mutually exclusive. If both bits are asserted the behavior is undefined. The assertion of register 1.19, bits 7 and 6 works in conjunction with register 1.19, bits 3:0. If none of the bits 3:0 are asserted then bits 7 and 6 have no effect.

Register 1.19, bit 3 enables PRBS generation in the transmit direction. Register 1.19, bit 2 enables PRBS checking in the transmit direction. Register 1.19, bit 1 enables PRBS generation in the receive direction. Register 1.19, bit 0 enables PRBS checking in the receive direction.

**Response**

**Response Status: C

ACCEPT.**

Comment Type: TR  Comment Status: A

Clause 83 indicates separate enable for test pattern generator and test pattern detector. Also need enable for selected short test pattern (e.g., PRBS9)

**Suggested Remedy**

Add separate enable for test pattern checker (which may be in different PMA from the generator), and for short test pattern generate and check.

**Response**

**Response Status: C

ACCEPT IN PRINCIPLE.**

See comment #131 response.

**Comment Type: TR  Comment Status: A

Need enable square wave test pattern, per lane?**

**Suggested Remedy**

Add enable square wave test pattern.

**Response**

**Response Status: C

ACCEPT IN PRINCIPLE.**

Since the square wave test pattern is accepted in Clause 83, add ability & enable bits in a separate register. See comment #657 resolution for square wave control per lane requirement.

**Comment Type: T  Comment Status: A

Bit 1.19.15 cannot always be 1. MMDs are expected to return zero for addresses they don’t use - and e.g. 10G MMDs don’t use this address. In other words, the register is implemented even if the feature isn’t.

**Suggested Remedy**

Change table entry and text to the usual 1 for able, 0 for not able.

**Response**

**Response Status: C

ACCEPT.**
The PMA clause indicates a per lane error counter register (up to 10 lanes toward a physically instantiated interface) and not only a single register. Also need error counters in Tx and Rx direction. Can use the same error counter register for PRBS31 and whatever is selected as the short test pattern (e.g., PRBS9).

**Suggested Remedy**

Change to per lane test pattern error counter registers in each direction.

**Response**

ACCEPT IN PRINCIPLE.

See resolutions to #128.

---

Register name needs to change

**Suggested Remedy**

Change PRBS31 to PRBS Tx

Title, 7 instances in text, 1 Table title.

**Response**

ACCEPT.

---

The PRBS31 pattern testing error counter is a twelve bit count as defined in 83.6.7.

There is no sub-clause 83.6.7 in Draft 1.1.

**Suggested Remedy**

Add a set of registers for Rx direction error counters.

**Response**

Add subclause 45.2.1.12d

PRBS Rx pattern testing error counter (Register 1.30, 1.31, 1.32, 1.33, 1.34, 1.35, 1.36, 1.37, 1.38, 1.39)

The PRBS Rx pattern testing error counter registers are used for PHY types that implement PRBS pattern testing in the PMA. This function is described in 83.6.7. The assignment of bits in the PRBS Rx pattern testing error counter registers is identical to the PRBS Tx pattern testing error counter as shown in Table 45-12c. Register 1.30 contains the PRBS pattern testing error counter for lane 0, register 1.31 contains the PRBS pattern testing error counter for lane 1, and registers 1.22 through 1.29 contain the PRBS pattern testing error counters for lanes 2 through 9 respectively. Counters corresponding to lanes that are not implemented in a PMA shall read all zeroes.

The PRBS Rx pattern testing error counter is a twelve bit count as defined in 83.6.7. These bits shall be reset to all zeros when the register is read by the management function or upon execution of the PMA reset. These bits shall be held at all ones in the case of overflow.

**Response**

ACCEPT.
Amendment reads
The BASE-R PMD control register is used for 10GBASE-KR and other PHY types using
the backplane PMD described in Clause 72, 84 or 85.

The PMD is not just for backplanes.

There are multiple instances of this sentence throughout Clause 45.

Suggested Remedy
Delete the work "backplane" in the sentence. Do this for all instances of this sentence in
Clause 45.

Response
ACCEPT.

Most of the register descriptions subsections seem to go from most significant bit to least
significant. This section goes the other way - from bit zero to bit fifteen. Spot checking the
full clause 45- it looks like msb->lsb is the normal order.

Other subsections with the same problem:
45.2.1.81a
45.2.1.81b
45.2.1.84
45.2.1.85
45.2.3.4.4
45.2.3.4.5

There may be others, so if this matters, please double check the other sections.

Suggested Remedy
Flip the order of the subsections.

Response
REJECT.

(changed subclause designation)

All of the registers added by 802.3ap (Backplane) have been numbered in this way, for
reasons only known to the editors of that project. This project should not change the order
of some of these registers while leaving the others. Therefore the job of making things
consistent should be left to a revision project (where the whole document is open for
change).
Cl 45 SC 45.2.1.81a
D'Ambrosia, John
Force10 Networks

Comment Type E
Comment Status A

The BASE-R PMD status register 2 is used for 100GBASE-CR10 and other PHY types using the backplane PMD described in Clause 72, 84 or 85 over more than 4 lanes.

Issue 1 - use of "backplane" PMD
Issue 2 - "more than 4 lanes" - this is for simplex operation.

Suggested Remedy

reword sentence

The BASE-R PMD status register 2 is used for 100GBASE-CR10 and other PHY types using the PMD described in Clause 72, 84 or 85 over more than 4 lanes in a given direction.

Response

Response Status C

ACCEPT.

Cl 45 SC 45.2.1.81a
P 56
L 3
# 388

Cl 45 SC 45.2.3.16a
P 69
L 49
# 317

Ofelt, David
Juniper Networks

Comment Type T
Comment Status A

The text says that "These bits shall be held at all ones in the case of overflow". Given the paragraph is for just the upper bits and there is an explicit indication for the lower bits that they do not saturate if the high-order register is implemented, I think the text should be explicit in referring to the 20b counter being held at all ones.

Suggested Remedy

Change the text to read "The 20 bit counter shall be held at all ones in the case of overflow".

Response

Response Status C

ACCEPT.

Cl 45 SC 45.2.3.16b
P 70
L 25
# 511

Ofelt, David
Juniper Networks

Comment Type T
Comment Status A

The text says that "These bits shall be held at all ones in the case of overflow". Given the paragraph is for just the upper bits and there is an explicit indication for the lower bits that they do not saturate if the high-order register is implemented, I think the text should be explicit in referring to the 22b counter being held at all ones.

Suggested Remedy

Change the text to read "The 22 bit counter shall be held at all ones in the case of overflow".

Response

Response Status C

ACCEPT.

[Editor's note: The commenter did not indicate the comment type, hence added comment type as Technical]

Cl 45 SC 45.4
P 41
L 35
# 193

Ofelt, David
Juniper Networks

Comment Type T
Comment Status A

The terms "PMA line-side loopback" and "PMA system loopback" do not clearly convey what function they perform. Also, clause 83 uses the term "line loopback"

A separate comment is submitted against clause 83 - these comments must be resolved together.

Suggested Remedy

Change all instances of "line-side loopback" to "remote loopback" and all instances of "system loopback" to "local loopback".

Response

Response Status C

ACCEPT.

Also see comment #201.
Comment Type: E  Comment Status: R  
Comment: AUTO-NEGOTIATION

Suggested Remedy: 
Auto-Negotiation

Response: REJECT.

This text is taken directly from the IEEE 802.3 base document and so should not be changed without good reason.

[Editor's note: This comment is incorrectly filed under 85. Corrected the Clause number field to Clause 69]

Comment Status: R
Response Status: C

Dawe, Piers Avago Technologies

Comment Type: T  Comment Status: A  
The reader is pointed to Clauses 80, 81, 82, and 84. It would seem we could be a bit more specific. Relevant subclauses are 80.3, 81.1.4, 82.5, and 84.4.

Also, 80.3 only provides informative specifications.

Suggested Remedy: 
Suggest rewording

For 40GBASE-KR4 normative delay specifications may be found in 81.1.4, 82.5, and 84.4. Informative delay specifications may be found in 80.3

Response: ACCEPT.

Comment Status: A
Response Status: C

D'Ambrosia, John Force 10 Networks

Comment Type: T  Comment Status: A  
Draft says "Parallel Detection is not performed for 10GBASE-KR"

Similarly, parallel detection can not be performed for 40GBase-CR4/KR4 and 100GBase-CR10. Specify those PMDs as well.

Suggested Remedy: 
Change to "Parallel Detection is not performed for 10GBASE-KR, 40GBase-CR4, 40GBase-KR4 and 100GBase-CR10."

Response: ACCEPT.

[Editor's note: Commenter has not indicated the comment type. Assigned comment type as Technical]

Delete the sentence: "Parallel Detection is not performed for 10GBASE-KR"

Comment Status: A
Response Status: C

Valliappan, Magesh Broadcom

Comment Type: T  Comment Status: A  
Remove the Editor's note.

Suggested Remedy: 
As above.

Response: ACCEPT.

Comment Status: A
Response Status: C

Gustlin, Mark Cisco

Comment Type: T  Comment Status: A  
Remove the Editor's note.

Suggested Remedy: 
As above.

Response: ACCEPT.

Comment Status: A
Response Status: C

Marris, Arthur Cadence

Comment Type: T  Comment Status: R  
Multilane correlated cross needs to be described in Annex 69B

Suggested Remedy: 
As above.

Response: REJECT.

Need a suggested remedy
352
374
SC 74.11
P111
L1
# 352
Ganga, Ilango Intel

Comment Type: TR
Comment Status: R

74.11 PICS and requirements for 40GBASE-R and 100GBASE-R:

Current PICS in 74.11 in base specification applies to 40GBASE-R and 100GBASE-R implementations as well. Add any new PICS entries that are specific to 40GBASE-R and 100GBASE-R PHYs.

For example add separate shall statements in 74.7.4.5 to indicate the decoding errors requirements to PCS for 40GBASE-R and 100GBASE-R. So this will result in separate PICS entries for single lane and multi-PCS lane implementations.

Current statements in 74.7.4.5 does not provide clarity regarding specific requirements for single and multi-PCS lane PHYs.

Suggested Remedy:
Update 74.7.4.5 to provide separate requirements for 40GBASE-R and 100GBASE-R PHYs and add corresponding PICS entries. (for e.g. PICS entry FE9 or FE11 in 74.11.5 may get split accordingly)

Also do the same for other requirements of 40GBASE-R and 100GBASE-R in Clause 74, if any.

Response: Response Status: C
REJECT.

This comment was WITHDRAWN by the commenter.

391
Cl 74 SC 74.3 P 101 L 38 # 391
D'Ambrosia, John Force10 Networks

Comment Type: E
Comment Status: A

"BASE-R FEC" is inconsistent with other layer diagrams

Suggested Remedy:
Change "BASE-R FEC" to "FEC"

Response: Response Status: C
ACCEPT.

This comment refers to Figure 74-1.
### Draft 1.1 Comments

**IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments**

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>74.5</td>
<td>103</td>
<td>5</td>
<td>392</td>
</tr>
<tr>
<td>D'Ambrosia, John</td>
<td>Force10 Networks</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comment Type**: TR/technical required  
**Comment Status**: A

The FEC service interface section does not discuss that the implementation shown in Fig 83-2, where the XLAUI / CAUI is above the FEC sublayer.

**Suggested Remedy**

Add the following sentence at the end of the first paragraph in 74.5:

The XLAUI / CAUI is an optional physical instantiation that may be used for the logical FEC interface.

**Response**:  
**Response Status**: C

ACCEPT IN PRINCIPLE.

Add sentence after first sentence in first paragraph of 74.5:

"The FEC service interface is equivalent to the PMA service interface."

Add third paragraph to 74.5

"Optional physical instantiations of the PMA service interface have been defined (see Clause 51 and Clause 83). There is XSBI (10 Gigabit Sixteen Bit Interface) for 10GBASE-R, XLAUI for 40GBASE-R and CAUI for 100GBASE-R. These physical instantiations, with a PMA if required, may also be used for the FEC service interface."

also see comment 395 against Clause 83

---

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>74.5.2</td>
<td>105</td>
<td>12</td>
<td>348</td>
</tr>
<tr>
<td>Ganga, Ilango</td>
<td>Intel</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comment Type**: ER/editorial required  
**Comment Status**: A

Add cross reference link to Clause 83 and also provide exact reference to 83.3.

The FEC service interface directly maps to the PMA service interface defined in Clause 83 (See 83.3)

**Suggested Remedy**

Change sentence as follows:

The FEC service interface directly maps to the PMA service interface defined in Clause 83 (See 83.3)

**Response**:  
**Response Status**: C

ACCEPT IN PRINCIPLE.

see response to comment 392

---

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>74.5.2.1.2</td>
<td>105</td>
<td>32</td>
<td>161</td>
</tr>
<tr>
<td>Gustlin, Mark</td>
<td>Cisco</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comment Type**: E/editorial required  
**Comment Status**: A

Gbd s/b GBd.

**Suggested Remedy**

as above.

**Response**:  
**Response Status**: C

ACCEPT.

see response to comment 157

---

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>74.5.2.2.2</td>
<td>106</td>
<td>4</td>
<td>102</td>
</tr>
<tr>
<td>Gustlin, Mark</td>
<td>Cisco</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comment Type**: E/editorial required  
**Comment Status**: A

Here you used Gtransfers/s, but in 74.5.2.1.2 you used GBd, should be consistent.

**Suggested Remedy**

Change to GBd.

**Response**:  
**Response Status**: C

ACCEPT.

also see comment 349

---

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>74.5.2.2.2</td>
<td>106</td>
<td>4</td>
<td>349</td>
</tr>
<tr>
<td>Ganga, Ilango</td>
<td>Intel</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comment Type**: E/editorial required  
**Comment Status**: A

Change 10.3125 Gtransfers/s to 10.3125 GBd to be consistent with other subclauses (for example tx_bit is defined in GBd).

Also change Gbd to GBd throughout this clause.

**Suggested Remedy**

As per comment

**Response**:  
**Response Status**: C

ACCEPT.

also see comment 162
<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>Subclause</th>
<th>Page</th>
<th>Line</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>74</td>
<td>74.5.2.3.1</td>
<td>106</td>
<td>22</td>
<td>353</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ganga, Ilango Intel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>T</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>A</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The FEC_SIGNAL.indication is set to True only if fec_signal_ok variable is true for all lanes or data streams and is set to fail if fec_signal_ok is false in any one or more of the lanes. Hence rephrase the appropriate sentences in 74.5.2.3.1 to provide clarity.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SuggestedRemedy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change two sentences in 74.5.2.3.1 as follows:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;..PMA sublayer indicated by the fec_signal_ok variable equal to true, for all data streams, and this payload...&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;A value of FAIL denotes that errors have been detected by the Receive process indicated by the fec_signal_ok variable equal to false, in any of the data streams, that prevent valid data...&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td><strong>Response Status</strong></td>
<td><strong>C</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCEPT.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ganga, Ilango Intel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cl 74 SC 74.7.4 P 106 L 40 # 351</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>TR</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>A</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>74.7.4 Functions within the FEC sublayer, should be updated to include the operation of a bit serial interface for 40GBASE-R and 100GBASE-R PHYs. The reverse gearbox function is not needed. A presentation or text will be provided to show the operation of Clause 74 FEC for operation with 40 and 100G multi lane PHYs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SuggestedRemedy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A supporting presentation will be submitted to show the operation of Clause 74 FEC with multi lane operation with 40GBASE-R and 100GBASE-R PHYs. Text and figures in 74.7.4 needs to be updated accordingly.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td><strong>Response Status</strong></td>
<td><strong>C</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCEPT IN PRINCIPLE.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>implement the changes suggested in ganga_03_0109.pdf. Correct the delay calculations considering 5G lanes for 100GBASE-R. Give pause quanta as well as BT. also check for any places where Clause 74 needs to be updated for the 40G/100G service interface definition and fix accordingly. Editorial license. Also, in 74.7.4.5.1, change (d, e, f) bullets to (a, b, c) and insert line 41 to match base text (retaining change item b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D'Ambrosia, John Force10 Networks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cl 74 SC 74.7.4.5.1 P 107 L 42 # 393</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>TR</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>R</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follow-up from D1.0 comment 322: need to determine whether the error bursting expected in 40GBASE-CR4 and 100GBASE-CR10 degrades MTTFPA too much.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SuggestedRemedy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do the analysis. If it does, several options are available.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td><strong>Response Status</strong></td>
<td><strong>C</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REJECT.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggested remedy is not complete</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comment 322 against D1.0 requested the ability to detect FEC errors without correcting them. For reference the final accepted response was:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;This needs approval by the task force. Also the proposed remedy is not complete. MTTFPA, power, latency need to be analyzed before a change can be proposed. Cannot use as background error monitor alone without adding latency because giving up sync header redundancy without being able to mark blocks bad due to FEC code will significantly increase MTTFPA. Could affect PCS high BER and lock state machines if a single error multiplies to mark the entire block bad.&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TYPE:** TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general

**COMMENT STATUS:** D/dispatched  A/accepted  R/rejected  RESPONSE STATUS: O/open  W/written  C/closed  U/unsatisfied  Z/withdrawn

**SORT ORDER:** Clause, Subclause, page, line

**Page 17 of 141**
Comment Type: E  Comment Status: A
In Table 74-1, change the width of the last column, to fit the variable to fall within a single line. Currently the last digit spills over the next line.

Suggested Remedy
As per comment

Response  Response Status: C
ACCEPT.

---

Comment Type: T  Comment Status: A
Here the phrasing is "at least 10 km on a single mode fiber", but then in 80.1.4 the phrasing change to "up to at least 10 km in length". We need to be consistent. This applies for all of the physical layers.

Suggested Remedy
Change to make it consistent.

Response  Response Status: C
ACCEPT IN PRINCIPLE.

See response to comment #159

---

Comment Type: E  Comment Status: R
physically implemented or physically instantiated?

Suggested Remedy
No preference, but different clauses have made different choices of words and it should probably be consistent. Also line 51 and many other places.

Response  Response Status: C
REJECT.

This use of this phrase is consistent with Clause 44 in base standard
### IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments

#### Task force Review

<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Comment</th>
<th>Suggested Remedy</th>
<th>Response</th>
<th>Response Status</th>
<th>Comment Status</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>80.1.3</td>
<td>114</td>
<td>7</td>
<td>394</td>
<td>T</td>
<td>R</td>
<td>In Fig 80-1 FEC sub-layer is noted as being &quot;conditional&quot;, but it is actually conditional for the PHY type, but then optional.</td>
<td>add second note that indicates that the FEC sub-layer is also optional. Apply to other layer diagrams throughout the document, where appropriate.</td>
<td>REJECT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>80.1.4</td>
<td>115</td>
<td>27</td>
<td>650</td>
<td>TR</td>
<td>R</td>
<td>Subclause 80.1.4(Nomenclature) page 115 lines 22-25</td>
<td>40Gb/s and 100Gb/s should retain the same terminology. Alternatively, if the change in terminology is intentional, additional text should be added in this section clarifying that a change in terminology has been made to eliminate any misunderstanding.</td>
<td>REJECT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>80.1.4</td>
<td>115</td>
<td>22</td>
<td>434</td>
<td>E</td>
<td>A</td>
<td>use of &quot;optical lanes&quot; should clarify that optical lanes can either be via wavelengths or number of fibers</td>
<td>modify sentence The numeric suffix in the port type (e.g. 40GBASE-CR4 or 100GBASE-CR10) represents the number of electrical or optical lanes. to The numeric suffix in the port type (e.g. 40GBASE-CR4 or 100GBASE-CR10) represents the number of electrical or optical (i.e. number of wavelengths or optical fibers) lanes.</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Abbott, John**
Corning Incorporated

**Comment Type**
TR

**Comment Status**
R

**Comment**
Subclause 80.1.4(Nomenclature) page 115 lines 22-25

**Suggested Remedy**
40Gb/s and 100Gb/s should retain the same terminology.

Alternatively, if the change in terminology is intentional, additional text should be added in this section clarifying that a change in terminology has been made to eliminate any misunderstanding.

**Response**
REJECT.

The nomenclature employed by the 40 and 100 Gigabit physical layers is defined in 80.1.4 since it is different from 10G.
Comment Type: T  Comment Status: A
Remove the editor's note. It is made clear what the 40 and 100G instantiations of the MII are.

Suggested Remedy

Response  
Response Status: C
ACCEPT IN PRINCIPLE.

Spell out XLGMII and CGMII everywhere instead of using generic MII. Omit abbreviation for Media Independent Interface in title and before it makes sense to be specific. Editorial license. Delete the editor's note.

Response  
Response Status: C
ACCEPT IN PRINCIPLE.

Move 80.2.2 to become 80.1.5.

Response  
Response Status: C
ACCEPT IN PRINCIPLE.

Move 80.2.2 to become 80.1.5 and renumber the subclauses 80.2.2.1 to become 80.2.1 and so on.

Response  
Response Status: C
ACCEPT IN PRINCIPLE.

Add a column and mark PPI as optional for SR4 and SR10.

Legend of O=Optional, M=Mandatory can be done just as a note rather than a table footnote as it applies to all of the cells and not just the two indicated with the superscript "a"

Suggested Remedy

Eliminate the superscript "a"

Response  
Response Status: C
ACCEPT.
Change:
"In addition the PMAs perform clock recovery from the received data stream and optionally provide data loopback at the PMA service interface."
to:
"In addition the PMAs perform retiming of the received data stream when appropriate, optionally provide data loopback at the PMA or PMD service interface, and optionally provide test pattern generation and checking."

SuggestedRemedy
As above.

Response  
Response Status  C
ACCEPT IN PRINCIPLE.

Change:
"In addition the PMAs perform clock recovery from the received data stream and optionally provide data loopback at the PMA service interface."
to:
"In addition the PMAs perform retiming of the received data stream when appropriate, optionally provide data loopback at the PMA or PMD service interface, and optionally provide test pattern generation and checking."

SuggestedRemedy
Move 80.2.3 Forward Error Correction (FEC) sublayer to after 80.2.2.1 Physical Coding Sublayer (PCS) and before 80.2.2.2 Physical Medium Attachment (PMA) sublayer.

Response  
Response Status  C
ACCEPT.

Comment Type  T  Comment Status  A
Delay
Table of delay limits is incomplete.

SuggestedRemedy
Add rows for FEC and AN. If AN delay is counted as part of PMD delay, say so in a table note and give a cross-reference

Response  
Response Status  C
ACCEPT IN PRINCIPLE.

Add row for FEC to Table 80-2 (see comment #351). Do not add row for AN - not in base specification. Commenter should provide data and justification for AN if desired.
Add in the round trip delay for the PMA:
First lets look at the dynamic skew since some PMAs have to account for that:
SP1, SP5, SP1 and back to SP5 again is what we need to worry about, plus we need to multiply these numbers by 2 since people will start fifos at the half full mark...
So: (3.6ns + .2ns )*2 = 15.2ns or 1474 bits due to dynamic skew buffers.

Now in the worst case you can have multiple PMAs, but they still have to meet the above skew points so I think we don't have to add any more for the skew for multiple PMAs.

Now there is some inherent delay in the muxing stages etc, and we put down for max skew 13ns per pma stage. So delay must be at least that much. Lets add another 66b word to that, so that is 13 + 6.4 = 19.4ns, now multiply x4 = 77.6ns or 7540 bits.

So a total of 1474 + 7540 = 9014 bits, or rounded up to the nearest 512 chunk is 18*512 = 9216 BT.

SuggestedRemedy
Change the TBDs to 9216 BT, or 18 pause quanta. Make this applicable for 100GBASE-R and 40GBASE-R PMAs (right now it only has an entry for 40GBASE-R PMAs)

Response
ACCEPT IN PRINCIPLE.

Adopt 9216 BT for 100G. Scale appropriately for 40G.

Defining delay for PMA or PMD in MAC bit times is inappropriate as well as misleading; these sublayers have no knowledge or visibility of the MAC clock, or MAC bits. With multi-lane sublayers, 'bit time' becomes even more confusing. We improved things a little in D1.1 but not enough.

Is a table note that says 'Note that' normative or informative? I suppose that we mean that if a clock is running slow (within the +/-100ppm limits), one is allowed extra time.

SuggestedRemedy
Turn note a into a NOTE (or regular text) at line 13, add extra sentence 'One pause_quantum is 512 MAC bit times.'
Either, if MAC and PCS engineers want their 'bit time' entries, insert a heading below the PCS in the second column 'Maximum at nominal signaling rate (ns)' and give the PMA and PMD entries in ns.
Or, As MAC and PCS engineers can multiply by 512 and probably aren't considering a serial MAC or PCS implementation anyway, replace the whole second column with 'Maximum at nominal signaling rate (ns)' and give all the entries in ns.

Response
REJECT.

This issue was discussed in the task force in Nov08 and decided to add notes in D1.1

The MAC bit time and pause quantum is provided for the system designer to plan buffers based on the delay number through the MAC/PHY stack and the medium. This is consistent with the unit(s) used in 802.3 base standard.
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>TR</th>
<th>Comment Status</th>
<th>A</th>
<th>Skew</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Fig 80-2 and Fig 80-3 are very complex drawings as they try to capture the flexibility and multiple options inherent in the draft. Neither figure shows that XLAUI / CAUI is an optional physical instantiation. Also, FEC should be conditional based on PMD type. Given the various architectures it is also not obvious which SPx need to be measured. **Suggested Remedy** Note that the XLAUI / CAUI are optional. Note that FEC is also conditional based on PMD type. add a statement that the reader should review the relevant clauses, as shown in Tables 80-3 and 80-4, to see which skew points need to be measured. **Response** **Response Status** C

<table>
<thead>
<tr>
<th>Comment Status</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accept in principle.</strong> Place following guidelines in an informative annex: Adopt Bullets 1 - 5 on Slide #9 of dambrina_01_0109. Change bullet 5: 5. A minimum of one PMA sub-layer is required in a PHY Add bullet 6 - &quot; A maximum of 4 PMA sublayers are addressable as MDIO Manageable Devices (MMDs). Skew comment already addressed by existing text and comment #553 resolution. <strong>Response</strong> <strong>Response Status</strong> C</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comment Type</th>
<th>T</th>
<th>Comment Status</th>
<th>A</th>
<th>Skew</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Figures 80-2 and 80-3 imply that the PMA next to the PMD is optional. Yet there must always be a PMA next to the PMD; one cannot connect to a PMD with nAUI. **Suggested Remedy** Mark the XLAUIs and CAUIs with 1 for optional. **Response** **Response Status** C

<table>
<thead>
<tr>
<th>Response Status</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accept in principle.</strong> This is an example to illustrate the location of the skew points, and SP1/SP6 are only present when there is a XLAUI/CAUI. In this example, they are present (even though optional). Remove optional notes except for FEC. Remove back to back PMAs (10:10 and 10:4 in 100GBASE-R stack) in Figures 80-2, 80-3 and indicate single PMA(10:n) in lower PMA (n=4 or 10). Add text to define locations of SPs, including clarification that SP6 is at the output of the uppermost XLAUI/CAUI and SP1 is at the output of the lowermost XLAUI/CAUI. This is illustrated by Figure 80-3 but never explained in the text. Editorial license. <strong>Comment Status</strong> A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comment Status</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Skew</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Need to qualify statement about dynamic skew since it isn't absolute (there is no guarantee that if the link is brought down and back up again, the PCS lanes will be on the same physical lanes). **Suggested Remedy** Replace "The Dynamic Skew must be limited to ensure that a given PCS lane always traverses the same physical lane," with "From the time the link is brought up, Dynamic Skew must be limited to ensure that a given PCS lane always traverses the same physical lane while the link remains in operation." **Response** **Response Status** C

<table>
<thead>
<tr>
<th>Response Status</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accept.</strong></td>
<td></td>
</tr>
</tbody>
</table>
Comment Type ER Comment Status A

Need to consolidate definitions of skew/dynamic skew so that they appear at earliest reference (here), that they agree for all PMD types. Also "time that the link is operational" needs to be defined -- is it only the length of time needed to measure BER = 10^-12 or something shorter or longer?

Suggested Remedy

a. move this text which is nomenclature/definition to the front of subclause 80.4
b. this line references a later clause 82.2.12. It is appropriate for the definition to appear in the first subclause it is used, hence move the 82.2.12 definition to this subclause.
c. Note in subclause 86.7.3.1 it is noted that the correct definition of skew and dynamic skew may need to be redefined differently for multimode fiber. This difference in definition should be noted in subclauses 80.4 and/or 82.2.12. There is a problem because 82.2.12 is primarily a definition appropriate to electronics.
d. For completeness, the definition in 82.2.12 says the dynamic skew is defined as the change in total skew over the "time that the link is operational". This "operational time" itself needs to be defined - is it only the length of time needed to measure BER = 10^-12 or something shorter or longer?

Response ACCEPT IN PRINCIPLE.

Suggested remedy A, B, D are covered by the resolution of #431. For C, skew variation should not be defined differently because there are different contributors to the effect. If the commenter feels differently, additional justification is required.

Comment Type TR Comment Status A

Regarding the skew values at SP3 & SP4, they should be revised considering the flexible Optical MUX/DEMUX device selection.
In case of using 1x2 port O-MUX/DEMUX devices, the skew of 10nm each (for Sending & Receiving portion, respectively) is necessary.

Suggested Remedy

Regarding Table80-3, the skew value at SP3 & SP4 should be revised.
SP3: 44ns-->53ns, 454UI-->547UI, 227UI-->273UI
SP4: 144ns-->136ns, 1484UI-->1403UI, 742UI-->701UI

Related sections below should be revised accordingly,
Sec 84.5 The 3rd & 4th paragraph
Sec 85.5 The 3rd & 4th paragraph
Sec 86.2.2 The 3rd & 4th paragraph
Sec 87.3.2 The 3rd & 4th paragraph
Sec 88.3.2 The 3rd & 4th paragraph

There exists a presentation on this issue.

Response ACCEPT IN PRINCIPLE.

[Editor's note: This comment also affects Clause 84, Clause 85, Clause 86, Clause 87, and Clause 88]

Move skew point 5 and 6 as per slide 6 and adopt maximum skew values from slide 7 in isono_01_0109.
Apply these skew limits throughout the rest of the draft.

Also see comment #445
<table>
<thead>
<tr>
<th>Cl 80</th>
<th>SC 80.4</th>
<th>P 121</th>
<th>L 10</th>
<th>#</th>
<th>445</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dudek, Mike</td>
<td>JDSU</td>
<td><strong>Comment Type</strong></td>
<td>TR</td>
<td><strong>Comment Status</strong></td>
<td>A</td>
</tr>
<tr>
<td><strong>Skew</strong></td>
<td>There is insufficient skew allowed for some desirable implementations between SP2 and SP3, and between SP4 and SP5 for the WDM mux/demuxes. There is more than enough skew allocated for the transmission medium.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SuggestedRemedy</strong></td>
<td>Change SP3 Total skew to 54ns (558 UI for 40G, and 279 UI for 100G) and SP4 skew to 134ns (1380 UI for 40G and 690 UI for 100G). In clause 80-3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Also in clause 83 section 83.5.3.5 page 190 line 53 change 144ns to 134ns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>ACCEPT IN PRINCIPLE.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>See response for #280.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cl 80</th>
<th>SC 80.4</th>
<th>P 121</th>
<th>L 22</th>
<th>#</th>
<th>642</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trowbridge, Stephen</td>
<td>Alcatel-Lucent</td>
<td><strong>Comment Type</strong></td>
<td>E</td>
<td><strong>Comment Status</strong></td>
<td>A</td>
</tr>
<tr>
<td><strong>Skew</strong></td>
<td>Should use same number of significant digits for 1 ui for 40GBASE-R and 100GBASE-R. Also line 46-47.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SuggestedRemedy</strong></td>
<td>Use same number of significant digits for both 40GBASE-R and 100GBASE-R.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>ACCEPT IN PRINCIPLE.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>See response for #280.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cl 80</th>
<th>SC 80.4</th>
<th>P 121</th>
<th>L 33</th>
<th>#</th>
<th>625</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dawe, Piers</td>
<td>Avago Technologies</td>
<td><strong>Comment Type</strong></td>
<td>TR</td>
<td><strong>Comment Status</strong></td>
<td>A</td>
</tr>
<tr>
<td><strong>Skew</strong></td>
<td>Dynamic Skew at SP2 (400 ps or 4 UI) is excessive; OIF has 1.5 UI at SP1(?) and that's after they sandbagged it. Because a group of 4 differential traces can be kept more equal in length than a group of 10, the Dynamic Skew for 40G should be lower than that for 100G. See another comment for estimates of dynamic skew; it's hard to see it being as large as 50 ps at SP1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SuggestedRemedy</strong></td>
<td>Change limit for Dynamic Skew at SP1 to 0.1 or 0.15 ns (which is 1.5 UI for 10G lanes). Change limit for Dynamic Skew at SP2 to 0.2 or 3 ns (which is 3 UI for 10G lanes).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>REJECT.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>See response to comment #616.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cl 80</th>
<th>SC 80.4</th>
<th>P 121</th>
<th>L 44</th>
<th>#</th>
<th>177</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gustlin, Mark</td>
<td>Cisco</td>
<td><strong>Comment Type</strong></td>
<td>T</td>
<td><strong>Comment Status</strong></td>
<td>R</td>
</tr>
<tr>
<td><strong>Skew</strong></td>
<td>Table 80-4 does not have an entry for 100GBASE-R dynamic skew in UIs at the PCS receive, in clause 82 we do have it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SuggestedRemedy</strong></td>
<td>Add in 21 UI for a pcs lane dynamic skew at the 100GBASE-R rx pcs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>REJECT.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>This comment was WITHDRAWN by the commenter.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cl 81</th>
<th>SC 81.1</th>
<th>P 123</th>
<th>L 49</th>
<th>#</th>
<th>176</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gustlin, Mark</td>
<td>Cisco</td>
<td><strong>Comment Type</strong></td>
<td>T</td>
<td><strong>Comment Status</strong></td>
<td>R</td>
</tr>
<tr>
<td><strong>Skew</strong></td>
<td>Remove the editor's note and live with the MII name.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SuggestedRemedy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td>REJECT.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>This comment was WITHDRAWN by the commenter. Overtaken by comment #172.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The MII is scalable and capable of supporting speeds of operation above 10 Gb/s. anything other than 40 Gb/s or 100 Gb/s is out of scope for the project.

**Suggested Remedy:**
reword sentence -
The MII is scalable and capable of supporting speeds of 40 Gb/s and 100 Gb/s.

**Response Status:**
ACCEPT.

**Suggested Remedy:**
The XLGMII and CGMII (like the original MII, GMII and XGMII) maximize media independence by cleanly separating the Data Link and Physical Layers of the OSI seven-layer reference model.

**Suggested Remedy:**
The XLGMII and CGMII maximize media independence by cleanly separating the Data Link and Physical Layers of the OSI seven-layer reference model.

**Response Status:**
ACCEPT.

There are two types of description for 'signalling' in D1.1 such as 'singling' or 'signalling.' Both description are correct, but 'signalling' is mostly used across the entire document. So, to maintain consistency, it will be better to change 'signalling' to 'signaling.' These changes also should be done in the following line.

- page 255, line 39
- page 278, line 6
- page 279, line 6
- page 352, line 17 & line 24
- page 351, line 46
- page 352, line 35, ...

**Suggested Remedy:**
Replace "The Reconciliation Sublayer (RS) shall map the signals provided at the MII to the PLS service primitives defined in Clause 6" with "The Reconciliation Sublayer (RS) maps the signals provided at the MII to the PLS service primitives defined in Clause 6"

**Response Status:**
REJECT.
This is consistent with clause 46.
Comment Type E  Comment Status A  signaling
'signalling' is used at the same time with 'signaling' through the draft 1.1.

SuggestedRemedy
I suggest to use one kind of spelling.
I suggest `signaling`.

Response  Response Status C  ACCEPT.
Also a duplicate of #158 and #310.

Comment Type E  Comment Status A  signaling
"Clause 46" is an external link

SuggestedRemedy
Make it dark blue

Response  Response Status C  ACCEPT.

Comment Type E  Comment Status A  signaling
"signalling" should be "signaling"

SuggestedRemedy
change "signalling" to "signaling"

Response  Response Status C  ACCEPT.
Agreed, this is a duplicate of #158.
### Comment 318

**Comment Type:** T  **Comment Status:** A  **Tpat**

The text says that the PCS sends out the test pattern on four or twenty lanes simultaneously and then goes on to say that the scrambler generates the test pattern. I think the text would be clearer if it made explicit that the test pattern is generated as a single stream by the scrambler and then distributed to the lanes in the same way as normal packet data coming from the upper layers.

**Suggested Remedy**

Move the third paragraph to be the first in the subsection, then change the current first to read something like:

"When the transmit channel is operating in test-pattern mode, the encoded data stream is distributed to the PCSL in the same way as normal packet data. There will be four separate data streams ..."

**Response**

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

**Change:**

"When the transmit channel is operating in test-pattern mode, the encoded data stream is distributed to the PCSL in the same way as normal packet data. There will be four separate data streams ..."

### Comment 319

**Comment Type:** T  **Comment Status:** A  **Ofelt, David Juniper Networks**

There is no mention of the fact the PCSL need to get muxed back into a single stream in this part of the document. 82.2.2 does mention re-forming the single stream of 66b blocks, but it seems appropriate to also include it in the more detailed list of functions.

**Suggested Remedy**

Add text to the Alignment marker removal subsection:

"Once the alignment markers are removed, the lanes are muxed together in the proper order to reform the single stream of blocks"

**Response**

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

**Change:**

"After all lanes are aligned and deskewed, then the alignment markers are removed. The alignment markers are deleted from the data stream. The difference in rate from the deleted alignment markers is compensated for by inserting idles by a function in the Receive process." to

"After all lanes are aligned and deskewed, the lanes are multiplexed together in the proper order to reconstruct the original stream of blocks and the alignment markers are deleted from the data stream. The difference in rate from the deleted alignment markers is compensated for by inserting idles by a function in the Receive process."

### Comment 314

**Comment Type:** E  **Comment Status:** A  **Ofelt, David Juniper Networks**

Figure 82-10

The block labeled "TSEST_SH2" should be "TEST_SH2"

**Suggested Remedy**

Change label to "TEST_SH2"

**Response**

**Response Status:** C  **Response:** ACCEPT.
Cl 82  SC 2.18.3  P 170  L 24  # 315
Ofelt, David  Juniper Networks  

Comment Type  E  Comment Status  A

Figure 82-11

Goto labels are different style than other figures.

Figure 82-14 on page 172 has house shaped boxes for the gotos and circled letters for the destination markers, but 82-11 just has plain letters.

Suggested Remedy
Make the figure style consistent.

Response  ACCEPT.

Cl 82  SC 2.4.4  P 155  L 22  # 289
Szczepanek, Andre  Texas Instruments  

Comment Type  T  Comment Status  A

FIGURE 82-5

The Payload encoding for Ordered Sets : OoD1D2D3D4D5D6D7 as D1-D2-D3-Oo-C4-C5-C6-C7 is confusing and imprecise.

Although Table 82-1 indicates "control codes are set to 0x00", defining this fixed 28 bit zero field in terms of control characters is confusing as there are no corresponding control characters on the MII, no definition of what happens on decode if non-zero control fields are received, what happens if D4-D5-D6-D7 are non-zero from the MII, or how D4-D7 are generated on decode.

Note that the definition of valid and invalid blocks in 82.2.4.5 only requires "Any control character contains a value not in Table 82-1". This is insufficient to invalidate Ordered set control field values of 0x1e.

Clearly what we intend is that the C4-C7 payload bits be zero and the D4-D7 MII characters be zero data bytes, anything else should be invalid.

So state this explicitly in the figure - don't pretend these fields are equivalent to the data or control fields in other block types, they aren't.!

Suggested Remedy
Define the payload field bits corresponding to C4-C5-C6-C7 explicitly as zero in Figure 82-5. Show these 28 bits as a single 0x000_0000 field. There are hex values in the figure already - just merge the C4-C7 cells and put 0x000_0000 in the merged cell.

Define the Input "data block format" for ordered sets as OoD1D2D3Z4Z5Z6Z7 where Zn is a zero value data character.

These 2 changes will explicitly define the encoding and decoding process for ordered sets.

Response  ACCEPT.

Make the proposed changes.
Ordered sets consist of a control character followed by seven data characters on the MII.

Suggested Remedy:
Ordered sets consist of a control character followed by three data characters followed by 4 zero data characters on the MII.

Response
ACCEPT.

The PCS connects to the PMD via the PMA and possibly FEC, not "directly"

Suggested Remedy:
delete the word "directly"

Response
ACCEPT.

It is not clear whether the test pattern is at the bit rate or whether the test pattern is generated separately for each lane. It needs to be at the bit rate as having the same pattern sent out on all lanes at the same time will result in 11 00 etc patterns on the lanes after bit interleaving. Note that a property of a PRBS is that when taking every n bits of the PRBS the resulting data stream is the same PRBS with a time shift so each stream will still have the same PRBS, but they will be offset in time such that when interleaved the 11 00 problem doesn't occur.

Suggested Remedy:
change "sends the test pattern in 4 separate data streams(for 40GBASE-R) or 20 separate data streams (for 100GBASE-R)" to "sends the serial test pattern distributed in the normal manner over the 4 separate data streams(for 40GBASE-R) or 20 separate data streams (for 100GBASE-R)."

Response
ACCEPT IN PRINCIPLE.
Overtaken by #318.
The term used for the PCS generated test pattern is "pseudo-random". This name, however, is easily confused with two of the PMA generated patterns PRBS31 and (likely) PRBS9. It would be better to change the name in line with that used in Tables 87-10 and 88-14 "Scrambled idle"

SuggestedRemedy
Change to:
"There is a single type of required PCS transmit test pattern: scrambled idle. The scrambled idle test-pattern mode is ..." and "When scrambled idle pattern is selected, the test pattern..."

Also in 82.2.17 change "pseudo-random" to "scrambled idle" in 6 places

Response Response Status C

ACCEPT IN PRINCIPLE.

It's not desirable to test a DTE receiver's sensitivity by sending it scrambled idle, because if the DTE is not explicitly put into test mode it will start sending frames to the tester. Better to send it scrambled RF. A network operator may wish to assess a signal received from another operator whose equipment it cannot put into test mode. That signal will be RF unless the other operator's receiver is receiving correctly, when it will be idle.

SuggestedRemedy
It would be helpful if the test-pattern generator and checker could generate and check scrambled RF as well as scrambled idle. I expect that a checker could be made that counts errors well enough without being told whether RF or idle is intended.

Response Response Status C

REJECT.
This proposes essentially a new test pattern, I would like to see additional details on the proposal in a few slides and have that presented to the group to justify the request.
272

Comment Type T

"00D1D2D3D4D5D6D7" at the Data Block Format column is wrong description.

SuggestedRemedy

Should be changed from "00D1D2D3D4D5D6D7" to "00D1D2D3C4C5C6C7"

Response Response Status C

REJECT.

The commenter is correct, but this has been overtaken by comment #289.

271

Comment Type E

At the sentence "Receipt of an /S/ on any other octet of TxD indicates an error.", TxD is wrong spelling.

SuggestedRemedy

Spelling : TxD should be changed TXD.

Response Response Status C

ACCEPT.

273

Comment Type T

The sentence "Ordered sets consist of a control character followed by seven data characters on the MII." is wrong description. In Figure 82-5 line 22, Ordered sets consist of data and control characters.

SuggestedRemedy

Should be changed from "Ordered sets consist of a control character followed by seven data characters on the MII." to "Ordered sets consist of a Block Type Field followed by three data characters and four control characters on the MII." or The sentence should be changed properly.

Response Response Status C

REJECT.

This is talking about where the ordered set on the MII, not in the 64b/66b encoding. It is correct as stated.

103

Comment Type E

Add a period at the end.

SuggestedRemedy

ACCEPT.

443

Comment Type E

PCS distributes the 66-bit block to n lanes. Actually figure 82-6 shows (n+1) distributions.

SuggestedRemedy

66b Block distribution should end with '66b Block n-1', '66b Block 2(n-1)', and etc. Or, First 66b Block distribution should start with 66b Block 1, 66b Block n+2, and etc.

Response Response Status C

ACCEPT.

Change numbering to 0 to n-1 in figure 82-6.
<table>
<thead>
<tr>
<th>Comment</th>
<th>Type</th>
<th>Status</th>
<th>Response</th>
<th>Suggested Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actually figure 82-7 and 82-8 shows n lanes.</td>
<td>T</td>
<td>A</td>
<td></td>
<td>Lane start with Lane0 and finish Lane n. The number of Lane is n+1. Lane n should be (n-1) Lane n-1.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Change to 0 to n-1 numbering in figures 82-7 and -8. Make block numbering consistent with lane numbering.</td>
<td></td>
</tr>
<tr>
<td>Better to consider &quot;n&quot; to be the number of PCS lanes which are numbered 0 through n-1</td>
<td>E</td>
<td>A</td>
<td></td>
<td>Replace largest lane number by n-1.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several customers have commented that while counting sync header errors (nicholl_02_0508 and implemented in D1.1) is very useful for monitoring the long term bit error rate performance of a link, it does not provide a method to detect isolated and/or infrequent error events.</td>
<td>TR</td>
<td>A</td>
<td></td>
<td>Modify the format of the alignment marker to include a BIP8 (Bit Interleaved Parity) error check for each PCS lane. Please see nichol_01_0109 for details of the proposal.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Comment Type:** TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general  
**COMMENT STATUS:** D/dispatched  A/accepted  R/rejected  
**RESPONSE STATUS:** O/open  W/written  C/closed  U/unsatisfied  Z/withdrawn  
**SORT ORDER:** Clause, Subclause, page, line
Figure 83-2
I think the text describing the MMD numbering would be clearer if the figure was labeled with the MMD register numbers.

Suggested Remedy
Add MMD 1, 8, and 9 labels to the figure. If there are more example figures in an annex, then label them as well.

Response
ACCEPT IN PRINCIPLE.
Actually MMD 1, 8, 9, 10 for Figure 83-2. Also add MMD labeling to all of the examples in Annex 83B.

The PMAs can support any of the respective PMDs
The 40GBASE-R PMA(s) can support one of the following PMDs: 40GBASE-SR4, 40GBASE-LR4, 40GBASE-CR4, or 40GBASE-KR4. The 100GBASE-R PMA(s) can support one of the following PMDs: 100GBASE-SR10, 100GBASE-LR4, 100GBASE-ER4, or 100GBASE-CR10.

Suggested Remedy
change "one" to "any"

Response
ACCEPT.

This is the first time that PCSL is introduce, add the non abbreviation here, PCS Lane. Then remove PCS Lane from the followin page (line 42).

Suggested Remedy
as above.

Response
ACCEPT.

Comment on PMA loopback modes, pattern generator and checkors.
As indiated by nicholl_01_1108.pdf, every 10GbE PHY device supports some kinds of PMA Loopbacks. I would recommend 802.3ba adopt at least PMA line loopback as mandatory which is extremely usefully for RX SRS test.

Actually currently IC advances has enabled the implementation of much more test features such as embedded BER monitoring, waveform viewing etc. I plan to provide some slides for this.

Suggested Remedy
Suggest to eliminate optional for g) and add the following after h)-
"The system and line loopback modes can be useful for both physical-layer test and debug purpose such as RX SRS test."

Response
REJECT.
Making loopback mandatory would require TF consensus. See comment #590 resolution for discussion of why line loopback may be burdensome in some cases.
### Comments

<table>
<thead>
<tr>
<th>Cl 83</th>
<th>SC 83.1.3</th>
<th>P 182</th>
<th>L 47</th>
<th># 201</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anslow, Peter</td>
<td>Nortel Networks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>Suggested Remedy</strong></td>
<td><strong>Response</strong></td>
<td><strong>Response Status</strong></td>
</tr>
<tr>
<td>T</td>
<td>A</td>
<td>The terms &quot;system loopback&quot; and &quot;line loopback&quot; do not clearly convey what function they perform. Also, clause 45 uses the term &quot;line-side loopback&quot; A separate comment is submitted against clause 45 - these comments must be resolved together.</td>
<td>Change all instances of &quot;system loopback&quot; to &quot;local loopback&quot; and all instances of &quot;line loopback&quot; to &quot;remote loopback&quot;.</td>
<td>ACCEPT.</td>
</tr>
<tr>
<td>Cl 83</td>
<td>SC 83.1.3</td>
<td>P 182</td>
<td>L 53</td>
<td># 524</td>
</tr>
<tr>
<td>Dawe, Piers</td>
<td>Avago Technologies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>Suggested Remedy</strong></td>
<td><strong>Response</strong></td>
<td><strong>Response Status</strong></td>
</tr>
<tr>
<td>T</td>
<td>A</td>
<td>There seem to be more test pattern and loopback options than are needed.</td>
<td>See presentation.</td>
<td>ACCEPT.</td>
</tr>
<tr>
<td>Cl 83</td>
<td>SC 83.1.3</td>
<td>P 182</td>
<td>L 49</td>
<td># 619</td>
</tr>
<tr>
<td>Latchman, Ryan</td>
<td>Gennum Corp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>Suggested Remedy</strong></td>
<td><strong>Response</strong></td>
<td><strong>Response Status</strong></td>
</tr>
<tr>
<td>T</td>
<td>A</td>
<td>Test Pattern generation / detection is optional. (see 83.5.9 - Where the output lanes of the PMA appear on a physically instantiated interface XLAUI/CAUI or the PMD service interface (whether or not it is physically instantiated), the PMA may optionally generate and detect test patterns)</td>
<td>&quot;Provide test pattern generation and detection&quot;*</td>
<td>ACCEPT.</td>
</tr>
</tbody>
</table>

---

* See response to comment #193.
Comment Type: ER
Comment Status: A

MDIO serial interface first appear for clause 83.

Suggested Remedy:
MDIO stands for the Management data input/output interface, specified in 802.3ae clause 45.

Response: Response Status C
ACCEPT IN PRINCIPLE.

Since clause 45 has existed for some time, only need to reference clause 45 (no need to single out 802.3ae)

Comment Type: T
Comment Status: A

"MMD 8 is the closest to the PMD and MMD 10 is the farthest from the PMD"

Suggested Remedy:
"MMD 8 is the 2nd closest MMD to the PMD and MMD 10 is the farthest from the PMD"

Response: Response Status C
ACCEPT.

Comment Type: T
Comment Status: A

By default, the PMA sublayer that is closest to the PMD is addressed as MDIO Manageable Device (MMD) 1. More addressable instances of PMA sublayers, each one separated from lower addressable instances by chip-to-chip interfaces, may be implemented and addressed as MMD 8, 9 and 10, where MMD 8 is the closest to the PMD...

The PMA closest to the PMD seems to be numbered both 1 and 8 in this part of the text, but it is clear later on that MMD 8 is for the second-closest PMA to the PMD.

Suggested Remedy:
Change the text to read:
"where MMD 8 is the second closest to the PMD..."

Response: Response Status C
ACCEPT.

[Editor's note: The commenter did not indicate the comment type, hence added comment type as Technical] Also addressed comment 180.

Comment Type: T
Comment Status: A

Remove the editor's note and add in the informative annex.

Suggested Remedy:
as above.

Response: Response Status C
ACCEPT IN PRINCIPLE.

Don't include 2nd generation CAUI examples from trowbridge_01_0109. Add single XLAUI/CAUI without FEC example using 10:4 in lower 100GBASE-R PMA. Editorial license.
<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>83.1.4</td>
<td>183</td>
<td>6</td>
<td>369</td>
</tr>
<tr>
<td>Ganga, Ilango</td>
<td>Intel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong>: T</td>
<td><strong>Comment Status</strong>: A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide additional examples in an informative annex as per Editor's note and/or delete the Editors note.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suggested Remedy</strong>: As per comment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td><strong>Response Status</strong>: C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCEPT IN PRINCIPLE.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>See response to comment #179.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>83.1.4</td>
<td>184</td>
<td>17</td>
<td>327</td>
</tr>
<tr>
<td>CHANG, Frank</td>
<td>Vitesse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong>: TR</td>
<td><strong>Comment Status</strong>: A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referring to Fig. 83-2, {1,2,4} or {1,2,4,5,10,20} causes confusions for PMA input/output lanes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suggested Remedy</strong>: Actually only one option {4} for 40G-R; while {4,10,20} for 100G-R.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Or to take the whole paragraph out.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td><strong>Response Status</strong>: C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCEPT IN PRINCIPLE.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change &quot;The number of input lanes and the number of output lanes for a PMA are always divisors of the number of PCSLs. For PMA sublayers supporting 40GBASE-R PMDs, the number of PCSLs is 4, so the number of input lanes and output lanes are selected from the set {1, 2, 4}. For PMA sublayers supporting 100GBaser PMDs, the number of PCSLs is 20, so the number of input lanes and output lanes are selected from the set {1, 2, 4, 5, 10, 20}.* to &quot;The number of input lanes and the number of output lanes for a PMA are always divisors of the number of PCSLs. For PMA sublayers supporting 40GBASE-R PMDs, the number of PCSLs is 4, and for PMA sublayers supporting 100GBaser PMDs, the number of PCSLs is 20.*&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>83.2</td>
<td>186</td>
<td>32</td>
<td>628</td>
</tr>
<tr>
<td>Dawe, Piers</td>
<td>Avago Technologies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong>: TR</td>
<td><strong>Comment Status</strong>: R</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Text says all these pattern generators, checkers and loopbacks are optional. This diagram implies otherwise.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suggested Remedy</strong>: Add new first note: Loopbacks and test pattern generators and detectors are optional.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td><strong>Response Status</strong>: C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REJECT.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The text is clear that these are optional. It doesn't need to be reiterated everywhere test patterns and loopbacks are mentioned or illustrated.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>83.2</td>
<td>186</td>
<td>35</td>
<td>655</td>
</tr>
<tr>
<td>Trowbridge, Stephen</td>
<td>Alcatel-Lucent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong>: T</td>
<td><strong>Comment Status</strong>: R</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decide whether (a) System loopback should be optional anywhere there is an exposed interface above; and if so, (b) Can test pattern generation/detection be limited to generating in transmit path and detecting in receive path, combining with loopback? Tradeoff of extra complexity and more registers for finer granularity fault localization.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suggested Remedy</strong>: A presentation will be provided to illustrate the two options. A decision should be made based on the consensus.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td><strong>Response Status</strong>: C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REJECT.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This comment was WITHDRAWN by the commenter.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>83.2</td>
<td>186</td>
<td>4</td>
<td>191</td>
</tr>
<tr>
<td>Gustlin, Mark</td>
<td>Cisco</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong>: T</td>
<td><strong>Comment Status</strong>: A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In figure 83-5, the indications and requests should have an x to indicate that they apply to multiple bits.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Suggested Remedy</strong>: Add the italic x to each indication and request (except for the status).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td><strong>Response Status</strong>: C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCEPT.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Comment Type T  Comment Status R
If the PMD uses Auto-negotiation, there is another primitive AN_LINK.indication which think is passed without modification from PMD to PCS.
SuggestedRemedy
Add conditional AN_LINK.indication.
Response  Response Status C
REJECT.

AN is below the PMD, so the PMD should turn AN_LINK.indication into PMD_SIGNAL.indication

Comment Type E  Comment Status A
Following D1.1 comment 335 through.
SuggestedRemedy
Change PMA_UNITDATA.indication(rx_bit) to PMA_UNITDATA.indication(rx_bit). i.e. without the space. Same in following subclauses e.g. 83.3.3.1.
Response  Response Status C
ACCEPT.

Comment Type T  Comment Status A
If we have PMAs_server_SIGNAL.indication(SIGNAL_OK) it would be better to:
SuggestedRemedy
Change Signal Indicate Logic to Signal Indication Logic, throughout.
Response  Response Status C
ACCEPT.

Comment Type T  Comment Status A
The PMA has no concern with the 'bit-rate'; that's what the MAC uses and the rate is modified by the line coding in the PCS before the PMA sees a signal.
SuggestedRemedy
Change 'nominal bit-rate' to 'nominal signaling rate', twice in this paragraph.
Response  Response Status C
ACCEPT.
Depending CDR or serdes implementation, PMA don't have to recover clock from the received signal if for CDR.

SuggestedRemedy
"....optionally to recover clock from the received signal, and to provide test signals...."

Response
Response Status C
ACCEPT IN PRINCIPLE.

Overtaken by events. See comment 395 resolution.

Tracking the last little bit of skew costs power in high speed analog circuitry. The PCS and PMA implemented as a silicon chip in a package on a PCB have no need to generate as much as 200 ps of Dynamic Skew. There could be several x 10 ps gate delay, most of which is correlated lane to lane (giving maybe 5 ps Dynamic Skew) plus perhaps 2" or 400 ps mismatched lane lengths on the PCBs, which might change by 5% over temperature and humidity: that's 20 ps. Total 25 ps. 50 ps should be adequate. Because the last fraction of a bit must be tracked in an analog way, rounding up to the next UI is not helpful. After padding, CEI chose a 1.5 UI limit for 'Relative Wander' (their term for Dynamic Skew).

SuggestedRemedy
Change SP1 Dynamic Skew output and tolerance limits to 150 ps or less, e.g. 100 ps. Similarly, reduce SP2 Dynamic Skew output and tolerance limits to 300 ps or less, e.g. 200 ps.

Response
Response Status C
REJECT.
SP1 is defined at the "lowest" CAUI, which could include dynamic skew accrued through up to 3 PMA sublayers and FEC. Any change here needs to be aligned with clause 80.4

It is unclear that for physical instantations XLAUI / CAUI that retiming is required and no apparent PIC for it.

SuggestedRemedy
Presentation with proposed remedy to be provided.

Response
Response Status C
ACCEPT IN PRINCIPLE.

Charter the editors to remove references to CDRs in 83.5.1 and 83.5.4. Specify that a shall statement is included regarding the electrical requirements.
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>Type</th>
<th>Status</th>
<th>Comment</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>83.5.5</td>
<td>191</td>
<td>3139</td>
<td>ER</td>
<td>R</td>
<td>Assume 87.2 will also specify PMD service interface (for 40G-LR4), expecting 40G-LR4 will likely implement the similar limiting interface based on 4xLR.</td>
<td>REJECT.</td>
</tr>
<tr>
<td>83</td>
<td>83.5.7</td>
<td>191</td>
<td>10</td>
<td>T</td>
<td>A</td>
<td>Fix the TBDs</td>
<td>ACCEPT IN PRINCIPLE.</td>
</tr>
<tr>
<td>83</td>
<td>83.5.7</td>
<td>191</td>
<td>52</td>
<td>E</td>
<td>A</td>
<td>Make system side loopbacks optional for any PMA sublayer, not just the uppermost. Many devices will implement them, so it would be good to have the management information to be consistent.</td>
<td>ACCEPT.</td>
</tr>
</tbody>
</table>

This comment was WITHDRAWN by the commenter.
Having the PMA system loopback at the top of the PMA stack (i.e. inside the same chip as the PCS) means that it doesn't test most of the PMA, and is not the way loopback is usually done. For example, 51.8 says NOTE-Loopback mode may be implemented either in the parallel or the serial circuitry of a device, and 50.3.9 says NOTE-The signal path through the WIS that is exercised in the Loopback mode of operation is implementation specific, but it is recommended that this signal path encompass as much of the WIS circuitry as is practical.

Three uses of system loopback - exercising the sublayers above, verifying correct operation of most of the PMA, and identifying a faulty part are achieved by this. If sometimes the lanes are re-ordered, so much the better for exercising the sublayers above. Diagnosing one bad lane is a specialist situation that this loopback need not cover - the lane by lane pattern checkers may be useful for this (although not in D1.1 where the checkers are below the loopback point).

The system loopback should be in the lowest PMA above any connector.

**Suggested Remedy**

**Change**

At the PMA service interface, the uppermost PMA sublayer (the one closest to the PCS) may provide a system loopback function. The function involves looping back each input lane to the corresponding output lane. Each bit received from the PMA_UNITDATA.request(tx_bit) primitive is looped back in the direction of the PCS using the PMA_UNITDATA.indication(rx_bit) primitive.

to

The PMA sublayer directly above the higher of any demountable electrical connectors between sublayers (if there is no such connector, the lowest PMA) may provide a system loopback function. The function involves looping back each input lane to an output lane.

NOTE-The signal path through the PMA that is exercised in the Loopback mode of operation is implementation specific, but it is recommended that this signal path encompass as much of the PMA circuitry as is practical.

Adjust Fig 83-5 and change note 3 to 'See 83.5.7.'

**Response**

**Response Status** C

ACCEPT IN PRINCIPLE.

Change notes 3 and 4 in Figure 83-5 to indicate "optional" rather than a required location for local and remote loopbacks.

Change in 83.5.7:

From:
"At the PMA service interface, the uppermost PMA sublayer (the one closest to the PCS) may provide a system loopback function.”

To:
"The PMA sublayer may provide a local loopback function.”

Editorial license to look for other unnecessary location constraints.

**Comment Status** A
Line loopback is something you should not expect of the module. In particular, small 100G modules are likely to use a double decker construction with the separate transmit and receive planes and no cheap and satisfactory way of making a high speed connection between them.

**Suggested Remedy**

Change

Line loopback is only applicable for the lowermost PMA (the one closest to the PMD) at the PMD service interface. When line loopback is enabled, each bit received over the PMD service interface via the x=0 to q-1. Note that "PMA server" can represent the FEC, PMD, or another PMA sublayer. PMAserver_UNITDATA.indication(x_bit) primitive is sent back toward the PMD via the PMAserver_UNITDATA.request(x_bit) primitive.

If the PMD can be removed, line loopback is only applicable for the PMD directly above the demountable electrical connector closest to the PMD at the PMD service interface. If the PMD cannot be removed, line loopback is only applicable for the lowermost PMA (the one closest to the PMD) at the PMD service interface. Adjust Fig 83-5 and change note 4 to "See 83.5.7."

**Response**

ACCEPT IN PRINCIPLE.

Change:

"Line loopback is only applicable for the lowermost PMA (the one closest to the PMD) at the PMD service interface."

to

"Remote loopback, if provided, should be implemented in a PMA sublayer close enough to the PMD to maintain the bit sequence on each individual PMD lane."

The text says: "When line loopback is enabled, each bit received over the PMD service interface via the x=0 to q-1. Note that "PMA server" can represent the FEC, PMD, or another PMA sublayer. PMAserver_UNITDATA.indication(x_bit) primitive is sent back toward the PMD via the PMAserver_UNITDATA.request(x_bit) primitive." which doesn't make sense.

**Suggested Remedy**

Change to "When line loopback is enabled, each bit received over the PMD service interface via the PMAserver_UNITDATA.indication(x_bit) primitive is sent back toward the PMD via the PMAserver_UNITDATA.request(x_bit) primitive."

**Response**

ACCEPT.

Change to "When line loopback is enabled, each bit received over the PMD service interface via the x=0 to q-1. Note that "PMA server" can represent the FEC, PMD, or another PMA sublayer. PMAserver_UNITDATA.indication(x_bit) primitive is sent back toward the PMD via the PMAserver_UNITDATA.request(x_bit) primitive." to

"When remote loopback is enabled, each bit received over the PMD service interface via the PMAserver_UNITDATA.indication(x_bit) primitive is sent back toward the PMD via the PMAserver_UNITDATA.request(x_bit) primitive."

Response Status: C
Comment Type: E  Comment Status: A
via the x=0 to q-?

Suggested Remedy:
Correct the paragraph.

Response  Response Status: C
ACCEPT IN PRINCIPLE.

Replace "When line loopback is enabled, each bit received over the PMD service interface via the x=0 to q-1," with "When line loopback is enabled, each bit received over a lane of the PMD service interface via PMD_UNITDATA.indicationx is looped back to the corresponding output lane via PMD_UNITDATA.requestx". Delete the sentence about PMAserver because it is only relevant when PMAserver=PMD.

Note that this was modified after the meeting to change PMD back to PMAserver since the text was softened by comment #624 that the remote loopback doesn't necessarily have to be in the lowest PMA, but low enough to guarantee the bit sequence of each looped back lane.

Comment Type: T  Comment Status: A
The reference to Clause 45 should be fixed - it should also match the one in the previous subclause.

Suggested Remedy:
Change the first sentence in the paragraph from

If a Clause 45 MDIO is implemented, then this function maps to the PMA line loopback function as specified in 45.2.1.1.4.

to

If a Clause 45 MDIO is implemented, then the ability to perform this function is indicated in register 1.13.15 (45.2.1.12a.1).

Response  Response Status: C
ACCEPT.

Comment Type: T  Comment Status: A
Control register bit reference needs fixing

Suggested Remedy:
After "PMA/PMD Control register 1"

Add "(register 1.0.1.1, see 45.2.1.1.4a)"

Response  Response Status: C
ACCEPT.
Comment Type: T  Comment Status: A

PMA test patterns sub-clause states that PMA test patterns maybe optionally generated (line 38). However, the title of the sub-clause does not state that it is optional, which may lead to confusion that PMA test patterns have to be supported in a PMD.

Suggested Remedy
The title of the sub-clause should be changed to:

PMA test patterns (optional)

Similar for example to sub-clause 83.5.7 title (PMA system loopback mode (optional). Further clarification should be added that if the PMA contains a SerDes function (for example 10:4 as in 100GBASE-LR4 and 100GBASE-ER4) then test pattern support is not optional, and test patterns have to be supported.

Further clarification should be added that if the PMA does not support test patterns, then sub-clause 83.5.7 is not optional, and PMA system loopback mode must be supported. In other words, either PMA test patterns are optional or PMA PMA system loopback is optional, but not both. This is to permit verification of nAUI functionality by the host.

Response  Response Status: C
ACCEPT IN PRINCIPLE.

Adding (optional) to the titles as requested is OK. But test patterns remain optional without task force consensus to change this.

Comment Type: ER  Comment Status: R

to define various test patterns.

Suggested Remedy
Suggest to add the following paragraph:
PMA test patterns can be the square wave, PRBS31, and mixed-frequency test patterns as described in section 50.3.8 of IEEE Standard 802.3ae as well as the Test Signal Structure (TSS) and continuous identical digits (CID) pattern.

Response  Response Status: C
REJECT. Agreed test patterns are square 8, PRBS31, PRBS9 (based on other comments), and scrambled idles from the PCS, which are all described in the text.
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>Comment</th>
<th>Comment Status</th>
<th>SuggestedRemedy</th>
<th>Response</th>
<th>Response Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>83.5.9</td>
<td>192</td>
<td>44</td>
<td>T</td>
<td>A</td>
<td>Much more description is needed to map the functions to Clause 45.</td>
<td>Replace &quot;If a Clause 45 MDIO is supported, then these functions map to the PMA test pattern functions as specified in TBD.&quot;</td>
<td>ACCEPT.</td>
</tr>
<tr>
<td>83</td>
<td>83.5.9</td>
<td>192</td>
<td>44</td>
<td>T</td>
<td>A</td>
<td>Ditch the TBD!</td>
<td>Replace TBD with &quot;registers 1.30 through 1.39 (see 45.2.1.1.12d)&quot;</td>
<td>ACCEPT.</td>
</tr>
<tr>
<td>83</td>
<td>83.5.9</td>
<td>192</td>
<td>50</td>
<td>TR</td>
<td>A</td>
<td>There is no requirement stated for the relative positions of the prbs sequences on the various lanes.</td>
<td>Add at the end of the paragraph. There shall be at least 31 bits delay between the PRBS31 patterns generated on one lane and any other lane.</td>
<td>ACCEPT.</td>
</tr>
</tbody>
</table>

Comment Status: D/dispatched A/accepted R/rejected Response Status: O/open W/written C/closed U/unsatisfied Z/withdrawn

Type: TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general

Sort Order: Clause, Subclause, page, line

Page 45 of 141
2/7/2009 4:23:35 PM
Comment Type T
Comment Status A

I believe that 'does not indicate a valid signal since the test pattern cannot, in general, transit the PMA and still be recognized.' is not correct. If the input is PRBS31 on all lanes, the output will be PRBS31 on all lanes. However, the PCS won't know what to do with it.

SuggestedRemedy
Change to 'does not indicate a valid signal since the test pattern is not meaningful to the PCS.'

Same at line 46.

Response Response Status C
ACCEPT IN PRINCIPLE.

Change to "does not indicate a valid signal." No need for lengthy explanation about why.

---

Comment Type T
Comment Status A

Editor's note suggests a choice between PRBS7 and PRBS9.

SuggestedRemedy
Choose PRBS9

Delete the editor's note, and anywhere that there is a TBD for the short PRBS pattern replace that will PRBS9 as appropriate. We had a meeting of interested parties (as solicited via the reflector) to discuss PRBS9 vs. other short patterns and the consensus was PRBS9 is the right choice.

Response Response Status C
ACCEPT.

See comment #101.

---

Comment Type TR
Comment Status A

The most useful short pattern is the PRBS9, the same as the pattern used in Clause 68. This is needed for measuring DDPWS as used in Clause 86.

SuggestedRemedy

Change TBD to PRBS9 18 places. Remove if PRBS9

Response Response Status C
ACCEPT.
Comment Type T  Comment Status A
Need a reference for Clause 45 register.

SuggestedRemedy
After "is enabled" add "by register 1.19.3 (see 45.2.1.1.12b)"

Response Response Status C
ACCEPT.

Comment Type T  Comment Status A
The only use for checking PRBS9 is if one can e.g. have most lanes carrying PRBS9 and
one lane carrying PRBS31 for lane-by-lane diagnostics when the lanes may have been re-
ordered. But I suspect this would need too much little-used PMA circuitry.

SuggestedRemedy
Consider deleting the check Tx TBD test pattern mode and check Rx TBD test pattern
mode.

Response Response Status C
REJECT.

There is consensus to add PRBS9. All test patterns are optional.

Comment Type T  Comment Status A
Need a reference for Clause 45 register.

SuggestedRemedy
After "is enabled" add "by register 1.19.1 (see 45.2.1.1.12b)"

Response Response Status C
ACCEPT.

Comment Type T  Comment Status A
Expecting the analog-oriented power-challenged semiconductors in a module to generate
and check all these test patterns. It is much easier done in a bigger more digitally oriented
IC in the host.

SuggestedRemedy
Change
Where the output lanes of the PMA appear on a physically instantiated interface
XLAlUI/CAUI or the PMD service interface (whether or not it is physically instantiated), the
PMA may optionally generate and detect test patterns.

to
Where the connection to the sublayer below uses a demountable connector, the PMA may
optionally generate and detect test patterns.

Change Figure 83-6 notes 1 and 2 to one note 'See 83.5.9'.

Response Response Status C
REJECT. The concern is covered by the fact that test patterns are optional.
Note other comment on decision between test pattern generation/detection in both directions or only generate in Tx path and detect in Rx path combined with loopback.

Suggested Remedy
In the event that it is decided to only generate test patterns in the Tx path and detect in the Rx path combined with loopback, the editors note can be removed since the case in question does not occur. If the decision is to generate and detect test patterns in both directions, one possibility is to send a test pattern downward in the Tx direction when in check test pattern mode for the Tx path from above. But this could be problematic if the interface below is not physically instantiated.

Response
See presentation trowbridge_02_0109. Since it was decided to retain detection in Tx path, just gearbox test pattern even though garbage is sent downstream. Editorial License.

Need a reference for Clause 45 register.

Suggested Remedy
After "is enabled" add "by register 1.19.0 (see 45.2.1.1.12b)"

Response
ACCEPT.

Ditch the TBD!

Suggested Remedy
Replace "TBD count" with "registers 1.30 through 1.39 (see 45.2.1.1.12d)"

Response
ACCEPT.

Editor’s note says: Per comment #485, RIN testing involves transmitting a square wave on one lane only and another pattern (PRBS31) on the other lanes. Actually, it's one lane not modulated and a mixed-frequency pattern on the other lanes, and separately, square wave on one lane and 'don't care' on the others.

Response
ACCEPT IN PRINCIPLE.

Make RIN spec informative and don't provide pattern support for it. This works for Clause 86. However, 87 and 88 have RIN specs and there might be other reasons to have one lane with a different pattern. Will try to provide more info.

Response
ACCEPT.

No specific proposal for change to PMA. Counting errored 66B blocks is done at PCS and not at PMA. This seems to refer to D1.0 comment 89 rather than D1.1.
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>A</td>
<td>Ditch the TBD!</td>
<td></td>
<td>T</td>
<td>R</td>
<td>When transmit test pattern is disabled</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replace TBD with &quot;registers 1.20 through 1.29 (see 45.2.1.1.12c)&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>A</td>
<td>Reconcile Tx square wave pattern with optical interface comment resolution. Is it necessary to have separate Tx square wave for each lane, with lanes not under test sending PRBS31?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Align per consensus to be reached in January 2009. If separate Tx square wave per lane, also need clause 45 registers for enabling per lane.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Have a bit per lane that controls enabling a square wave on that lane, any lane that the bit is not set for passes data as normal. Editorial license to implement this in clause 83 and 45.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>A</td>
<td>We do need to be able to generate square wave pattern on one lane and typical data on the other lanes to measure RIN or QSQ with crosstalk effects included. There is no need to generate the square wave pattern on all lanes at the same time.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>At this sentence change &quot;on each of the lanes&quot; to &quot;on the specified lane&quot;. Add per lane enabling of the square wave pattern, here and in clause 45. Note that if the PMA is set to transmit PRBS31 and any lanes are set to transmit square wave, then the square wave will be transmitted on those lanes and all other lanes will transmit PRBS31.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Accepted, Rejected, or Withdrawn status can be added as needed for each comment.
**Comment**

**Comment Type:** T

**Comment Status:** A

**Table 83-1.**

Register names & locations to be filled in.

**SuggestedRemedy**

Each lane...

Name = Lane n PRBS Tx pattern testing error counter

Locations = 1.20..1.29

**Response**

**Response Status:** C

ACCEPT.

---

**Comment**

**Comment Type:** T

**Comment Status:** A

**Table 83-1.**

Register names & locations to be filled in.

**SuggestedRemedy**

Each lane...

Name = Lane n PRBS Rx pattern testing error counter

Locations = 1.30..1.39

**Response**

**Response Status:** C

ACCEPT.

---

**Comment**

**Comment Type:** T

**Comment Status:** A

**Table 83-1.**

Register names & locations to be filled in.

**SuggestedRemedy**

As above

**Response**

**Response Status:** C

ACCEPT IN PRINCIPLE.

---

**Comment**

**Comment Type:** TR

**Comment Status:** A

This should be a requirement

A PMA with m input lanes and n output lanes must clock the output lanes at m/n times the rate of the input lanes. This applies in both the Tx and Rx directions of transmission.

**SuggestedRemedy**

change sentence to

A PMA with m input lanes and n output lanes shall clock the output lanes at m/n times the rate of the input lanes. This applies in both the Tx and Rx directions of transmission.

**Response**

**Response Status:** C

ACCEPT.
PICS overlooks some of the basics

Add major options:
- 40G or 100G
- Number of lanes above this PMA (would be better done as a field to enter a number in like 'Date of Statement' on the previous page, rather than a yes/no multiple choice)
- Number of lanes below this PMA

SP1SP6 needs to be split in two: nAUI above and nAUI below

We should use PRBS9

Replace "TBD short pattern" with "PRBS9" 4 places.

Isn’t it quite feasible to interoperate between a nAUI lane and an XFI spec part? Even to comply to both at once? Response to D1.1 comment 360 said ‘Although this is feasible, there may be risks in explicitly stating it is interoperable with XFI. XFI loss budget including connector at 5.5GHz is 6dB. nAUI is looking at a 10dB budget.’ This sounds like a yes.
Cl 83A SC 83A.1 P 349 L 29 # 414
D'Ambrosia, John Force 10 Networks

Comment Type E Comment Status A

XLAUI / CAUI are optional, but not noted that way in Fig 83A-1.1

SuggestedRemedy
note that xlaui / caui are optional in figure

Response Response Status C
ACCEPT IN PRINCIPLE.
Add '1 superscript to XLAUI / CAUI

Cl 83A SC 83A.1 P 350 L 26 # 510
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

What does 'Shared functionality with other 40 Gb/s or 100 Gb/s ethernet blocks' mean? It looks like a copy from Clause 47. As nAUI doesn't do its own coding, I don't see what functional blocks are shared.

SuggestedRemedy
Delete. If kept, correct 'ethernet' to 'Ethernet'.

Response Response Status C
ACCEPT IN PRINCIPLE.
correct 'ethernet' to 'Ethernet'.

Cl 83A SC 83A.1 P 350 L 26 # 509
Dawe, Piers Avago Technologies

Comment Type T Comment Status A

What does 'Self-timed interface allows timing control at higher layers' mean?

SuggestedRemedy
Delete 'allows timing control at higher layers'

Response Response Status C
ACCEPT.
Comment Type: E
Comment Status: A
Remove Editors Note:
[Editor's note: (to be removed prior to publication) - condition for total jitter error rate at 1E-15 is proposed]

Suggested Remedy: Remove

Response: Response Status: C
ACCEPT.

Comment Type: T
Comment Status: A
‘the data stream is converted into four lanes at the chip interface’ - not. The conversion is done well inside an IC, not necessarily the IC with the nAUI interface.

Suggested Remedy: Change to ‘For 40 Gb/s applications, the data stream is presented in four lanes as described in Clause 83, and for 100 Gb/s applications, it is presented in ten lanes.

Response: Response Status: C
ACCEPT IN PRINCIPLE.
See suggested remedy change converted to presented.

Comment Type: E
Comment Status: A
Remove Editor's note:
Editor's note: (to be removed prior to publication) - Include definition of XLAUI, CAUI link block diagram, test points and channel boundaries in this section]

Suggested Remedy: Remove

Response: Response Status: C
ACCEPT.
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response</th>
<th>Response Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>R</td>
<td>KR felt it sufficient to state that the path between the transmitter to testpoint be &quot;carefully designed”. To ensure future flexibility, perhaps we should do the same for the following TBD: &quot;Any interconnect which has a loss less than ((SDD21(dB) (TBD)) f) is given in GHz)&quot;.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>A</td>
<td>Remove Editor's Note: [Editor's note: (to be removed prior to publication) - Insert or change, to include definition of transmit test points]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>A</td>
<td>sdd21 MASK was defined in ghiasi_01_0708 but is TBD in the draft. Please use the mask per definition of ghiasi_01_0708.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>R</td>
<td>This comment was WITHDRAWN by the commenter.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>A</td>
<td>XLAUI/CAUI in addition to loss definition it also require min return loss definition.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ER</td>
<td>A</td>
<td>Already defined in 83A-2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Suggested Remedy**

- **Change:** Any interconnect which has a loss less than \((SDD21(dB) (TBD)) f\) is given in GHz\) between the XLAUI/CAUI transmit pin and Transmit Compliance Point may be used as long as transmitter parameters of Table 83A-1 are met.
- **To:** Any interconnect which minimizes the loss between the XLAUI/CAUI transmit pin and Transmit Compliance Point may be used as long as transmitter parameters of Table 83A-1 are met. The electrical path from the transmitter block to transmit compliance point will affect link performance and the measured values of electrical parameters used to verify conformance to this standard. Therefore, it is therefore recommended that this path be carefully designed.

**Response**

This comment was WITHDRAWN by the commenter.

Too many "Therefore" in last line. Change last line to:

It is therefore recommended that this path be carefully designed.

**Suggested Remedy**

Remove

**Response**

ACCEPT.
KR felt it sufficient to state that the path between the receiver to testpoint be "carefully designed". To ensure future flexibility, perhaps we should do the same for the following TBD. "Any interconnect which has a loss less than (SDD21(dB) (TBD) ) f is given in GHz"

SuggestedRemedy

Change Any interconnect which has a loss less than (SDD21 dB) f is given in GHz) between the XLAUI/CAUI receive pin and Receive Compliance Point may be used as long as receiver parameters of Table 83A-2 are met.

to

Any interconnect which minimizes the loss between the XLAUI/CAUI receive pin and Receive Compliance Point may be used as long as receiver parameters of Table 83A-2 are met. The electrical path from the receiver block to receiver compliance point will affect link performance and the measured values of electrical parameters used to verify conformance to this standard. Therefore, it is therefore recommended that this path be carefully designed.

Response REJECT.

This comment was WITHDRAWN by the commenter.

Too many "Therefore" in last line. Change last line to:

It is therefore recommended that this path be carefully designed.

---

Dawe, Piers Avago Technologies

Comment Type TR

I submitted a comment to add label on the transmit and receive compliance points

SuggestedRemedy

I suggest we use label A and B

Response REJECT.

If we require labels, consider using TP style

---

Latchman, Ryan Gennum Corp

Comment Type E

Remove: [Editor's note: (to be removed prior to publication) - Insert or change, to include definition of receive test points]

SuggestedRemedy

Remove

Response ACCEPT.
Comment Type TR  Comment Status R  jitter
Draft says 'transmitter eyemask as defined in figure 83A-5 is not
considered a sufficient description to guarantee performance; additional test methods are
required'.
When you have proper test points - a combination of a somewhat tighter absolute eye
mask, jitter specs and either, relative eye mask, or, Qsq spec and control over baseline
wander, should be adequate.

SuggestedRemedy
Reduce X2.  Add a relative eye mask.  Delete the editor's note.

Response
Response Status C
REJECT. Values not provided for X2. Comment is insufficiently supported to make
changes.

Comment Type E  Comment Status A
Delete Editor Comments:
[Editor's note: (to be removed prior to publication) - transmitter eyemask as defined in figure
83A-5 is not considered a sufficient description to guarantee performance; additional test methods are
required]
Editor's note: (to be removed prior to publication) - proposals for jitter methodology to be
submitted against D1.1 for completion of TBDs]

SuggestedRemedy
Remove

Response
Response Status C
ACCEPT.
<table>
<thead>
<tr>
<th>Comment ID</th>
<th>Subclause</th>
<th>Page</th>
<th>Line</th>
<th>Type</th>
<th>Commenter</th>
<th>Status</th>
<th>Suggested Remedy</th>
<th>Response Status</th>
<th>Response</th>
<th>Commenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>83A.3.3</td>
<td>352</td>
<td>27</td>
<td>TR</td>
<td>Ghiasi, Ali</td>
<td>A</td>
<td>To guarantee interoperability min transmitter pre-emphasis must be defined</td>
<td>ACCEPT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>83A.3.3</td>
<td>352</td>
<td>28</td>
<td>TR</td>
<td>Ghiasi, Ali</td>
<td>A</td>
<td>xAUI transmitter at complaint point near end must have 3.5 dB of de-emphasis</td>
<td>ACCEPT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>83A.3.3</td>
<td>352</td>
<td>30</td>
<td>TR</td>
<td>Ghiasi, Ali</td>
<td>A</td>
<td>Min receiver eye opening can not be guaranteed with min transmitter level and slow rise time and fall time</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>249</td>
<td>83A.3.3</td>
<td>352</td>
<td>46</td>
<td>T</td>
<td>Latchman, Ryan</td>
<td>A</td>
<td>XLAUI / CAUI Receive Eye mask can only be met by specifying a minimum level of de-emphasis.</td>
<td>Add De-emphasis Specification to table</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td>Latchman, Ryan</td>
</tr>
<tr>
<td>513</td>
<td>83A.3.3</td>
<td>352</td>
<td>47</td>
<td>T</td>
<td>Dawe, Piers</td>
<td>A</td>
<td>defined in where?</td>
<td>Change '83A.4.4' to a proper cross-reference to 86.7.4.3.</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td>Dawe, Piers</td>
</tr>
</tbody>
</table>

**Comment Status: D/dispatched A/accepted R/rejected**

**Response Status: O/open W/written C/closed U/unsatisfied Z/withdrawn**

**Sort Order:** Clause, Subclause, page, line
Output Amplitude definition does not include de-emphasis which is needed to meet Rx compliant point.

**Suggested Remedy**

Modify Text to:

Driver differential output amplitude shall be less than 760 mVp-p and greater than 380mVppd including transmit equalization. DC referenced logic levels are not defined since the receiver is AC-coupled. Single-ended output voltage range shall be between -0.4 V and 4.0 V with respect to ground.

De-emphasis shall be the ratio between the amplitude following a transition and the amplitude during a non-transition bit as seen in equation EEE. Amplitude measurements are taken using an averaged waveform and taken at the center of the respective UI. See Figure 83A-3 for an illustration of absolute driver output voltage limits, definition of differential peak-to-peak amplitude, and definition of pre-emphasis.

Modify Diagram to de-emphasis levels as seen in latchman_xlc_01_1208.pdf

**Response**

ACCEPT IN PRINCIPLE.

Modify Text to implement supporting text per comment 254.

---

Rise/fall definition does not take into account de-emphasis.

**Suggested Remedy**

Modify text to:

Rise and fall times are measured from the 20% to the 80% levels of the differential voltage level. Note that, with de-emphasis, the voltage thresholds corresponding to 20% and 80% vary depending on the voltage level of the previous UI. Only those transitions crossing the zero threshold need to meet TR/TF limits defined in Table 83A-1. In Figure YYY, there are three distinct thresholds corresponding to deemphasized transitions from high to low, low to high, and full swing transitions in either direction. Rise / Fall Time must be validated for all four possible cases.

Include diagram from latchman_xlc_01_1208.pdf

**Response**

ACCEPT IN PRINCIPLE.

---

**Comment Type:** E

**Comment Status:** A

**Suggested Remedy**

Modify text to:

Include the Rise/fall time requirements in a shall statement and add corresponding PICS entry.

Suggested Remedy

Change sentence as follows and add a corresponding PICS entry.

Differential rise/fall times shall be greater than 24 ps, as measured between the 20% and 80% levels.

**Response**

ACCEPT.

---

**Comment Type:** E

**Comment Status:** A

**Suggested Remedy**

Modify sentence as follows and add a corresponding PICS entry.

Differential rise/fall times shall be greater than 24 ps, as measured between the 20% and 80% levels.

**Response**

ACCEPT.

---

**Comment Type:** E

**Comment Status:** A

**Suggested Remedy**

Typo - Returnloss

Change to "Return Loss"

**Response**

ACCEPT.
Latchman, Ryan  
**Comment Type:** T  
**Comment Status:** A  
following editor note has been addressed:

[Editor’s note: (to be removed prior to publication) - The Return Loss limits in Figure 83A-5 and Figure 83A-9 may have to be plotted in log linear scale with loss being positive. The definition or formatting to be reconciled similar to the definition or plots in base spec 802.3-2008 Annex 69B]

**SuggestedRemedy**
remove editors comment

**Response**  
**Response Status:** C

**ACCEPT.**

Latchman, Ryan  
**Comment Type:** T  
**Comment Status:** A  
Transmitter jitter specification should be measured with de-emphasis off since this will unnecessarily contribute to the transmitter DJ

**SuggestedRemedy**
Change text to:

The eye templates are given in Figure 83A-6 and Table 83A-1. The template measurement requirements are specified in 83A.5.1. The jitter requirements at the transmitter are for a maximum total jitter of 0.32 UI peak-to-peak and a maximum deterministic component of 0.17 UI peak-to-peak. The maximum random jitter is equal to the maximum total jitter minus the actual deterministic jitter. Jitter measurement requirements are described in 83A.5.2, and are conducted with de-emphasis off.

**Response**  
**Response Status:** C

**ACCEPT.**

See suggested remedy.

Dudek, Mike  
**Comment Type:** T  
**Comment Status:** R  
Incorrect reference

**SuggestedRemedy**
Change Table 83A-1 to 83A-7

**Response**  
**Response Status:** C

**REJECT.**
Table 83A-1 Describes Transmitter Characteristics
Cl     83A   SC  83A.3.3.5   P 355   L 35   # 55
Ghiasi, Ali   Broadcom
Comment Type  TR   Comment Status  R
Jitter methodology need to be updated
SuggestedRemedy
In both SFP+ and CL 86 we have moved away from dual dirac DJ definition since DJ
amount can go down as RJ is increased. Instead of breaking down the jitter components
these group have just defined TJ at BER1E-2 as replacement for DJ and J12 as the TJ at
1E-12. Please see ghiasi_01_0109 for more details
Base on the above definition
then TJ(J12)=0.3 UI (to support BER 1E-15) otherwise it would be 0.32
J2=0.19 UI replacing DJ
Add DDPWS=0.1 UI when measured with PRBS9
Response  Response Status  C
REJECT.
This comment was WITHDRAWN by the commenter.
See comment 52

Cl     83A   SC  83A.3.3.5   P 355   L 40   # 252
Latchman, Ryan   Gennum Corp
Comment Type  E   Comment Status  A
Remove Editor's Note:
Editor's note: (to be removed prior to publication) - Presentations needed with respect to
ber for Jitter measurements]
SuggestedRemedy
Remove
Response  Response Status  C
ACCEPT.

Cl     83A   SC  83A.3.4   P 356   L 26   # 253
Latchman, Ryan   Gennum Corp
Comment Type  T   Comment Status  A
Remove Editor's Note:
Editor's note: (to be removed prior to publication) - proposals for jitter methodology to be
submitted against D1.1 for completion of TBDs
SuggestedRemedy
Remove
Response  Response Status  C
ACCEPT.

Cl     83A   SC  83A.3.4   P 356   L 37   # 254
Latchman, Ryan   Gennum Corp
Comment Type  T   Comment Status  A
Minimum Differential Input Voltage Parameter is not useful in the table since it points to
another area in the table (See receiver eye mask definition).
SuggestedRemedy
Remove Minimum Differential Input Voltage Parameter
Response  Response Status  C
ACCEPT.

Cl     83A   SC  83A.3.4   P 357   L 13   # 56
Ghiasi, Ali   Broadcom
Comment Type  TR   Comment Status  A
Sine XAUt has defined mandatory de-emphasis there is little benefit to define non-EQJ
which is difficult parameter to test or verify
SuggestedRemedy
Remove non-EQJ with J2=0.48 UI
J12=0.62 UI this will result in J15 of 0.65 UI.
To to increase the test time the transmitter and receiver can be tested at J12 but the jitter
tolerance defined at J15, see ghiasi_01_0109
Response  Response Status  C
ACCEPT IN PRINCIPLE.
Remedy in comment#255

TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched A/accepted R/rejected RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn
SORT ORDER: Clause, Subclause, page, line
Comment Type T  Comment Status A  jitter

'non-EQ Jitter (TJ - ISI)'. There's no definition of what 'non-EQ Jitter' means in this document, nor this usage of 'ISI'. I suspect if I saw one I would not agree with it ;-)

SuggestedRemedy
Find a better metric, or explain these terms.

Response  Response Status C
ACCEPT IN PRINCIPLE.
See comment 255

Comment Type T  Comment Status R  jitter

Need something as well as TJ. Other comment objects to Maximum non-EQ Jitter (TJ - ISI)

SuggestedRemedy
Replace Maximum non-EQ Jitter (TJ - ISI) with a J2 spec. Refer to Clause 86 for definition.

Response  Response Status C
REJECT.
Additional supporting material required with respect to this concern

Comment Type T  Comment Status A  jitter

Maximum non-EQ Jitter is not well defined.

SuggestedRemedy
Change Parameter to Maximum Deterministic Jitter

Response  Response Status C
ACCEPT.
See resolution in comment 259

Comment Type T  Comment Status R
Receiver eye mask definition Y1 45 mV is radically different to the similar thing in Table 86-11 (150 mV). While some difference is expected, this makes me think someone has miscalculated

SuggestedRemedy
Review.

Response  Response Status C
REJECT.
Additional supporting material required with respect to this concern

Comment Type T  Comment Status A
BER Target BER 1E-12. Section for lower BER values to be added

SuggestedRemedy
Change TBD to 1E-12.

Response  Response Status C
ACCEPT.
Change TBD to 1E-12.

BER for XLAUI/CAUI is still not settled in D1.1. The current concensus is that the normative specification will be set at a BER=10^-12, while BER=10^-15 will still be allowed for those who want to meet it. Current specification in D1.1 is thus considered to be for BER=10^-12, and specifications for 10^-15 are yet to be defined.

SuggestedRemedy
Specification text for meeting BER=10^-15 for XLAUI/CAUI is needed.

Response  Response Status C
ACCEPT IN PRINCIPLE.
See comment resolution comment#58.
Cl 83A SC 83A.3.4.2 P 357 L 38 # 483

Dudek, Mike JDSU

Comment Type TR Comment Status R

To test the receiver the worst case input should be used.

SuggestedRemedy

Replace "does not exceed" with "equals"

Response Response Status C

REJECT. Lower jitter values are acceptable as an XLAUI / CAUI input.

Cl 83A SC 83A.3.4.2 P 357 L 41 # 257

Latchman, Ryan Gennum Corp

Comment Type E Comment Status A

No input has been received from Statistical Eye Adhoc. Remove:
Editor's note: (to be removed prior to publication) - Receiver Eye Mask may change as an outcome of the Statistical eye adhoc.

SuggestedRemedy

Remove
Editor's note: (to be removed prior to publication) - Receiver Eye Mask may change as an outcome of the Statistical eye adhoc.

Response Response Status C

ACCEPT.

Cl 83A SC 83A.3.4.3 P 358 L 23 # 258

Latchman, Ryan Gennum Corp

Comment Type E Comment Status A

No input has been received on Rx input amplitude. This is covered by the Receiver template and therefore unnecessary.

SuggestedRemedy

Remove section 83A.3.4.3

Response Response Status C

ACCEPT.

Cl 83A SC 83A.3.4.4 P 359 L 4 # 551

Dawe, Piers Avago Technologies

Comment Type T Comment Status R

Figure 83A-8 Differential input return loss is the same as Figure 83A-4 Differential Output return loss.

The file for D1.1 is already nearly as big as 802.3 Section 5 (3 projects, 19 clauses).

SuggestedRemedy

Remove Figure 83A-8 and refer to Figure 83A-4. Change the title of Figure 83A-4 to Differential input or output return loss.

Response Response Status C

REJECT.

Keeping input and output separate makes the document cleaner.

Cl 83A SC 83A.3.4.8 P 289 L 14 # 618

Dawe, Piers Avago Technologies

Comment Type TR Comment Status A

It's not clear that these jitter specs allow the two concatenated CDRs and an optical link, XFP style, that will be wanted when connecting e.g. a 40GBASE-LR4 module.

SuggestedRemedy

Modify the jitter specifications to be sure they do. This may mean that the specs on the transmit side and receive side differ - I think the single-tone sinusoidal jitter masks (Fig. 83A-10) have to differ. See dawe_03_1108.pdf.

Response Response Status C

ACCEPT IN PRINCIPLE.

Refer to comment 411 and dambrosia_01_0109 for nAUI.
Cl 83A SC 83A.3.4.8 P 360 L 50 # 57
Ghiasi, Ali Broadcom

Comment Type: TR  Comment Status: R  jitter
no-EQJ require definition of channel s-parameter response too much complications when xAUJ defines transmit de-emphasis

Suggested Remedy: Replace non-EQJ with TJ(J2) value of 0.48 UI and TJ(J12)=0.62 UI and J15=0.65 UI

Response: REJECT.
This comment was WITHDRAWN by the commenter.

Modify non-EQJ to DJ. Additional input on E-15 operation required (additional section).

Cl 83A SC 83A.3.4.8 P 360 L 51 # 259
Latchman, Ryan Gennum Corp

Comment Type: T  Comment Status: A  jitter
non-EQ jitter is no longer specified. Replace with DJ / RJ terms

Suggested Remedy: The XLAUI/CAUI receiver shall have a peak-to-peak total jitter amplitude tolerance of at least 0.62 UI. This total jitter is composed of two components: Deterministic Jitter and Random Jitter. Deterministic jitter tolerance shall be at least 0.42 UIp-p. The XLAUI/CAUI receiver shall tolerate sinusoidal jitter with any frequency and amplitude defined by the mask of Figure 83A-10. This sub-component of deterministic is intended to ensure margin for low-frequency jitter, wander, noise, crosstalk and other variable system effects.

Response: ACCEPT.
See suggested remedy.

Cl 83A SC 83A.3.4.8 P 52 L 58 # 58
Ghiasi, Ali Broadcom

Comment Type: TR  Comment Status: A  jitter
Optional operation at BER 1E-15

Suggested Remedy: A receiver capable of operating at stress jitter tolerance of TJ(J12)=0.65 UI would have sufficient margin for operation at BER 1E-15 since the max TJ(J12) from the worst case channel is TJ(J12)=0.62 UI see ghiasi_01_0109

Response: ACCEPT IN PRINCIPLE.
Under BER subclause:
Add Note: A transmitter capable of operating at TJ = 0.30 UI and DJ = 0.16 UI and receiver capable of operating at stress jitter tolerance of TJ=0.64UI and DJ= 0.41 UI would have sufficient margin for operation at approximately BER 1E-15.

see ghiasi_01_0109

Cl 83A SC 83A.4 P 361 L 24 # 260
Latchman, Ryan Gennum Corp

Comment Type: T  Comment Status: A  channel
Replace Editor's comments with text from latchman_xlc_01_1208.pdf

Suggested Remedy: This section describes informative characteristics which are used to describe an XLAUI / CAUI channel.
• The informative values for insertion loss are summarized in table YYY and equation ZZZ. Other impairments such as crosstalk can have a material impact on the link performance and should be minimized

Where tables are found in latchman_xlc_01_1208.pdf

Response: ACCEPT IN PRINCIPLE.
Supporting text for comment #60 where table is not provided and use equation as reference to informative channel loss.

TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched  A/accepted  R/rejected     RESPON SE STATUS: O/open   W/written   C/closed   U/unsatisfied  Z/withdrawn
SORT ORDER:  Clause, Subclause, page, line
IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments

Draft 1.1 Comments

<table>
<thead>
<tr>
<th>Cl.</th>
<th>SC</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Task force Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>83A</td>
<td>83A.4</td>
<td>TR</td>
<td>A</td>
<td>Ghiasi, Ali Broadcom</td>
</tr>
<tr>
<td>361</td>
<td>26</td>
<td>XLAUI/CAUI in addition to loss definition it also require min return loss definition.</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>262</td>
<td>32</td>
<td>T</td>
<td>A</td>
<td>Latchman, Ryan Gennum Corp</td>
</tr>
<tr>
<td>362</td>
<td>30</td>
<td>TR</td>
<td>A</td>
<td>D'Ambrosia, John Force10 Networks</td>
</tr>
</tbody>
</table>

Comment Type: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
Comment Status: D/dispatched  A/accepted  R/rejected  
Response Status: O/open  W/written  C/closed  U/unsatisfied  Z/withdrawn

Sort Order: Clause, Subclause, page, line

Page 64 of 141
2/7/2009 4:23:38 PM
Cl 83A SC 83A.4.1.1 P 362 L 31 # 263
Latchman, Ryan Gennum Corp

Comment Type T Comment Status A
No material received with respect to characteristic impedance

SuggestedRemedy
Remove section and comment

Response Response Status C
ACCEPT IN PRINCIPLE.
Insert:
The recommended differential characteristic impedance of circuit board trace pairs is 100ohm +/- 10%

Cl 83A SC 83A.5 P 362 L 39 # 264
Latchman, Ryan Gennum Corp

Comment Type T Comment Status A
Replace editor's comment with actual text

SuggestedRemedy
This section describes the measurement methodology which is to be used to verify XLAUI / CAUI compliance

Response Response Status C
ACCEPT.

Cl 83A SC 83A.5.1 P 362 L 45 # 266
Latchman, Ryan Gennum Corp

Comment Type E Comment Status A
No input on eye template measurements. Remove section.

SuggestedRemedy
Remove

Response Response Status C
ACCEPT IN PRINCIPLE.
Also remove reference in 83A.3.4.2

"The template measurement requirements are specified in 83A.5.1."
Incomplete transmit jitter measurement methodology. Replace following text: The clock recovery unit (CRU) used in the transmit jitter measurement has a corner frequency of less than or equal to 4 MHz and a slope of -20 dB/decade (need figure consistent with text). When using a CRU as a clock for jitter measurements.

[Editor's note: (to be removed prior to publication) - Insert or change, to include transmit jitter]

With below

Suggested Remedy

Include the following text:

Transmit jitter is defined with respect to a test procedure resulting in a BER bathtub curve such as that described in Annex 48B.3. For the purpose of jitter measurement, the effect of a single-pole high-pass filter with a 3 dB point at 4 MHz is applied to the jitter. The data pattern for jitter measurements shall be test patterns YYY or WWW as defined in CCCC. Crossing times are defined with respect to the mid-point (0 V) of the AC-coupled differential signal. Equalization shall be off during jitter testing.

Response

ACCEPT.

83A.5.2.1 Transmit jitter
Transmit jitter is defined with respect to a test procedure resulting in a BER bathtub curve such as that described in Annex 48B.3. For the purpose of jitter measurement, the effect of a single-pole high-pass filter with a 3 dB point at 4 MHz is applied to the jitter. The data pattern for jitter measurements shall be test pattern PRBS31. Crossing times are defined with respect to the mid-point (0 V) of the AC-coupled differential signal. Equalization shall be off during jitter testing. All XLAUI / CAUI channels shall be active during transmit jitter testing to ensure any channel-channel crosstalk is included in the jitter evaluation.

Response

ACCEPT IN PRINCIPLE.
See resolution in comment 268

There are two Editor's Notes on 83A 5.2.2.
One is "interference tolerance test" and the other is "test pattern". This proposal compensates these two items.

Suggested Remedy

No.1 Interference test
For the interference test of the high speed backplanes, at least three synchronized-pattern streams are required; one stream is a victim under the test and two adjacent streams are as aggressors.
To maximize the interference, aggressors' amplitude should be set at the maxim. And switching timing among aggressors and victim pattern should be same. But the pattern should be different aggressors and victim to increase the simultaneous switching effect.
Victim's amplitude should be set at the minimum.

No.2 Test pattern of the jitter tolerance
PRBS31 is good for testing the jitter tolerance of the optical modules, which simply requires the physical characterizations.
But for the equipments, the test pattern should include the "Alignment Marker" to drive the alignment circuit.
In the large scale of the FPGA / ASIC, the higher percentage usage of the circuit makes the internal power level drifting due to the simultaneous switching.
The switching reduces the jitter tolerance margin of the chips in the asynchronous clocks.
Inside of FPGA / ASIC, there are two different clocks to drive 66bit logic block and 64bit logic block.
Between these asynchronous clocks, the amount of jitter is difference. So this makes jitter tolerance worse.
To test the switching affects of the equipment the test pattern of the jitter tolerance test should include the "Alignment Marker".

For more detail about test system and test pattern, please refer to presentation.
Cl 83A SC 83A.5.2.2 P 363 L 38 # 268
Latchman, Ryan Gennum Corp
Comment Type T Comment Status A Interference Test
Formal text on jitter tolerance / stressed test required
SuggestedRemedy See presentation
Response

Cl 83A SC 83A.5.3 P 363 L 47 # 512
Dawe, Piers Avago Technologies
Comment Type T Comment Status R rise fall
Rise/fall time is defined in 86.7.4.3 Transition time. No need to do it again.
SuggestedRemedy Either,
Replace editor's note with
Rise/fall time is defined as transition time in 86.7.4.3.
Change title to Rise/Fall time
OR
Replace editor's note with Transition time is defined as transition time in 86.7.4.3.
Change title to Transition time
In Table 83A-1, change 'Output Rise and Fall time' to 'output transition time', and similarly in Table 83A-2 and in 83A.7.4. In the footnote, change 'Rise/Fall time' to 'Transition time'. In 83A.3.3.2, change Rise/fall to Transition.
Response

Cl 83A SC 83A.5.3 P 363 L 48 # 269
Latchman, Ryan Gennum Corp
Comment Type T Comment Status A rise fall
Remove section (rise/fall time measurement is described in rise / fall time section)
SuggestedRemedy Remove 83A.5.3
Response

Cl 83A SC 83A.6 P 363 L 51 # 823
Dawe, Piers Avago Technologies
Comment Type TR Comment Status R rise fall
Like a PMA or PCS clause, nAUI is completely on a single line card or similar, so the draft doesn't need environmental specifications for it. Compare 14.7: the only part that might apply is 14.7.1 General safety All equipment meeting this standard shall conform to IEC 60950:1991.
SuggestedRemedy Delete the subclause or replace the editor's note with 'All equipment subject to this clause shall conform to IEC 60950-1.'
Response

Response Status C REJECT.
This was discussed at the last meeting and it was felt that environmental specifications were needed
IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments

Comment Type TR
Comment Status A

envirionmental specifications are missing.

Suggested Remedy
Copy environmental specifications from 84.10

83A.6.1 General safety
All equipment subject to this clause shall conform to applicable sections (including isolation requirements) of IEC 60950-1.

83A.6.2 Network safety
The designer is urged to consult the relevant local, national, and international safety regulations to ensure compliance with the appropriate requirements.

83A.6.3 Installation and maintenance guidelines
It is recommended that sound installation practice, as defined by applicable local codes and regulations, be followed in every instance in which such practice is applicable.

83A.6.4 Electromagnetic compatibility
A system integrating the 40GBASE-KR4 PHY shall comply with applicable local and national codes for the limitation of electromagnetic interference.

83A.6.5 Temperature and humidity
A system integrating the 40GBASE-KR4 PHY is expected to operate over a reasonable range of environmental conditions related to temperature, humidity, and physical handling (such as shock and vibration). Specific requirements and values for these parameters are considered to be beyond the scope of this standard.

Response
ACCEPT IN PRINCIPLE.
Modify "40GBASE-KR4 PHY" to XLAUI / CAUI

Comment Type T
Comment Status A

module

Suggested Remedy
The XLAUI/CAUI should include specifications to guarantee operation with a connectorized module.

Suggested Remedy
Change from 'The application of the optional XLAUI/CAUI is primarily intended as a chip-to-chip (integrated circuit to integrated circuit) interface implemented with traces and potentially one connector on a printed circuit board. The XLAUI/CAUI allows interconnect distances of approximately 25 cm over printed circuit board, see 83A.4.1.'

To: 'The application of the optional XLAUI/CAUI is intended as:
1) a chip-to-chip (integrated circuit to integrated circuit) interface implemented with traces on a printed circuit board.
2) a chip-to-module (integrated circuit to connector) interface implemented with traces on a printed circuit board and one connector.

The XLAUI/CAUI allows interconnect distances of approximately 25 cm over printed circuit board, see 83A.4.1.'

Response
ACCEPT IN PRINCIPLE.
See remedy comment 295

Comment Type T
Comment Status A

module

Suggested Remedy
Modify Fig. 83A-2 to include a connectorized module interface or add an additional diagram.

Response
ACCEPT IN PRINCIPLE.
See remedy 295
Annex 83A (XLAUI and CAUI) only specifies a chip to chip (i.e. component to component) interface and does not specify a chip to module (i.e. component to module) interface. The optical interfaces specified in sub-clause 87 (40GBASE-LR4) and sub-clause 88 (100GBASE-LR4 and 100GBASE-ER4) require a chip (component) to module XLAUI and CAUI interface, respectively. Unfortunately, the nAUI terminating component test points inside the module are not available as compliance or test points. They are permanently mounted inside the module, and the only available compliance and test points are at the module pins. This means that for sub-clause 87 and sub-clause 88, the electrical interface is not specified. The chip to chip specifications are not usable.

**Suggested Remedy**

Annex 83B 40Gb/s Attachment Unit Interface (XLAUI) and 100Gb/s Attachment Unit Interface (CAUI) should be added, which mirrors all the specifications in Annex 83A but with different values. While it is preferable for Annex 83B to be Normative, it can be discussed if Annex 83B could be Informative.

Block diagram, 83A.2.2 becomes block diagram 83B.2.2 with the right side box name changed from XLAUI/CAUI component to XLAUI/CAUI module.

All the specification in 83B then only apply to right side (module) test points. The left hand side, or component or chip test points, are still specified in Annex 83A.

The updated specifications for the module test points can be based on the following channel parameters, which can be further discussed to get general agreement as to the appropriate values:

- Max module trace length 3"
- Max module vias: 2
- Max host trace length 8" (or 6")
- Max host vias: 2

Connector limits (similar to XFP connector):

- Max connector insertion loss: 0.5dB at 5GHz
- Max connector return loss: 21dB at 5GHz
- Max crosstalk: 36dB at 5GHz

Compliance curves can be generated based on these limiting values.

**Response**

ACCEPT IN PRINCIPLE.

Add annex 83B

Add figures illustrating compliance points and table illustrating loss budget at 5.5GHz per
Comment Type: E
Comment Status: A
84.2.1.4 PMD_UNITDATA.indication should be a heading 3 i.e. 84.2.2 and the next heading (currently 84.2.2.2) should be a heading 4 i.e. 84.2.2.1

Suggested Remedy:
- change the current 84.2.1.4 to heading 3 and change the current 84.2.2 to heading 4

Response: Accept.

Also see comment 86.

Comment Type: TR
Comment Status: A
This clause can't tell the PCS what to do. That's what the PCS clause is for - and it already does so in 82.6

Suggested Remedy:
- Change 'shall' to 'must', delete 84.11.4.1.

Response: Accept.

Also need to remove reference to Clause 49.

Change to:
- "The PCS associated with this PMD is required to support the AN service interface primitive AN_LINK.indication defined in 73.9. (See 82.6.)"

and delete 84.11.4.1.

Also fix issue with AN_LINK.indication in Clause 73:
- Delete editors note at end of 73.10.1
- Add sentence at end of 73.9.1.2
- "This primitive is an out-of-band signal and may be implemented as a PCB signal trace when the AN layer and PCS are in separate chips."

Comment Type: TR
Comment Status: A
Update the Transmit and Receive delay contributed by 40GBASE-KR4 PMD to 1024 BT and round trip medium delay to 160BT and remove the TBDs.

Suggested Remedy:
- In 84.4 Delay constraints change the delay requirements as follows and also update corresponding entry in Table 80-2:
  - The sum of the transmit and the receive delays contributed by the 40GBASE-KR4 PMD and medium shall be no more than 1024 bit times. It is assumed that the round-trip delay through the medium is 160 bit times.

Response: Accept.

The numbers need to be four times those of Clause 72.
- Change TBD (1024) to 4096 and TBD (160) to 640.

See comment 87.
Delay constraints are marked TBD. There is no clear reason why the 40GBASE-KR requirements should differ significantly from 10GBASE-KR requirements.

SuggestedRemedy
Remove "(TBD)" and text highlighting to set the PMD plus medium delay to 1024 bit times.
Also remove the TBD and highlighting to indicate that the assumed delay through the medium is 160 bit times.

Response  Response Status C
ACCEPT.

The numbers need to be four times those of Clause 72.
Change TBD (1024) to 4096 and TBD (160) to 640.
See comment 87

Figure 80-3 does not apply to 40GBASE-KR4.

SuggestedRemedy
Remove reference.

Response  Response Status C
REJECT.

Yes it does for the case with a separate FEC chip.
Cl  84  SC  84.7  P 205  L  32  #  90
Marris, Arthur  Cadence

Comment Type  T  Comment Status  A
Add lane by lane transmit disable similar to the one defined in Clause 85

SuggestedRemedy
As above

Response  Response Status  C
ACCEPT.

See comment 361

Cl  84  SC  84.7.10  P 206  L  22  #  364
Ganga, Ilango  Intel

Comment Type  T  Comment Status  A
Update the text in 84.7.10 to indicate the PMD control function requirement by including a shall statement.

Also add a PICS entry for the requirements specified in 84.7.10 PMD control function.

SuggestedRemedy
Change sentence as follows and add a corresponding PICS entry to 84.11.

Each lane of the 40GBASE-KR4 PMD shall use the same control function as 10GBASE-KR, as defined in 72.6.10.

Response  Response Status  C
ACCEPT.

Also see comment 91
Comment Type: T
Comment Status: A

Add a subclause below 84.7.5 for lane by lane transmit disable function and renumber the subclauses accordingly.

Suggested Remedy:
Add 84.7.6 PMD lane-by-lane transmit disable function
See 85.7.7 for reference.
Corresponding register bit references are already added to Table 84-1.
Add corresponding PICS entry as appropriate

Response: C
ACCEPT.

Comment Type: TR
Comment Status: R

Submitted again with clarification as the response did not address the main point. 84.8 refers to 72.7, which says "...the PMD sublayer is standardized at test points TP1 and TP4 as shown in Figure 72-1. The electrical path from the transmitter block to TP1, and from TP4 to the receiver block, will affect link performance and the measured values of electrical parameters used to verify conformance to this standard. Therefore, it is recommended that this path be carefully designed. " In other words, there is no expectation that a board from vendor A, a backplane from B and another board from C can be expected to interoperate reliably, because each of them can spend as much of the shared channel budget as he pleases. This is not an interoperability spec, it's just an advertisement for some ICs. Is this what we want?
An interoperability spec must have PMD electrical specs related to the connectors so that boards from different vendors can be interchanged. This true whether or not the channel is normative. For my part, I can't see why the backplane from one connector to the other should not be normative.

Suggested Remedy:
Discuss. Options are: make Clause 84 into a proper interoperability spec with PMD test points related to the connectors (Clause 86 will have to do much of that work anyway), delete the clause, move it to an annex, or accept that it's not a proper spec.
Also consider giving a normative backplane spec from one connector to the other - Clause 85 has a normative cable spec.

Response: C
REJECT.
Making any part of the backplane channel spec normative is in conflict with the adopted baseline proposal.

For reference this is the final accepted response to the comment made against the 1.0 draft:
"The 802.3ap project specified the backplane interconnect characteristics to be informative, with a normative description of receiver testing, which ensures interoperability.

The baseline proposal voted in by the task force for 40GBASE-KR4 adopted the 802.3ap informative channel. Making the channel normative as the commenter seems to request would be big change."
Comment Type: T  Comment Status: A  
Update the text in 84.8.1 and 84.8.2 to indicate the Transmit and receive requirements by including a shall statement.

SuggestedRemedy
Add corresponding shall statements for each requirement.

The equations for generating the fit line for any data to test to the limit line as specified in equations 85-24 through 85-29 are faulty (See attached supporting document.)

The equation just extends what was accepted in IEEE 802.3ap as the equation. In light of the presented data, it is necessary to revisit the equation. The fit line, as it stands now, can cause some connectors which actually pass the requirements in raw data to fail the requirements with the fit line.

SuggestedRemedy
Need to come up with a new equation for the fit line which takes into account the low frequency data also when coming up with the fit line to test against the limit line.

Resolution will be provided in a supporting document.

Response  Response Status: C  
REJECT.

For sub-task force review. Although I generally agree that the least mean squares line fit can be improved for CR4 and CR10 ICR I had looked at this and observed that all of the line fit alternatives I utilized had issues with different channel structures (response shapes). I recommend extending this effort into working group ballot and not replace current method without extensive review of a wider range of channel topologies and response shapes.

Response  Response Status: C  
ACCEPT IN PRINCIPLE.

Replace 85.10.4 Cable assembly return loss Equation (85-18) and Equation (85-19).

Return Loss(f) = 10
for 100 MHz = f < 1250 MHz
Return Loss(f) = 10 - 7 x log10(f/1250)
for 1250 MHz = f = 10000 MHz
Balasubramanian, Vittal  
FCI USA, Inc.

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

The equation for generating the fit line for any data to test to the limit line as specified in Figure 69B-8 is faulty (See attached supporting document.)

The fit line, as it stands now, can cause some connectors which actually pass the requirements in raw data to fail the requirements with the fit line.

**Suggested Remedy**

Need to come up with a new equation for the fit line which takes into account the low frequency data also when coming up with the fit line to test against the limit line.

**Resolution will be provided in a supporting document.**

**Response**  **Response Status:** C

**Reject.**

If the commenter believes the 802.3ap-2007 standard is faulty the commenter should submit a maintenance request against the base standard.

---

Balasubramanian, Vittal  
FCI USA, Inc.

---

Dawe, Piers  
Avago Technologies

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

Exchange of DME frames is an unnecessary burden on the host. It is not necessary for these copper links, and should not appear on front-panel ports. The choice of link types is 4 x 3.125 lanes, 4x10G lanes, and 4x10G lanes with FEC, and this can be managed with 'Parallel Detection' not DME frames.

**Suggested Remedy**

Add text in Clause 85 saying that 40GBASE-CR4 and 100GBASE-CR10 use Parallel Detection.

**Response**  **Response Status:** C

**Reject.**

Proposal insufficiently supported and lacking sufficient recommended changes to implement in the draft.
The SFP+ direct attach cable specification includes DC blocking capacitors. Maybe this has grounding advantages.

**Suggested Remedy**

Why doesn't this cable specification?

**Response**

AC-coupling is provided at the receiver, as defined in 85.8.4.3.

Remove TBDs - 85.10 Cable assembly characteristics

- 85.10.2 Cable assembly insertion loss - equation (85-9)
- 85.10.3 Cable assembly insertion loss deviation (ILD) - equation (85-16 and 85-17)
- 85.10.8 Cable assembly insertion loss to crosstalk ratio (ICRCA) - equation (85-23)

**Suggested Remedy**

Remove TBDs - 85.10 Cable assembly characteristics

- 85.10.2 Cable assembly insertion loss - equation (85-9)
- 85.10.3 Cable assembly insertion loss deviation (ILD) - equation (85-16 and 85-17)
- 85.10.8 Cable assembly insertion loss to crosstalk ratio (ICRCA) - equation (85-23)

See diminisho_02_1108.pdf.

**Response**

ACCEPT.

**Reported insertion loss deviation at 5.15625 GHz does not appear to be consistent with 85.10.3.**

**Suggested Remedy**

Please correct to be consistent.

**Response**

ACCEPT IN PRINCIPLE.

**Pulse response provided is not sufficient i.e., it's not the pulse response of minimally compliant CR4/CR10 cable assembly.**
Comment Type: TR Retrun loss missing
Suggested Remedy:
Add differential retrun loss = -12 + 2*sqrt(f) f from 0.01 to 4.1 GHz
= -6.3 + 13*log10(f/5.5) from 4.1 to 11.1 GHz
Add common more retrun loss = -7.51 + 1.1 *f from 0.01 to 4.1 GHz and -3 dB from 4.1 to 11.1 GHz
Response: REJECT.
This comment was WITHDRAWN by the commenter.

Common mode return loss proposal insufficiently supported or justified.

Comment Type: TR Output common mode voltage missing
Suggested Remedy:
Add output common mode voltage of 13.5 mV RMS when input driver to the cable has 12 mV of RMS common mode voltage.
An acceptable method of generating common mode voltage if the driver does not have sufficient common mode is by adjusting P and N.
Response: REJECT.
This comment was WITHDRAWN by the commenter.

Proposal insufficiently supported and lacking sufficient recommended changes to implement in the draft.
Cl 85 | SC 85.13.4 | P 242 | L 32 | #358
Ganga, Ilango Intel
Comment Type T Comment Status A
Missing status field in the PICS for AN. Add "M" to the status field. Also change subclause reference to 85.1 that specifies this requirement for AN.
SuggestedRemedy
As per comment
Response Response Status C
ACCEPT.

Cl 85 | SC 85.2 | P 215 | L 47 | #647
Trowbridge, Stephen Alcatel-Lucent
Comment Type E Comment Status A
Could parameterize description of primitives.
SuggestedRemedy
Describe as PMD_UNITDATA.request/indication0 through PMD_UNITDATA.request/indication n-1 for an n-lane interface (n=4 or 10)
Response Response Status C
ACCEPT IN PRINCIPAL.
Add the following description to 85.2
The following PMD service primitives are described as PMD_UNITDATA.request/indication n-1 for an n-lane interface (n=4 or 10):

Cl 85 | SC 85.2.1.1 | P 215 | L 22 | #498
Anslow, Peter Nortel Networks
Comment Type E Comment Status A
spurious space in "PMD_UNITDATA.request0 (tx_bit)" to "PMD_UNITDATA.request9 (tx_bit)" excluding "PMD_UNITDATA.request3(tx_bit)
Also applies to 85.2.2.1
SuggestedRemedy
Remove the space. i.e change "PMD_UNITDATA.request0 (tx_bit)" to "PMD_UNITDATA.request0(tx_bit)" etc.
SuggestedRemedy
Do the equivalent in 85.2.2.1
Response Response Status C
ACCEPT.

Cl 85 | SC 85.2.3 | P 216 | L 29 | #506
Anslow, Peter Nortel Networks
Comment Type T Comment Status A
This says "The effect of receipt of this primitive by the client (the PMA) is described in 83.3.1.3", however that clause describes receipt of data from the layer above the PMA.
SuggestedRemedy
change to "The effect of receipt of this primitive by the client (the PMA) is described in 83.4"
Response Response Status C
ACCEPT.

Cl 85 | SC 85.4 | P 217 | L 14 | #503
DiMinico, Christopher MC Communications
Comment Type TR Comment Status A
Remove TBDs: The sum of the transmit and the receive delays contributed by the 40GBASE-CR4 and 100GBASE-CR10 PMDs and medium shall be no more than TBD (2560) bit times. It is assumed that the round-trip delay through the medium is TBD (1135) bit times.
SuggestedRemedy
Change text line 14-17 to: The sum of the transmit and the receive delays contributed by the 40GBASE-CR4 and 100GBASE-CR10 PMDs and medium shall be no more than (2560) bit times. It is assumed that the round-trip delay through the medium is (1135) bit times.
SuggestedRemedy
See supporting material in presentation to be submitted in support of Clause 85 Draft 1.1 comment resolutions.
Response Response Status C
ACCEPT.
Update the Transmit and Receive delay contributed by the 40GBASE-CR4 and 100GBASE-CR10 PMDs to 2560 BT and round trip medium delay to 1135 BT and remove the TBDs.

**SuggestedRemedy**

In 84.4 Delay constraints change the delay requirements as follows and also update corresponding entry in Table 80-2:

"The sum of the transmit and the receive delays contributed by the 40GBASE-CR4 and 100GBASE-CR10 PMDs and medium shall be no more than 2560 bit times. It is assumed that the round-trip delay through the medium is 1135 bit times."

Also add the missing "period" at the end of the sentence.

In corresponding PICS "DC" in 85.13.4, do not add absolute delay number in PICS entry instead refer back to the requirements in 85.4. "Value/Comment: Device conforms to Delay constraints specified in 85.4"

**Response**

**Response Status** C

ACCEPT IN PRINCIPLE. Also add the missing "period" at the end of the sentence.

Suggested remedy comment #300

And, in corresponding PICS "DC" in 85.13.4, do not add absolute delay number in PICS entry instead refer back to the requirements in 85.4. "Value/Comment: Device conforms to Delay constraints specified in 85.4"

**Response**

**Response Status** C

ACCEPT IN PRINCIPLE. Also add the missing "period" at the end of the sentence.

**SuggestedRemedy**

Remove sentence: The measurements of Total Skew and Dynamic Skew are defined in 85.xx.xx.

**Response**

**Response Status** C

ACCEPT IN PRINCIPLE.

Suggested remedy comment #304

**Remove editors note:** [Editors note (to be removed prior to publication) - Transmitter and receiver testing and definitions need to be addressed; e.g., transmitter testing from TP2 and TP2 definition.]

Consider removing any other editors notes in this subclause that are not addressed by specific comment(s) proposal(s) against draft 1.1.

**Response**

**Response Status** C

ACCEPT IN PRINCIPLE.

See comment#62 : TP2 transmitter to be specified utilizing valliappan_01_0109.pdf slide 2 table Tx specification @ TP2.
Cl 85 SC 85.7.1 P 220 L 12 # 61
Ghiasi, Ali Broadcom
Comment Type TR Comment Status A
Editor note on the location of the AC coupling
SuggestedRemedy
All cable assembly shall incorporate ac coupling between TP3 and MDI on the receive function with 0.1 uf capacitor.
Response Response Status C
ACCEPT IN PRINCIPLE.
See remedy in comment#285.

Cl 85 SC 85.7.1 P 220 L 25 # 203
Anslow, Peter Nortel Networks
Comment Type T Comment Status A
In figure 85-2 on the left and right edges are shown "tx_bit<0:3> or x_bit<0:9>". However the latest service primitives all have the same parameter "tx_bit".
SuggestedRemedy
change figure 85-2 to use the same labelling as Figure 86-2 (and 87-2 and 88-2) "PMD_UNITDATA.request0 to PMD_UNITDATA.requestn"
Response Response Status C
ACCEPT.

Cl 85 SC 85.7.1 P 220 L 9 # 62
Ghiasi, Ali Broadcom
Comment Type TR Comment Status A
TP2 test method missing
SuggestedRemedy
PPI test method of the CL 86 can be used to test CR4/CR10 please see ghiasi_02_0109 for the PPI detail proposal
Response Response Status C
ACCEPT IN PRINCIPLE.

Cl 85 SC 85.7.12 P 223 L 3 # 562
Ganga, Ilango Intel
Comment Type T Comment Status A
Add a PICS entry for the requirements specified in 85.7.12 PMD control function. Also update the text in 85.7.12 to indicate the requirement by including a shall statement.
SuggestedRemedy
Change sentence as follows and add a corresponding PICS entry to 85.13.
Each lane of the 40GBASE-CR4 or 100GBASE-CR10 PMD shall use the same control function as 10GBASE-KR, as defined in 72.8.10.
Response Response Status C
ACCEPT.

Cl 85 SC 85.7.5 P 221 L 40 # 363
Ganga, Ilango Intel
Comment Type T Comment Status A
Provide description of lane by lane signal detect function in 85.7.5 and delete the Editor's note.
The description for lane by lane PMD_signal_detect_n function is provided in the last paragraph of 85.7.4
SuggestedRemedy
As per comment
Response Response Status C
ACCEPT IN PRINCIPLE.

Cl 85 SC 85.7.5 P 221 L 40 # 298
Diminico, Christopher MC Communications
Comment Type T Comment Status A
Remove editors note. Subclause 85.7.5 text is sufficient to describe lane-by-lane signal detect function.
SuggestedRemedy
Remove editors note line 40-41.
Response Response Status C
ACCEPT.
Cl 85 SC 85.8 P 223 L 11 # 299
DiMinico, Christopher MC Communications

Comment Type T Comment Status A
Remove editors note as unnecessary.

SuggestedRemedy
Delete editors note line 223 lines 11-13.

Response Response Status C
ACCEPT.

Cl 85 SC 85.8.2 P 223 L 41 # 64
Ghiasi, Ali Broadcom

Comment Type TR Comment Status R
Proposal for jitter methodology needed

SuggestedRemedy
In SFP+ and CL86 we have moved away from dual dirac jitter to J2=0.26 UI, J9=0.18 UI and DDPWS=0.07 UI, please anslow_04_0109_draft4.pdf

Response Response Status C
REJECT.
Proposal insufficiently supported and lacking sufficient recommended changes to implement in the draft.

Cl 85 SC 85.8.3 P 223 L 38 # 284
Healey, Adam LSI Corporation

Comment Type T Comment Status A
Data dependent pulse width shrinkage (DDPWS) does not need to be addressed for 40GBASE-CR4 and 100GBASE-CR10.

1. DDPWS measured at TP2 will be a function of the equalization state of the transmitter. Since 40GBASE-CR4 and 100GBASE-CR10 intend to use the 10GBASE-KR start-up protocol to automatically optimize the equalization state for the channel and receiver, the DDPWS required at this point will also be a function of the channel and receiver.

2. The copper cable assembly is a linear and passive medium. DDPWS measured at each point in the link is a function inter-symbol interference which can be readily mitigated with an appropriate combination of transmitter and receiver equalization. In contrast, optical link designs control the DDPWS at the input to, and output of, non-linear functions such as laser drivers and limiting amplifiers whose outputs in turn drive channels of limited bandwidth. The DDPWS at the output of the non-linear function cannot be completely equalized and furthermore these narrow pulses are most severely impacted by the channel that follows.

3. Duty cycle distortion (DCD) at the transceiver output for linear passive is analogous to DDPWS for optical links and is the appropriate parameter for this clause.

SuggestedRemedy
Remove editor's note.

Response Response Status C
ACCEPT.

Cl 85 SC 85.8.3 P 223 L 38 # 3
Ran, Adee Intel

Comment Type T Comment Status A
Data dependent pulse width shrinkage is due to ISI and can be dealt with using equalization in either RX or TX side. Adaptive equalization is assumed in KR and should also be assumed in CR4, CR10. Therefore, only DCD in 1010 pattern (which is not solved by equalization) should be specified.

SuggestedRemedy
remove editor's note and do not address data dependent pulse width.

Response Response Status C
ACCEPT IN PRINCIPLE.
See remedy in comment#284.
IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments

Comment Type: TR/technical required
Comment Status: A

Cl 85 SC 85.8.3 P 223 L 38 # 63
Ghiasi, Ali Broadcom

DDPWS not included in current DCD value

SuggestedRemedy
Copy 86.7.4.4 for definition and test method of DDPWS and with value of 0.07 UI

Response
Response Status: C
ACCEPT.
See comment#284 for rationale.

Comment Type: TR/technical required
Comment Status: A

Cl 85 SC 85.8.3 P 223-224 L 32 # 305
DiMinico, Christopher MC Communications

Remove TBDs Table 85-4-Transmitter characteristics' summary.
Remove editors note line 32-36 page 223. Consider removing any other editors notes in this subclause that are not addressed by specific comment(s) proposal(s) against draft 1.1.

CR4 and CR10 channel characteristics consistent with 10GBASE-KR. Table 85-4 Transmitter characteristics to be met at TP0 for consistent test/reference point consistent with 10GBASE-KR channel.

SuggestedRemedy
Remove TBDs in Table 85-4-Transmitter characteristics summary.
Remove editors note line 32-36 page 223. Consider removing any other editors notes in this subclause that are not addressed by specific comment(s) proposal(s) against draft 1.1.

See presentation material to be submitted in support of Clause 85 Draft 1.1. comment resolutions.

Response
Response Status: C
ACCEPT.

For sub-task force review of supporting presentation diminico_04_0109.pdf
Table 85-4 is missing common mode output voltage limit, since the connector and the
cable are guided differential mode excess common mode from the driver may result in
unacceptable BER and EMI

SuggestedRemedy
Add row to table 85-4
Output AC common mode voltage with max value of 15 mV RMS

SuggestedRemedy
Add row to table 85-4
Output AC common mode voltage with max value of 30 mV RMS

If you have stated the signalling rate there is no need to give the unit interval, and writing
down a recurring decimal is a nuisance. The other clauses don’t have this.

SuggestedRemedy
Delete the row 'Unit interval nominal 85.8.3.3 96.969697 ps'.' In 85.8.3.3, delete 'The
Corresponding unit interval is nominally 96.969697 ps.' Similarly in 85.8.4 and 85.8.4.2.

Other 802.3 clauses include UI. Providing UI and signalling speed in a look-up table of the
Transmitter characteristics’ summary helps users of the standards quickly view relevant
transmitter parameters.
Cl  85  SC  85.8.3.1  P  225  L  17  #  514
Dawe, Piers  Avago Technologies

Comment Type  TR  Comment Status  R
It is very good that TP1, TP2, TP3, TP4 are positioned in relation to the connector, but not clear enough where they are exactly with respect to the connector. While for some measurements like S-parameter measurements on a passive cable, de-embedding can be used to infer the performance right next to the connector. For measurements of nonlinear active elements like transmitters and receivers, in general this cannot be done.

SuggestedRemedy
Use the same defined reference losses (HCB losses) between MDI and TP2 and between MDI and TP3 as Clause 86 has between MDI and TP1a and between MDI and TP4a. See presentation by Ali.

Response  Response Status  C
REJECT.

Consistent with CX4, all cable assembly measurements are to be made between TP1 and TP4 as illustrated in Figure 85-2. Two mated connector pairs have been included in the cable assembly specifications defined in 85.9. TP1 and TP4 are not test points for the measurements of nonlinear active elements like transmitters and receivers.

PCB trace loss at TP0 defined (Tx_pcb) and at TP5 (Rx_pcb).

Cl  85  SC  85.8.4  P  225  L  17  #  514
DiMinico, Christopher  MC Communications

Comment Type  TR  Comment Status  A
Table 85-5 is missing Differential to common mode conversion

SuggestedRemedy
Add row to table 85-5 for SCD11 with value of -10 dB max from 0.01 to 11.1 GHz

Response  Response Status  C
ACCEPT IN PRINCIPLE. Add row to table 85-5 for SCD11 with value of -10 dB max from 0.01 to 11.1 GHz

Cl  85  SC  85.8.4  P  226  L  49  #  306
Ghiasi, Ali  Broadcom

Comment Type  TR  Comment Status  R
Table 85-5-Receiver characteristics’ summary. Remove editors note lines 49-54 page 225.

CR4 and CR10 transmitter and channel characteristics consistent with 10GBASE-KR therefore 10GBASE-KR receiver is sufficiently specified.

SuggestedRemedy
Remove TBDs Table 85-5-Receiver characteristics’ summary. Remove editors note line 32-36 page 223.

Response  Response Status  C
REJECT.

This comment was WITHDRAWN by the commenter.

See presentation material to be submitted in support of Clause 85 Draft 1.1. comment resolutions and ghiasi_03_0109.pdf.

Cl  85  SC  85.8.4  P  226  L  50  #  73
Ghiasi, Ali  Broadcom

Comment Type  TR  Comment Status  R
Comperehensive stress receiver is requried for both TP0 and TP3

SuggestedRemedy
Please see ghaisi_03_0109 for block diagram and test method for comeprehensive receiver test method

Response  Response Status  C
REJECT.

See presentation material to be submitted in support of Clause 85 Draft 1.1. comment resolutions and ghiasi_03_0109.pdf.
Cl  85  SC 85.8.4.1  P 226  L 29  # 449

Dudek, Mike  JDSU

Comment Type  T  Comment Status  R
It is not clear that the BER has to be met in the complete worst case condition (not just worst case attenuation).

Suggested Remedy
Add to the end of the sentence "the maximum insertion loss deviation of 85.10.3 and the maximum cable assembly loss to crosstalk ratio of 85.10.8"

Response  Response Status  C  REJECT.
Simultaneous worse case of all impairments in a single cable assembly is not tractable e.g., worse case ILD and worse case IL and worse case crosstalk. Worse case compliant cable assembly characteristics are defined in 85.10.

Cl  85  SC 85.8.4.1  P 226  L 30  # 237

DiMinico, Christopher  MC Communications

Comment Type  T  Comment Status  A
Remove editors note.

Suggested Remedy
[Editor's note (to be removed prior to publication) - The ambiguity between the requirements of 85.8.4.1 and subclause 71.7.2.1, receiver interference tolerance, which references Annex 69A, needs to be resolved.]

See presentation material to be submitted in support of Clause 85 Draft 1.1. comment resolutions.

Response  Response Status  C  ACCEPT IN PRINCIPLE.
Remove editors note.

Cl  85  SC 85.8.4.3  P 225  L 51  # 68

Ghiasi, Ali  Broadcom

Comment Type  TR  Comment Status  A
Since TP2 include a connector with about 4" of PCB traces table 85-5 then specifications for TP0 are missing

Suggested Remedy
Please duplicate section 85.8.4 for TP0 specificaitons, for detail return loss and testing see ghiasi_03_0109

Response  Response Status  C  ACCEPT IN PRINCIPLE.
See suggested remedy comment#307.
The 40GBASE-CR4 and 100GBASE-CR10 receiver shall be AC-coupled to the cable assembly to allow for maximum interoperability between various 10 Gb/s components.

The 40GBASE-CR4 and 100GBASE-CR10 receiver shall be AC-coupled to the cable assembly to allow for maximum interoperability.

Recommended coupling capacitor value is TBD. This value should be set to 100 nF in accordance with 10GBASE-KR and to avoid additional link penalties associated with baseline wander.

Recommended coupling capacitor value is TBD. This value should be set to 100 nF in accordance with 10GBASE-KR and to avoid additional link penalties associated with baseline wander.

The copper length objective for 40 and 100 Gigabit Ethernet is at least 10 m over a copper cable assembly.

Current PCB loss limit Eq 85-1 allows for 8" of PCB trace meeting nicole_01_0708 objective. Ilpcbmax represents 8 inches (0.2032 m) of the maximum fitted attenuation Amax due to trace skin effect and dielectric properties as defined in Annex 69B.4.2.
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>Page</th>
<th>Line</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response Status</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>85.9.1</td>
<td>227</td>
<td>13</td>
<td>T</td>
<td>R</td>
<td>This maximum insertion loss allocation, halved if it covers the sum of transmit and receive PCB traces, is only 2.3 dB at Nyquist. Another opinion has 3.5 dB for 4 inches of PCB.</td>
<td>C</td>
<td>REJECT.</td>
</tr>
<tr>
<td>85</td>
<td>85.9.1</td>
<td>227</td>
<td>15</td>
<td>TR</td>
<td>R</td>
<td>Specification range for cable insertion loss is not adequate at either end. SFP+ Annex E cable S-parameter specs go from 10 MHz to 11.1 GHz. This is not about 1G operation; a channel that is not controlled below 100 MHz WILL be expected to fail at 10G/lane.</td>
<td>C</td>
<td>REJECT.</td>
</tr>
<tr>
<td>85</td>
<td>85.9.2</td>
<td>228</td>
<td>14</td>
<td>E</td>
<td>A</td>
<td>The copper length objective for 40 and 100 Gigabit Ethernet is at least 10 m over a copper cable assembly.</td>
<td>C</td>
<td>ACCEPT IN PRINCIPLE. Change to &quot;represents approximately 0.20 meters (8 inches)&quot;</td>
</tr>
</tbody>
</table>
Comment Type: T  Comment Status: A

Note states that "2.5 dB of the 3 dB signal-to-noise ratio penalty related to insertion loss deviation embodied in 802.3ap ICRmin is applied as 2.5 dB ICRchmin margin to account for reduction in ILD penalty for CR4 and CR10."

While the more stringent ILD limits for the cable assembly shown in 85.10.3 would imply a reduction of ILD penalty, it is not obvious that the ILD penalty for the _channel_ is reduced by 2.5 dB. The ILD penalty is a function of the cable assembly ILD, transmit and receive PCB trace impedances, and transmitter and receiver return loss.

SuggestedRemedy
Supply analysis that supports the assertion that the ILD penalty is reduced by 2.5 dB. A presentation that investigates this issue will be presented to the Task Force.

Response  Response Status: C

ACCEPT IN PRINCIPLE.

(1) Explicitly define the channel insertion loss limit chIL=Cable assembly IL+TX_PCB+RX_PCB

(2) Channel insertion loss deviation (ILD) specifications = cable assembly ILD specifications equation 85-16 and 85-17


See healey_01_0109.pdf slide #7.

Comment Type: TR  Comment Status: R

The equations for generating the fit line for any data to test to the limit line as specified in equations 85-3 through 85-8 are faulty (See attached supporting document.)

The equation just extends what was accepted in IEEE 802.3ap as the equation. In light of the presented data, it is necessary to revisit the equation. The fit line, as it stands now, can cause some connectors which actually pass the requirements in raw data to fail the requirements with the fit line.

SuggestedRemedy
Need to come up with a new equation for the fit line which takes into account the low frequency data also when coming up with the fit line to test against the limit line.

Resolution will be provided in a supporting document.

Response  Response Status: C

REJECT.

See comment#667 for rationale.

Comment Type: T  Comment Status: A

Remove TBDs in the power budget for clause 86 in Tables 86-6 to 86-12 and associated definitions.

SuggestedRemedy
Apply changes shown in anslow_04_0109.pdf

Response  Response Status: C

ACCEPT IN PRINCIPLE.

Accept with any modifications as captured in other comment responses.
Cl 86 SC 86.1 P 247 L 21 # 276
Chang, Sun Hyok ETRI

Comment Type T Comment Status A operating

'Minimum range' is written in Table 86-1.  
In Draft 1.0 comments #78 - #81, it is decided to change 'Minimum range' to 'Required operating range'.

SuggestedRemedy
Change 'Minimum range' to 'Required operating range' in Table 86-1.

Response Response Status C
ACCEPT.

Cl 86 SC 86.1 P 247 L 29 # 648
Trowbridge, Stephen Alcatel-Lucent

Comment Type E Comment Status A

Letting n=3 or n=9 isn't intuitive since n doesn't correspond to any attribute of the implementation. Use n=4 or n=10 (the number of lanes), and number primitives and lanes throughout the clause as 0 through n-1

SuggestedRemedy
Let n=the number of lanes and number primitives and lanes throughout the clause as 0 through n-1.

Response Response Status C
ACCEPT IN PRINCIPLE.

The root cause is that the lanes are numbered from 0, which isn't intuitive. In the format "PMD_UNITDATA.requestn(tx_bit)" we need a symbol for the last lane ID: "PMD_UNITDATA.requestn-1(tx_bit)" isn't good.  
In future, we should change the lane numbering to start from 1 throughout or make the lane ID a subscript.  
For now, uses of n+1 later in the clause replaced by "4 or 10" or eliminated.

Cl 86 SC 86.1 P 248 L 2 # 536
Dawe, Piers Avago Technologies

Comment Type T Comment Status R

Waste of space

SuggestedRemedy
Change:
LAN CSMA/CD LAYERS
or better, LAN CSMA/CD layers
or even better, Ethernet layers

Response Response Status C
REJECT.

To preserve consistency with the base standard (e.g. Figure 52-1)

Cl 86 SC 86.10.1 P 271 L 50 # 555
Dawe, Piers Avago Technologies

Comment Type T Comment Status R

Point out that cabling does not have to preserve lane numbering.

SuggestedRemedy
Add: As the PCS is capable of receiving the lanes in any arrangement, the cabling is not required to preserve lane numbering.

Response Response Status C
REJECT.

A more appropriate wording for this addition is requested.

[Editor's note: page number changed from 71 to 271]
Comment Type T Comment Status A
Need to reduce cabling skew and Dynamic Skew limits by the skew and Dynamic Skew that could be caused by wavelength changes, which are attributable to the transmitter not the channel. We aren't required to spend all the skew budget.

SuggestedRemedy
Change Cabling skew Max from 100 to e.g. 99 ns. Change table title to:
Fiber optic cabling (channel) characteristics at 850 nm.
Change footnote b to:
These channel insertion loss values include cable, connectors, and splices.
Response Response Status C
ACCEPT IN PRINCIPLE.
Change table title to:
Fiber optic cabling (channel) characteristics at 850 nm.
Change footnote b to:
These channel insertion loss values include cable, connectors, and splices.
Change Cabling skew Max from 100 to 79 ns

Comment Type T Comment Status A
100ns of skew is much more than is needed. A separate comment has been made to re-allocate 20ns of this skew to the PMD's.

SuggestedRemedy
Change 100ns to 80ns.
Response Response Status C
ACCEPT IN PRINCIPLE.
See response to comment 280

Comment Type T Comment Status A
Is the channel insertion loss going to receive further study?

SuggestedRemedy
Review the 1.9 dB allocation and delete footnote c.
Response Response Status C
ACCEPT.
The effective modal bandwidth when measured with the launch conditions specified in Table 86-8 is irrelevant. Cable vendors and network operators will use the launch in the relevant standard.

Suggested Remedy
Change 'Table 86-8' to whatever the relevant IEC standard for effective modal bandwidth measurement for OM3 is.

Response
REJECT.

This comment was WITHDRAWN by the commenter.

The fact that this new chromatic spec is met by the old spec would have had lasting value however the editor's note is technically incorrect and should be deleted. The correct note would have stated that fibers manufactured to the old specification in practice actually meet the new tighter specification.

Suggested Remedy
Delete the editor's note

Response
ACCEPT.

While I do not object to the MPO as an example connector, this is not the right document for defining optical connectors.

Suggested Remedy
Delete the editor's note

Response
ACCEPT IN PRINCIPLE.

There is only one sort of maximum link distance, and only one maximum link distance, in this clause. 'calculated based on' seems like a mistake.

Suggested Remedy
Change 'The maximum link distances for multimode fiber are calculated based on' to 'The maximum link distance is based on'.

Response
ACCEPT.

As n is 3 or 9, there are not n optical signal streams.

Suggested Remedy
Change 'n' to '4 or 10'.

Response
ACCEPT.
Dynamic Skew at SP2 (400 ps or 2 UI) is excessive; OIF has 1.5 UI at SP1(?) and that's after they sandbagged it. Because a group of 4 differential traces can be kept more equal in length than a group of 10, the Dynamic Skew for 40G should be lower than that for 100G. Removing an editor's note.

**Suggested Remedy**
Change limit for Dynamic Skew at SP2 to 300 ps (which is 3 UI). Remove the editor's note at line 28.

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

Make no change to Dynamic skew limit (renamed to Skew Variation by comment 282) see Response to comment 616

Remove editor's note at line 28

see comments 625, 616 and 504

---

The editor's note says "The Dynamic Skew limit at SP2 may be too high, further information is invited. The limits may be different for 40G and 100G" However, the skew limit at SP2 is independent of the PMD type and hence it is inappropriate to have this note here.

**Suggested Remedy**
Remove editor's note

**Response**
Response Status C
ACCEPT.

---

There are no lane assignments for 40GBASE-SR4 and 100GBASE-SR10. While it is expected that a PMD will map electrical lane i to optical lane i and vice versa, there is no need to define where the electrical lanes are physically, as the PCS is capable of receiving the lanes in any arrangement. The PMD layer is not required to preserve lane numbering. This standard does not specify physical lane numbering at the PPI or MDI. A PMD may map electrical lane i to optical lane i and vice versa. MSA definitions of specific implementations of PPI or MDI, or connector specifications, distinguish transmit lanes from receive lanes. Delete 86.5.1 and 86.5.2.

**Response**
Response Status C
REJECT.

This comment was WITHDRAWN by the commenter.

This change is not necessary for technical completeness.
<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>86.5</td>
<td>255</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td>Ghiasi, Ali</td>
<td>Broadcom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>TR</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td><strong>SuggestedRemedy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optical lane assignment are missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

See response to 186 and 187

---

<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>86.5</td>
<td>255</td>
<td>29</td>
<td>76</td>
</tr>
<tr>
<td>Ghiasi, Ali</td>
<td>Broadcom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>TR</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td><strong>SuggestedRemedy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optical lane assignment are missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

See response to 186 and 187

---

<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>86.5.1</td>
<td>255</td>
<td>24</td>
<td>405</td>
</tr>
<tr>
<td>D'Ambrosia, John</td>
<td>Force10 Networks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>T</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td><strong>SuggestedRemedy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subclauses for optical lane assignments for 40 &amp; 100G SR are blank.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

Subclauses 86.5.1 and 86.5.2 have been populated. See Responses to comments 186 and 187

---

<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>86.5.1</td>
<td>255</td>
<td>30</td>
<td>186</td>
</tr>
<tr>
<td>Kolesar, Paul</td>
<td>CommScope</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>TR</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Lanes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optical lane assignments for 40GBASE-SR4 must be defined to provide an interoperable interface that provides proper connectivity over standard structured cabling infrastructures. The editor's note invites contributions proposing content for this subclause.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SuggestedRemedy**

See contribution kolesar_01_0109 for slides containing rationale and specific content in the form of text and figure. The slides within this contribution intended for subclause 86.5.1 are so entitled atop each slide. Note: This contribution also contains proposed content for related subclauses 86.5.2 and 86.10.2.3.

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

Populate clause 86.5.1 with content of slide 18 of kolesar_01_0109.pdf

A vote of the sub-task force was taken as to whether to accept this response:

Yes 19
No 1

---

<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>86.5.2</td>
<td>255</td>
<td>30</td>
<td>187</td>
</tr>
<tr>
<td>Kolesar, Paul</td>
<td>CommScope</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>TR</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Lanes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optical lane assignments for 1000GBASE-SR10 must be defined to provide an interoperable interface that provides proper connectivity over standard structured cabling infrastructures. The editor's note invites contributions proposing content for this subclause.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SuggestedRemedy**

See contribution kolesar_01_0109 for slides containing rationale and specific content in the form of text and figures. The slides within this contribution intended for subclause 86.5.2 are so entitled atop each slide. Note: This contribution also contains proposed content for related subclauses 86.5.1 and 86.10.2.3.

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

Populate clause 86.5.2 with content of slide 19 through 22 of kolesar_01_0109.pdf

Modify the content to indicate that there are three options, the arrangement shown in Figure 86-4c is "Recommended" and the two arrangements shown in Figures 86-a and 86-b are "Alternatives"

Grant editorial licence in modifying this text.
At line 37, Table 86-18 is referred. However, I think the specifications of multimode fibers are written in Table 86-19.

Suggested Remedy
Change 'Table 86-18' to 'Table 86-19'.

Response
ACCEPT.

At line 37 'operational range requirement', and at line 38 'minimum range requirement' are written. In Draft 1.0 comments #78 and #81, it was decided to write it as 'operating range requirement'.

Suggested Remedy
Change 'operational range requirement' to 'operating range requirement'.
Change 'minimum range requirement' to 'operating range requirement'.

Response
ACCEPT.

Single ended input voltage tolerance -0.3 4.0
This spec needs to be better defined. If it is for non-operational conditions, then it is fine. If it is operational, then it needs to be defined with a swing size.

Suggested Remedy
Preferred range would be from -0.3 to Vsupply + 0.3

Response
ACCEPT IN PRINCIPLE.

Apply changes in Anslow_04_0109 and then add footnote to Single ended input voltage tolerance saying "The single ended input voltage tolerance is the allowable range of the instantaneous input signals"
In table 86-6, parameters TP1a TJ, DJ & DDPWS, contain TBDs and/or are noted for further study. It appears the 0.30 UI Max for TP1a TJ is unnecessarily high and can be reduced to 0.26 UI. Further, the eye mask coordinate, X1 & X2 do not appear to be consistent with eye mask coordinates proposed for TP2 and/or the requirements of the receiver at TP3.

The same issue holds for table 86-7.

SuggestedRemedy
Accept the changes in anslow_04_0109 for table 86-6 except, change the Eye Mask Coordinates X1 & X2 to 0.12, 0.33 to 0.1, 0.31 consistent with eye mask coordinates at TP2 and optical receiver requirements.

Repeat for table 86-7

Response
ACCEPT IN PRINCIPLE.

Comment Type TR Comment Status A

In both tables 86-6 and 86-7
Replace Total Jitter (0.3) with J9 jitter (0.26 )
Replace Deterministic Jitter (TBD) with J2 Jitter (0.18 )
Remove the reference to BER 1e^-12
Remove the TBD for DDPWS with 0.07
Remove the editors footnotes.

Note that these are the same as the proposed changes in Anslow_04.

Response
ACCEPT IN PRINCIPLE.

See Response to comment 502

Ghiasi, Ali Broadcom

Comment Type TR Comment Status A

DDPWS and DJ are TBD, based on the value of DJ then TJ need to be adjusted

SuggestedRemedy
TJ(J9)=0.26 UI, J2=0.18 UI, DDPWS=0.07 UI please see anslow_04_0109

Response
ACCEPT IN PRINCIPLE.

See Response to comment 502

[Editor's note: comment was entered against 226]
Comment Type: TR  Comment Status: A
The eye mask coordinates allow the host to generate a really large, slow, noisy eye. Reflections with a large eye will degrade the small opening specified in the eye. Slow and noisy edges will cause the transmitted optical signal to have excessive jitter. This same problem was observed and fixed in SFP+. Options for fixing are:
Reduce X2 from 0.33;
Introduce a relative mask;
Introduce a Qsq limit of 50 or so, and require the host to keep its baseline wander in check (SFP+ is attempting this);
Tighten the hit ratio.
Because the measurement time can be used for a relative and absolute mask, the first and last options do not add test cost.

SuggestedRemedy
Reduce X2.  Apply a relative mask with the same X1, X2, and Y1, Y2 of 0.25, 0.25.

Response  Response Status: C
ACCEPT IN PRINCIPLE.
See Response to comment 425
 Invite advice from the statistical eye ad-hoc

Comment Type: T  Comment Status: A
Some of the specifications (return losses) in table 86-7 apply at TP1 while others apply at TP1a.

SuggestedRemedy
In the table title change “TP1a” to “TP1 and TP1a”, or better split the table and references to it, into two tables
*PPI electrical transmit signal input specifications at TP1* with the SDD11 and SCD11 specifications and
*PPI electrical transmit signal input tolerance at TP1a* with all the other specifications.

Note this change is also needed in Anslow_04

Response  Response Status: C
ACCEPT IN PRINCIPLE.
Follow response to comment 457
Cl  86  SC  86.6.1.1  P 257  L 14  # 557  
Dawe, Piers  Avago Technologies

Comment Type  T  Comment Status  A
Illustrate the reflection specs.

SuggestedRemedy
Show the reflection specs in a figure, delete [To do: illustrate these specs]

Response  Response Status  C
ACCEPT.

Cl  86  SC  86.6.1.2  P 257  L 23  # 80  
Ghiasi, Ali  Broadcom

Comment Type  TR  Comment Status  R
SCC22 at TP1a and TP4 is little too tight with some of the connectors

SuggestedRemedy
Propose to slightly relax the mask
SCC22=-7.51 + 1.1*f from 0.01 to 4.1 GHz and -3 from 4.1 to 11.1 GHz

Response  Response Status  C
REJECT.
Commenter is requested to provide a presentation to illustrate and justify this.
[Editor's note: subclause changed from 86.1.2]

Cl  86  SC  86.6.2  P 257  L 30  # 558  
Dawe, Piers  Avago Technologies

Comment Type  T  Comment Status  A
RIN
Expecting that we will have a normative TDP spec per anslow_04_0109, we don't need a
normative RIN spec. We are asked not to mix normative and informative material.

SuggestedRemedy
Delete the RIN12OMA row in Table 86-9. Here, add 'The transmitter's RIN12OMA should
not exceed -128 dB/Hz.'

Response  Response Status  C
ACCEPT IN PRINCIPLE.
See Response to comment 608
Note other comments 420, 426 and 608 tagged "RIN".

Cl  86  SC  86.6.2  P 257  L 38  # 432  
Abbott, John  Corning Incorporated

Comment Type  TR  Comment Status  R
Lines 38-41
Table 86-8. RMS spectral width. The RMS spectral width is not a good way to characterize
the spectral content of VCSEL lasers, whose spectra consists of two or more narrow lines
separated by a gap in wavelength. The RMS spectral width pre-supposes a Gaussian
character to the spectral power vs. wavelength which is incorrect.
This change is needed in order to have an accurate link budget and for accurate link
models.
A simple suggestion is to include both RMS width and full width quarter max.

SuggestedRemedy
One solution is to include both RMS width and full width quarter max. Need to involve
transceiver manufacturers

Response  Response Status  C
REJECT.
This comment was WITHDRAWN by the commenter.

Cl  86  SC  86.6.2  P 257  L 43  # 415  
Petrilla, John  Avago Technologies

Comment Type  T  Comment Status  A
In table 86-8, parameters Max & Min Average launch power and Aggregate signal
parameter contain TBDs and/or are noted for further study.

SuggestedRemedy
Accept the changes in anslow_04_0109 for table 86-6.

Response  Response Status  C
ACCEPT IN PRINCIPLE.
See Response to comment 502

TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched  A/accepted  R/rejected  RESPONSE STATUS: O/open  W/written  C/closed  U/unsatisfied  Z/withdrawn
SORT ORDER: Clause, Subclause, page, line
In order to reduce the overload requirements on the receiver the maximum OMA and the Peak Power from the transmitter should be specified. The values suggested assume that at the maximum average power the extinction ratio is <=9.4dB and at this extinction ratio the overshoot is <13%.

If the average power is not at it's max value then the extinction ratio can be higher and/or the overshoot can be larger. Similarly if the average power is at the maximum value but the extinction ratio is less than the overshoot can be larger.

It is expected that the vast majority of transmitters would be compliant to these requirements anyway.

Suggested Remedy
Add specifications to Table 86-8 for Maximum OMA per lane of 3dBm and Peak power per lane of 4dBm.

Also make equivalent changes to table 86-9.

Note that this is as proposed in Anslow_04

In addition add rows to table 86-10 (receiver specs) page 259 for Optical Modulation Amplitude max +3dBm and Peak Power max +4dBm. (These changes are not in Anslow_04)

Response
ACCEPT IN PRINCIPLE.

add rows to table 86-10. OMA max +3dBm and Peak Power max +4dBm. Make parameter names consistent with clause 87 and 88.

In table 86-8 the parameter RIN12OMA is noted for further study and becoming informative if its effects are included in an aggregate signal parameter. Such aggregate signal parameters, TDP & OMA-TDP, have been proposed. If TDP is accepted RIN12OMA can be noted as informative or deleted.

Suggested Remedy
If TDP is accepted RIN12OMA, note as informative or delete.

Response
ACCEPT IN PRINCIPLE.
See Response to comment 608
Note other comments 558, 420 and 608 tagged "RIN".

With a normative TDP spec (see anslow_04_0109), we don't need a normative RIN spec. IEEE are tightening their request to not mix normative and informative material. Also, not having a normative RIN12OMA should simplify the lane-by-lane pattern generation requirements in the PMA.

Suggested Remedy
Please delete the RIN12OMA row in Table 86-9. At 86 86.6.2 p257 line 30 (just above this table), add "The transmitter's RIN12OMA should not exceed -128 dB/Hz."

Response
ACCEPT IN PRINCIPLE.
Delete the row for RIN12OMA from Table 86-9
Do not add proposed text.
Note other comments 420, 426 and 558 tagged "RIN".
In table 86-8 eye mask coordinates, X1, X2, X3, Y1, Y2, Y3, shown as 0.25, 0.4, 0.45, 0.25, 0.28 0.4, respectively, are noted for further study. These values are just carried over from clause 52 and do not take into account the shift to a hit ratio of 5E-5 nor the requirements of the optical receiver for SRs. Further, since it has been shown, petrilla_03_1108, that a six-sided mask is sufficient, an eight-sided mask should be rejected due to the increase in test time or loss of yield due to the additional corners.

**Suggested Remedy**

In table 86-8 change eye mask coordinates, X1, X2, X3, Y1, Y2, Y3, to 0.23, 0.34, 0.34, 0.17, 0.17, 0.4, respectively.

A presentation, petrilla_01_0109, will be provided in support.

**ACCEPT IN PRINCIPLE.**

Comment on Table 86-8 (TP2) and Table 86-10 (TP3). Suggest to reuse 802.3ae 10GBASE-SR Stress RX sensitivity for TP3 specs as in Table 86-10 by taking into account xtalk impacts.

**Suggested Remedy**

Specify RX stressed sens. in OMA about -5.5dBm. (pls see slides to review 802.3ae 10GBASE-SR Stress RX sensitivity test/margin results.)

**ACCEPT IN PRINCIPLE.**

See Response to comment 416

[Editors note:Page number was 257-9]
Cl 86  SC 86.6.4  P 259  L 15  # 416
Petrilla, John  Avago Technologies

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

In Table 86-10, the Stressed Rx sensitivity parameter and associated test conditions are TBD.

**Suggested Remedy**

In Table 86-10, change the Stressed Rx sensitivity parameter and associated test conditions from TBD as follows:
- Stressed Rx sensitivity to -5.4
- Vertical eye closure penalty to 2.0
- Stressed eye J2 jitter to 0.35

A presentation, petrilla_01_0109, will be provided in support.

**Response**  Response Status  C

ACCEPT IN PRINCIPLE. After applying the changes due to comment 502, in Table 86-10, set:
- Stressed Rx sensitivity to -5.4
- Vertical eye closure penalty to 2.0
- Stressed eye J2 jitter to 0.35
- Stressed eye J9 jitter to 0.47

These numbers need to be reviewed via future comment cycles.

Cl 86  SC 86.6.4  P 259  L 21  # 611
Dawe, Piers  Avago Technologies

**Comment Type**  T  **Comment Status**  A  SRS SJ

For the same reasons as for LRM, sinusoidal jitter tolerance testing should be separated.

**Suggested Remedy**

For the stressed receiver sensitivity, use just one SJ setting e.g. at 80 GHz.
- Add rows to Table 86-8: Conditions of receiver jitter tolerance test:
  - Jitter frequency and peak to peak amplitude (75, 5) (kHz, UI)
- Jitter frequency and peak to peak amplitude (375, 1) (kHz, UI)

Add new subclause: 86.7.5.10 Receiver sinusoidal jitter tolerance

Receiver sinusoidal jitter tolerance for each lane is defined as in 68.6.11, with the following differences:
- The pattern to be received is specified in Table 86-16;
- The other receive lanes not being tested are receiving Pattern 1, 2, 3, 5, or portion(s) of a 10GBASE-R, 40GBASE-R4 or 100GBASE-R10 signal, and the transmitter is transmitting one of these signals using all lanes, and
- The transmitter and the receiver are not synchronous.

**Response**  Response Status  C

ACCEPT IN PRINCIPLE. See response to 579.

Cl 86  SC 86.6.4  P 259  L 21  # 454
Dudek, Mike  JDSU

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

Specifying the stressed receiver input signal as having minimal random jitter and noise for 10G was a bad idea as this was too difficult for test equipment vendors to produce resulting in over-stressful tests, also it is better to test with a signal that more accurately represents a worst case input signal.

**Suggested Remedy**

Add a row to Table 86-10: stressed eye J9 jitter. Value TBD. Also include a definition of J9 jitter in the test section.

**Response**  Response Status  C

ACCEPT IN PRINCIPLE. See Response to comment 502
Needless repetition; these similar footnotes are not coincidence.

**Suggested Remedy**

Change

Vertical eye closure penalty is a test condition for measuring stressed receiver sensitivity. It is not a required characteristic of the receiver.

Stressed eye jitter is a test condition for measuring stressed receiver sensitivity. It is not a required characteristic of the receiver.

to

Vertical eye closure penalty and stressed eye jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

**Response**

ACCEPT IN PRINCIPLE.

Needless repetition: See response to comment 610 since this is needless repetition.

---

Some of the specifications (jitter and eye mask) in Table 86-12 should be calibrated after the connector while others (reflection coefficients) are tested before the connector.

**Suggested Remedy**

Either change the title to "TP4 and TP4a" and add "at TP4" to the jitter and eye mask rows and "at TP4a" to the other rows or better split the table moving the jitter and eye mask rows into a new table labelled "PPI receiver electrical input tolerance specifications at TP4".

Note that this change is also required to Anslow_04

**Response**

ACCEPT IN PRINCIPLE.

Change table title to "PPI receiver electrical input specifications at TP4 and TP4a"

Editor to see if adding a column is practical, if not add "at TP4a" to S-parameters.

Also, add AC common mode input voltage tolerance (RMS) min to Table 86-12 with a value of 7.5 mV

---

In table 86-11, eye mask coordinate X1 = 0.35 is based on TJ. Anslow_04_0109 proposes shifting to a hit ratio of 1E-5 but doesn't take into account the reduced allocation at TP1.

The same issue holds for table 86-12.

**Suggested Remedy**

Accept the hit ratio, 1E-5, proposed in anslow_04_0109, but change X1 to 0.27.

Repeat in table 86-12.

**Response**

REJECT.

This comment was WITHDRAWN by the commenter.
### Task force Review

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>SuggestedRemedy</th>
<th>Response</th>
<th>Response Status</th>
<th>Commenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>86.6.5</td>
<td>260</td>
<td>11</td>
<td>455</td>
<td><strong>T</strong></td>
<td><strong>A</strong></td>
<td>Eye mask tests are best specified at a reasonable hit rate to provide statistical significance in a reasonable test time. 5e-5 is an appropriate hit ratio. with this hit ratio and to reduce the stress on the electrical receiver the value of X1 should be reduced.</td>
<td><strong>REJECT.</strong></td>
<td><strong>C</strong></td>
<td><strong>Dudek, Mike</strong> JDSU</td>
</tr>
<tr>
<td>86</td>
<td>86.6.5</td>
<td>260</td>
<td>19</td>
<td>559</td>
<td><strong>T</strong></td>
<td><strong>R</strong></td>
<td>Is this the best choice for AC blocking?</td>
<td><strong>REJECT.</strong></td>
<td><strong>C</strong></td>
<td><strong>Dawe, Piers</strong> Avago Technologies</td>
</tr>
<tr>
<td>86</td>
<td>86.6.5</td>
<td>260</td>
<td>34</td>
<td>83</td>
<td><strong>TR</strong></td>
<td><strong>A</strong></td>
<td>The total jitter and DJ at TP4 are at the same level as SFP+, 4x and 10x SerDes and host need some margin due to PCB degradation and crosstalk</td>
<td><strong>ACCEPT IN PRINCIPLE.</strong></td>
<td><strong>C</strong></td>
<td><strong>Ghiasi, Ali</strong> Broadcom</td>
</tr>
</tbody>
</table>

**Type:** TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general  
**Comment Status:** D/dispatched  A/accepted  R/rejected  
**Response Status:** O/open  W/written  C/closed  U/unsatisfied  Z/withdrawn  
**Sort Order:** Clause, Subclause, page, line
Draft 1.1 Comments  IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments  Task force Review

Cl 86 SC 86.6.5.1 P 261 L 6 # 81
Ghiasi, Ali Broadcom

Comment Type TR  Comment Status A
It would be better to separate the equation in to two

SuggestedRemedy
SDD11=-12 + 2*SQR(f) from 0.01 to 4.1 GHz
SDD11=-6.3 +13*log10(f/5.5) from 4.1 to 11.1 GHz

Response  Response Status C
ACCEPT IN PRINCIPLE.
use same solution as comment 79

Cl 86 SC 86.6.5.1 P 261 L 6 # 560
Dawe, Piers Avago Technologies

Comment Type T  Comment Status A
Repetition; notice that equation 86-3 is the same as 86-1. Also 'where where'.

SuggestedRemedy
Replace:
given by:
20xlog10(|SDDnn|) LE max(-12, -12 + 2xsqrt(f), -6.3+13xlog10(f/5.5)) (86.3)
where where SDDnn is SDD22 or SDD11 and f is the frequency in GHz.
with
given by Equation 86-1.

Response  Response Status C
ACCEPT IN PRINCIPLE.
Fix the "where where" only

Cl 86 SC 86.6.6 P 261 L 10 # 433
Abbott, John Corning Incorporated

Comment Type TR  Comment Status R
Summarize link power budget and a link model in an informative annex with more detail. The link power budget in Table 86-13 should be incorporated into a link model spreadsheet similar to 10GEPBud3_1_16a.xls found at http://ieee802.org/3/ae/public/index.html (for 10GBASE).

However, the link model should be kept current with the 802.3ba project and summarized in annex 86A at the end of the project. Note that the spreadsheet 10GEPBud3_1_16a.xls does not accurately represent the 10GBASE link budget for all PMDs because it was a proposal early in the project. This has the potential to cause misunderstandings among users and also in subsequent standards.

SuggestedRemedy
Summarize link power budget and a link model in an informative annex 86A with more detail.

Response  Response Status C
REJECT.
Standards don't have to show their working; an annex in the standard is not the right place for such material, and would not be convenient for a spreadsheet. 802.3ae partly moved away from the spreadsheet. Editor can resubmit 10GEPBud3_1_16a.xls with numbers from this project (for Clause 86, anyway) when they are stable enough and make it available but it may not be very helpful (jitter discussion). ...

Cl 86 SC 86.6.6 P 261 L 22 # 458
Dudek, Mike JDSU

Comment Type T  Comment Status A
The link budget is with the largest TDP

SuggestedRemedy
Add "for max TDP" to the Power budget and allocation for penalties rows.

this is proposed in Anslow_04

Response  Response Status C
ACCEPT IN PRINCIPLE.
See Response to comment 502
Comment Type: T  Comment Status: A
Power budget may change as a consequence of other changes.

Suggested Remedy
Revise entries in power budget table 86-13 following other changes.

Response  Response Status: C
ACCEPT IN PRINCIPLE.
All changes detailed in anslow_04_0109.pdf

Comment Type: TR
Comment Status: R
Refering to baseline proposal pepeljugoski_01_0508.pdf, in slide#13 PMD will with PMA as a CDR, possibly with simple EDC. The allocation for penalties (6.4dB) and power budget (8.3dB) could be too pessimistic.

Suggested Remedy
Plan to address this from the slides for SRS test.

Response  Response Status: C
REJECT.
[Editor's note:Line number was 1630] Changes to the optical power budget need justification.

Comment Type: T  Comment Status: A
In Table 86-13 notes b and d say:
b [Editor's note (to be removed prior to publication) - For further study]
d [Editor's note (to be removed prior to publication) - Connector loss under study] These values seem to be as stable as any others in this clause, so these notes are no longer needed.

Suggested Remedy
Remove editor's notes b and d

Response  Response Status: C
ACCEPT.
Need to define the compliance board losses.

Suggested Remedy:
Add new 86.7.1.1 Compliance board transfer characteristics. Add equations for nominal S21 of HCB and MCB, from instrumentation connectors to just before module connector. Use the SFP+ equations scaled up by 0.2 to 0.3 dB at Nyquist. Add new 86.7.1.2 Transfer characteristics of mated HCB and MCB, consistent with above.

Response: ACCEPT IN PRINCIPLE.
See Response to comment 84

The symbol used in Figure 86-3 for the optical connector to the modules is not consistent with that used in Figure 86-2 (or 87-2 or 88-2).

Suggested Remedy:
Change the optical connector symbol to be consistent with that used in Figure 86-2

Response: REJECT.
This comment was WITHDRAWN by the commenter.

Pattern 1 is a suitable test pattern and it may be convenient for factories and others to use the same patterns for 10G, 40G and 100G production.

Suggested Remedy:
Change the row for Pattern 1 from italic to upright. Move or remove the footnote depending on decision for Pattern 2.

Response: ACCEPT IN PRINCIPLE.
See response to comment 505.
See also comments 473, 563, 564, 205, 463, 460, 634, 462, 565, 332.

This says "NOTE-The longer test patterns are designed to emulate system operation; however, they do not form valid 10Gbase-R, 40Gbase-R4 or 100Gbase-R10 frames."
This is not correct for test pattern 5 in Table 86-15. This is scrambled idles and is a valid signal. Also the use of the term "frame" is not helpful here.

Suggested Remedy:
Change to: "NOTE-Test patterns 3 and 4 are designed to emulate system operation; however, they do not form valid 40Gbase-R4 or 100Gbase-R10 signals."

Response: ACCEPT IN PRINCIPLE.
Delete entire note.
<table>
<thead>
<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Comment</th>
<th>Suggested Remedy</th>
<th>Response</th>
<th>Response Status</th>
<th>Acceptance</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>86.7.2</td>
<td>263</td>
<td>32</td>
<td>563</td>
<td>T</td>
<td>A</td>
<td>Pattern 2 is as suitable for 40G and 100G as it is for 10G, and it may be convenient for factories and others to use the same patterns for 10G, 40G and 100G production.</td>
<td>Turn the row for Pattern 2 from italic to upright. Remove footnote a.</td>
<td>Accept in principle.</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>86</td>
<td>86.7.2</td>
<td>263</td>
<td>36</td>
<td>473</td>
<td>T</td>
<td>A</td>
<td>Test pattern 2 in clause 52 was generated to stress CDR circuits. It includes pattern transitions that are considered likely to be more stressful than PRBS31. There is no provision in the PMA to generate a pattern like this. Is it necessary?</td>
<td>If necessary add this test pattern to the PMA on a per lane basis.</td>
<td>Accept in principle.</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>86</td>
<td>86.7.2</td>
<td>263</td>
<td>37</td>
<td>564</td>
<td>T</td>
<td>A</td>
<td>Adopt PRBS9.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>86</td>
<td>86.7.2</td>
<td>263</td>
<td>36</td>
<td>563</td>
<td>T</td>
<td>A</td>
<td>The 40G and 100Gb/s pseudo-random pattern is at the PCS. This isn't useful for testing the PMD. Also as there is a PMA PRBS as well it's confusing to have this.</td>
<td>Either delete pattern no 5 or add PCS between Gb/s and pseudo</td>
<td>Accept in principle.</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

**Comment Type:** TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general  
**Comment Status:** D/dispatched  A/accepted  R/rejected  
**Response Status:** O/open  W/written  C/closed  U/unsatisfied  Z/withdrawn  
**Sort Order:** Clause, Subclause, page, line

---

**IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments Draft 1.1 Comments Task force Review**
Comment Type T Comment Status A Patterns
The information about alternative square waves should not be in a normative table. One could move the information to the NOTE on the previous page, or...

Suggested Remedy
Delete the row 'Square'.

Response Response Status C
ACCEPT IN PRINCIPLE.

See response to comment 505.
See also comments 562, 473, 564, 205, 463, 460, 634, 462, 332.

Comment Type T Comment Status A Patterns PRBS9
Many potential test patterns are listed. Suggest that square wave patterns are not necessary exceptionally if short (PRBS9) patterns is included

Suggested Remedy
remove square wave patterns from test pattern list (also change transmitter OMA test pattern to PRBS9)

Response Response Status C
ACCEPT IN PRINCIPLE.

See Response to comment 505 for changes to Table 86-15 and comment 566 for changes to Table 86-16 and OMA measurement
See also comments 562, 473, 564, 205, 463, 460, 462, 332.

Comment Type T Comment Status A Patterns
The Clause 52 square wave isn't helpful because it had variable run length. Clause 68 improved the definition by standardizing on a single run length making measurements more reproducible.

Suggested Remedy
Delete the clause 52 square pattern row in table 86-15.
In table 86-16 change all the square pattern references to Square, eight one's and eight zero's.

Response Response Status C
ACCEPT IN PRINCIPLE.

See Response to comment 505.
See also comments 562, 473, 564, 205, 463, 460, 634, 565, 332.

Comment Type T Comment Status A
Table 86-16 contains a parameter, RIN12OMA, that was included until an aggregate Tx metric was defined. Anslow_04_0109 proposes TDP and OMA-TDP as aggregate metrics permitting RIN12OMA to be deleted or declared informative.

Suggested Remedy
In Table 86-16 delete parameter, RIN12OMA, if TDP or OMA-TDP is included.

Response Response Status C
ACCEPT IN PRINCIPLE.
See response to comment 566.
Note other comments 558, 426 and 608 tagged "RIN".
Completing table of test patterns. Remove rows for TJ and DJ, add rows for J2 and J9. Replace "Aggregate TP2 metric" with "TDP, OMA-TDP". For rows that say "1 or 3" and for J2, allow Pattern 1, 2, or 3, the appropriate portion of a valid 40GBASE-R4 or 100GBASE-R10 signal (this includes Pattern 5), or a valid 10GBASE-R signal. For Tx eye, don't allow Pattern 2. For TDP, stressed sensitivity and J9, don't allow Pattern 1. For J9, don't allow Pattern 2 or PRBS9 (this last needs review). For DDPWS, PRBS9 only. For OMA and transition time, square 8+8 or PRBS9. Delete the RIN12OMA row as RIN12OMA should not be a normative spec and the test procedure in 52.9.6 is not appropriate for a system level test.

Suggested Remedy
See separate file to follow.

Response

ACCEPT IN PRINCIPLE.

In Table 86-16
Delete the row for RIN12OMA
Change "Aggregate TP2 metric" to "TDP"
Change "Total Jitter" to "J9 Jitter" and Related subclause from "86.7.4.4" to "86.7.3.3.2"
Change "Deterministic Jitter" to "J2 Jitter" and Related subclause from "86.7.4.4" to "86.7.3.3.1"
Set the Related subclause for DDPWS to "86.7.4.4.1"

In the Pattern column:
Set DDPWS to "4"
Set: Transmitter OMA (modulated optical power), Calibration of OMA for receiver tests and Transition time to "Square, 4"
Set: Wavelength, spectral width, Average optical power, Extinction ratio, Transmitted waveform (eye mask), J2 Jitter and AC common mode voltage to "3, 5, or valid 40/100GBASE-SR signal"

Set TDP, Stressed receiver sensitivity, Vertical eye closure penalty calibration, J9 Jitter to "3, 5"

Delete all footnotes.

Also, in clause 86.7.5.3 change "OMA is as defined in 52.9.5 and 68.6.2." to "OMA is as defined in 52.9.5 for measurement with a square (8 ones, 8 zeros) test pattern or 68.6.2 (from the variable MeasuredOMA in 68.6.6.2) for measurement with a PRBS9 test pattern with the exception that each optical lane is tested individually."

Also, in clause 86.7.4.3 change "In this clause, transition times (rise and fall times) are defined as the time between the 20% and 80% times, or 80% and 20% times, respectively, of isolated edges. The normative test pattern is the square wave with eight ones and eight zeros. The 0% level and the 100% level are as defined by the OMA measurement procedure (see 68.6.2). This can be applied to electrical signals as well as optical signals)."

Alternatively, suitable edges exist in the PRBS9, within sequences of five zeros and four ones, and nine ones and five zeros, respectively. These are bits 10 to 18 and 1 to 14, respectively. In this case, the 1% level and the 100% level may be estimated as ZeroLevel and ZeroLevel + MeasuredOMA in the TWDP code (see 68.6.6.2), or by the average signal within windows from -3 to -2 UI and from 2 to 3 UI relative to the edge.

The alternative methods are inaccurate for transition times longer than 2.5 UI [TBC]."

"In this clause, transition times (rise and fall times) are defined as the time between the 20% and 80% times, or 80% and 20% times, respectively, of isolated edges. This applies to electrical signals as well as optical signals.

If the test pattern is the square wave with eight ones and eight zeros, the 0% level and the 100% level are as defined by the OMA measurement procedure (see 68.6.2).

If the test pattern is PRBS9, the transitions within sequences of five zeros and four ones, and nine ones and five zeros, respectively, are measured. These are bits 10 to 18 and 1 to 14, respectively. In this case, the 0% level and the 100% level may be estimated as ZeroLevel and ZeroLevel + MeasuredOMA in the TWDP code (see 68.6.6.2), or by the average signal within windows from -3 to -2 UI and from 2 to 3 UI relative to the edge.*

After applying the changes in the response to comment 502:
In 86.7.3.3.2, add at the end "The normative test patterns are given in Table 87-11. As Pattern 3 is more demanding than Pattern 5 (which itself is the same or more demanding than other 40GBASE-R or 100GBASE-R bit streams) an item which is compliant using Pattern 5 is considered compliant even if it does not meet the required limit using Pattern 3."

In 86.7.5.4 bullet c) add at the end "As Pattern 3 is more demanding than Pattern 5 (which itself is the same or more demanding than other 40GBASE-R or 100GBASE-R bit streams) an item which is compliant using Pattern 5 is considered compliant even if it does not meet the required limit using Pattern 3."

See also comments 206, 437, 464, 635.
Comment Type: T, Comment Status: A, Patterns

In Table 86-16 most of the test patterns are undefined. Also, alternative patterns should not be shown with footnotes.

Suggested Remedy

- Leave "Transmitter OMA (modulated optical power)" as "Square"
- Set "RIN12OMA" to "Square"
- Set "Data Dependent Pulse Width Shrinkage (DDPWS)" to "4"
- Set "Transition time" to "Square"
- Set the pattern for all other rows to: "3, 5 or valid 40/100GBASE-R signal"
- Remove all three footnotes

Response

See response to comment 566.
Draft 1.1 Comments

IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments

Task force Review

---

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

Clause 86.7.3.1 only refers to 82.2.12 without defining measurement methods. Unfortunately, the definitions of clause 82.2.12 do not lend themselves to pragmatic test implementation as they refer to timing changes or differences over the extent of time the link is operational.

**SuggestedRemedy**

Accept the relevant change proposed in anslow_04_0109, except add appropriate time durations for these measurements, e.g. 24 hrs for dynamic skew & 7 days for total skew at SP1 and SP4 to capture effect of equipment power-up and daily cycles. Durations at SP2, SP3 and SP5 may be substantially shorter as only the PMA and PMD are involved.

**Response**

ACCEPT IN PRINCIPLE.

Change "Total Skew and Dynamic Skew are defined in 82.2.12" to "Skew and Skew Variation are defined in 82.2.12 and are required to remain within the limits given in 86.2.2 over the time that the link is in operation. Skew points as they relate to the PPI are shown in Figure 86-3."

Add additional text per response to comment 502 (anslow_04_0109.pdf). See comment 282 for change of skew terminology.

---

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

Editor's note may not be not needed after this round: the eye mask measurement is pretty much there although the exact levels of statistical significance need review.

**SuggestedRemedy**

Consider deleting the editor's note.

**Response**

ACCEPT IN PRINCIPLE.

Delete the editor's note.

---

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

Clause 86.7.3.2, defining eye mask measurements, makes no mention of minimum test equipment requirements or de-embedding for the effects of the test equipment. To avoid over rejection of otherwise acceptable product and for consistent results this should be explicitly addressed and applied consistently at the various interfaces. Since it is difficult to de-embed the test equipment from eye mask results, setting minimum test equipment requirement should be considered first.

**SuggestedRemedy**

Add a statement to 86.7.3.2 declaring that the equipment for measuring and displaying eye mask results meet minimum requirements for sensitivity (e.g. 3 dB better than the downstream receiver requirement), timing uncertainty (e.g. < 300 fs), and bandwidth (e.g. 7.5 GHz for optical interfaces and 12 GHz for electrical interfaces). After the approach is decided, then all eye mask coordinates should be evaluated for fit with this approach.

**Response**

ACCEPT IN PRINCIPLE.

Add at the end of clause 86.7.3.2:

"Consideration should be given as to whether a correction is needed for actual instrument properties."

---

Comment Status: D/dispatched A/accepted R/rejected  Response Status: O/open W/written C/closed U/unsatisfied Z/withdrawn

Sort Order: Clause, Subclause, page, line
In eye mask testing, if use of CRU makes a difference we must specify whether it is used or not. If it doesn’t make a difference, the test implementer can take short cuts whatever we say. We cannot fail a transmitter for wander that the receiver is specified to tolerate, or credit it for low jitter or noise that will be overwritten by any receiver that can tolerate the wander.

Note Clauses 87 and 88 rely on this text.

Suggested Remedy

A clock recovery unit (CRU) should be used to trigger the oscilloscope for mask measurements, as shown in Figure 52-9. It should have a high frequency corner bandwidth as specified in Table 86-17 and a slope of -20 dB/decade.

And add a PICS.

ACCEPT IN PRINCIPLE.

Other equations moved to indented left per house style.

Parameter

Change

A clock recovery unit (CRU) should be used to trigger the oscilloscope for mask measurements, as shown in Figure 52-9. It has a high frequency corner bandwidth as specified in Table 86-17 and a slope of -20 dB/decade.

Response

ACCEPT IN PRINCIPLE.

Center the Eq.86-4.

ACCEPT.

Swap the normative and alternative procedures with editorial adjustments to make the text flow.

ACCEPT IN PRINCIPLE.

See response to comment 566.
Transition time can be measured with PRBS9 pattern which is used in jitter measurements. Change transition time pattern to PRBS9.

**Suggested Remedy:**
Change text to "The normative test pattern is the PRBS9 test pattern"

**Response:**
ACCEPT IN PRINCIPLE.

See Response to comment 505 for changes to Table 86-15 and comment 566 for changes to Table 86-16 and OMA measurement.

See also comments 206, 437, 464.

---

**Comment:**
Typo "w/ve"

**Suggested Remedy:**
Replace "w/ve" with "wave".

**Response:**
ACCEPT.

---

**Comment:**
Typo: square w/ve

**Suggested Remedy:**
Square wave

**Response:**
ACCEPT.

---

**Comment:**
Spelling error - "w/ve"

**Suggested Remedy:**
Replace with "wave".

**Response:**
ACCEPT.

---

**Comment:**
"In this case the 1% level and..."

**Suggested Remedy:**
Change to:
"In this case the 0% level and..." (the ZeroLevel is 0%!)

**Response:**
ACCEPT IN PRINCIPLE.

See Response to comment 566.
<table>
<thead>
<tr>
<th>Cl.</th>
<th>SC 86.7.4.3</th>
<th>P 266</th>
<th>L 27</th>
<th>#</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response</th>
<th>Response Status</th>
<th>Comment Status</th>
<th>Comment Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>86.7.4.3</td>
<td></td>
<td></td>
<td></td>
<td>T</td>
<td>A</td>
<td>Delete [TBC].</td>
<td></td>
<td>C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comment Type: Unwanted question

Response: See Response to comment 566.

<table>
<thead>
<tr>
<th>Cl.</th>
<th>SC 86.7.4.4</th>
<th>P 266</th>
<th>L 34</th>
<th>#</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response</th>
<th>Response Status</th>
<th>Comment Status</th>
<th>Comment Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>86.7.4.4</td>
<td></td>
<td></td>
<td></td>
<td>T</td>
<td>A</td>
<td>J2 and J8 have optical application.</td>
<td></td>
<td>C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Suggested Remedy: Define J2 and J9 at 86.7.3.3.

Response: See Response to comment 502.

<table>
<thead>
<tr>
<th>Cl.</th>
<th>SC 86.7.4.7</th>
<th>P 267</th>
<th>L 20</th>
<th>#</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response</th>
<th>Response Status</th>
<th>Comment Status</th>
<th>Comment Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>86.7.4.7</td>
<td></td>
<td></td>
<td></td>
<td>T</td>
<td>A</td>
<td>Any more electrical parameter definitions to be added?</td>
<td></td>
<td>C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Suggested Remedy: Delete this heading or add them.

Response: Delete the heading.
The OMA definition is the only thing that causes us to need square wave generators. We need a measure with low experimental scatter for the clean reference signal in the TDP definition, and for the compliance signal in the stressed receiver sensitivity - both these (after averaging) are very 'linear' signals. We don't need such a good measure for the OMA of the product transmitter.

**Suggested Remedy**

Look again at deriving OMA from a captured PRBS9 waveform. If this method is accurate enough (as it will be for the first two cases above), make it normative and delete the square wave generators in the PMA.

**Response**

ACCEPT IN PRINCIPLE.

See Response to comment 505 for changes to Table 86-15 and comment 566 for changes to Table 86-16 and OMA measurement.

TDP should be used for the Aggregate TP2 signal

**Suggested Remedy**

Replace section 86.7.5.4 with TDP as proposed in Anslow_04

**Response**

ACCEPT IN PRINCIPLE.

Clause 52 stressed sensitivity for 10GBASE-S uses a comparison of a sensitivity measurement of a good signal with a reference receiver without a transversal filter, and of the signal (transmitter) under test with the same reference receiver but with the transversal filter in place. This is disliked.

**Suggested Remedy**

I hope we can get to a TDP definition where the same reference receiver is used with both the reference signal and the signal under test.

**Response**

REJECT.

This comment was WITHDRAWN by the commenter.

The parameter, RIN12OMA, was in lieu of or until an aggregate signal parameter was defined. TDP and OMA-TDP are now defined and RIN12OMA can be made informative or deleted.

**Suggested Remedy**

Delete subclause 86.7.5.6, if TDP or OMA-TDP is included.

**Response**

ACCEPT.

Delete 86.7.5.6 entirely
Having to provide lane-by-lane square wave generators would be a nuisance, especially as RIN12OMA should be just informative.

**Suggested Remedy**

Change subclause to:

The RIN measurement methodology of 52.9.6 may be used with these exceptions:

a) All lanes are operational in both directions (transmit and receive);

b) Each lane is tested individually;

c) The signal on the lanes not under test should be Pattern 1, 2, 3 (PRBS31), 5 or parts of valid 10GBASE-R, 40GBASE-R or 100GBASE-R signals;

d) It may be more convenient to find the equivalent of P_M with Pattern 1, 2, 3, 4, 5 or parts of valid 10GBASE-R, 40GBASE-R or 100GBASE-R signals and apply a correction factor.

**Accept in Principle.**

See response to comment 422.

---

**Comment Type:** T  **Comment Status:** A  **CL:** 86  **SC:** 86.7.5.6  **P:** 268  **L:** 3  **#:** 574

Dawe, Piers  
Avago Technologies

**Response Status:** C  
**Response:**

ACCEPT IN PRINCIPLE.

See response to comment 422.

---

**Comment Type:** T  **Comment Status:** A  **CL:** 86  **SC:** 86.7.5.7  **P:** 268  **L:** 12  **#:** 575

Dawe, Piers  
Avago Technologies

**Response Status:** C  
**Response:**

ACCEPT IN PRINCIPLE.

See response to comment 422.

---

**Comment Type:** T  **Comment Status:** A  **CL:** 86  **SC:** 86.7.5.7  **P:** 268  **L:** 22  **#:** 468

Anslow, Peter  
Nortel Networks

**Response Status:** C  
**Response:**

ACCEPT IN PRINCIPLE.

See response to comment 420.

See also comments 207 and 225.

See also comments 505, 562, 473, 563, 460.

[Editor's note: Commenter has not indicated the comment type. Assigned comment type as Technical. Subclause changed from 86.6.5.7.]

---

**Comment Type:** T  **Comment Status:** A  **CL:** 86  **SC:** 86.7.5.7  **P:** 268  **L:** 37  **#:** 215

Dudek, Mike  
JDSU

**Response Status:** C  
**Response:**

ACCEPT IN PRINCIPLE.

See response to comment 240.

See also comments 207 and 225.

See also comments 505, 562, 473, 563, 460.

[Editor's note: Commenter has not indicated the comment type. Assigned comment type as Technical. Subclause changed from 86.6.5.7.]

---

**Comment Type:** E  **Comment Status:** A  **CL:** 86  **SC:** 86.7.5.7.1  **P:** 268  **L:** 37  **#:** 215

Anslow, Peter  
Nortel Networks

**Response Status:** C  
**Response:**

ACCEPT IN PRINCIPLE.

See response to comment 240.

See also comments 468 and 225.

See also comments 505, 562, 473, 563, 460.

[Editor's note: Commenter has not indicated the comment type. Assigned comment type as Technical. Subclause changed from 86.6.5.7.1]

---

**Comment Type:** E  **Comment Status:** A  **CL:** 86  **SC:** 86.7.5.7.1  **P:** 268  **L:** 37  **#:** 215

Anslow, Peter  
Nortel Networks

**Response Status:** C  
**Response:**

ACCEPT IN PRINCIPLE.

See response to comment 240.

See also comments 468 and 225.

See also comments 505, 562, 473, 563, 460.

[Editor's note: Commenter has not indicated the comment type. Assigned comment type as Technical. Subclause changed from 86.6.5.7.1]

---

**Comment Type:** E  **Comment Status:** A  **CL:** 86  **SC:** 86.7.5.7.1  **P:** 268  **L:** 37  **#:** 215

Anslow, Peter  
Nortel Networks

**Response Status:** C  
**Response:**

ACCEPT IN PRINCIPLE.

See response to comment 240.

See also comments 468 and 225.

See also comments 505, 562, 473, 563, 460.

[Editor's note: Commenter has not indicated the comment type. Assigned comment type as Technical. Subclause changed from 86.6.5.7.1]
Comment Type: T  Comment Status: A

equation (86-9) appears "clipped" in that the leading symbol and trailing symbols are not clearly seen

Suggested Remedy
make the leading symbol be "y"
make the trailing symbol be "GHz"
[now matches equation (52-3)]

Response  Response Status: C
ACCEPT.

Comment Type: T  Comment Status: A

Are the 0 and 1 amplitudes or levels? Gratuitous capitals; Clause 45 doesn't use capitals.

Suggested Remedy
Change 'amplitudes' to 'levels', ZERO to zero, ONE to one.

Response  Response Status: C
ACCEPT IN PRINCIPLE.

Comment Type: E  Comment Status: A

There are no optical transmit jitter specs in this clause, although J2 and J9 are used for stressed receiver signal calibration.

Suggested Remedy
Delete 86.7.5.8 Transmit jitter... and its Editor's note.

Response  Response Status: C
ACCEPT IN PRINCIPLE.
See Response to comment 502

Comment Type: T  Comment Status: A

The distance between -Y3 and 0 should be the same as between 1 and 1+Y3.

Suggested Remedy
Move the -Y3 section lower down.

Response  Response Status: C
ACCEPT IN PRINCIPLE.
Redrawn for changed eye coordinates.

Comment Type: E  Comment Status: A

The distance between -Y3 and 0 should be the same as between 1 and 1+Y3.

Suggested Remedy
Move the -Y3 section lower down.

Response  Response Status: C
ACCEPT IN PRINCIPLE.
Redrawn for changed eye coordinates.

In clause 86.7.5.9 change "using the method defined by 52.9.9 with the conformance test signal at TP3 with jitter J and vertical eye closure penalty as given in Table 86-10 and added sinusoidal jitter as specified in Table 86-17."

to:
"using the method defined by 52.9.9 with the conformance test signal at TP3 with the following exceptions:
a) The sinusoidal amplitude interferer is replaced by a Gaussian noise generator;
b) The sinusoidal jitter is at a fixed 80 MHz frequency;
c) The Gaussian noise generator, the amplitude of the sinusoidal jitter and the Bessel-Thomson filter are adjusted so that the VECP, J2 and J9 specifications given in Table 86-10 are simultaneously met (the random noise effects such as RIN, random clock jitter do not need to be minimised).

Delete the second Table 86-17 (on page 269).
Draft 1.1 Comments  IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments  Task force Review

Cl  86  SC  86.7.5.9  P  269  L  32  #  579
Dawe, Piers  Avago Technologies

Comment Type  T  Comment Status  A  SRS_SJ
For the same reasons as for LRM, sinusoidal jitter tolerance testing should be separated.

SuggestedRemedy
For the stressed receiver sensitivity, use just one SJ setting e.g. at 80 GHz.
Delete Table 86-17. Add rows to Table 86-8:
Conditions of receiver jitter tolerance test:
Jitter frequency and peak to peak amplitude (75, 5) (kHz, UI)
Jitter frequency and peak to peak amplitude (375, 1) (kHz, UI)
Add new subclause:
86.7.5.10 Receiver jitter tolerance
Receiver jitter tolerance for each lane is defined as in 68.6.11, with the following differences:
a) The pattern to be received is specified in Table 86-16;
b) The other receive lanes not being tested are receiving Pattern 1, 2, 3, 5, or portion(s) of a 10GBASE-R, 40GBASE-R4 or 100GBASE-R10 signal, and the transmitter is transmitting one of these signals using all lanes, and
c) The transmitter and the receiver are not synchronous.

Response  Response Status  C
ACCEPT IN PRINCIPLE.
See Response to comment 578 for changes to clause 86.7.5.9

Add rows to Table 86-10:
Receiver jitter tolerance signal level in OMA, each lane with a value of -5.4 dBm
Conditions of receiver jitter tolerance test:
Jitter frequency and peak to peak amplitude (75, 5) (kHz, UI)
Jitter frequency and peak to peak amplitude (375, 1) (kHz, UI)
Add new subclause:
86.7.5.10 Receiver jitter tolerance
Receiver jitter tolerance for each lane is defined as in 68.6.11, with the following differences:
a) The pattern to be received is specified in Table 86-16;
b) The parameters of the signal are specified in Table 86-10;
c) The receive lanes not being tested are receiving Pattern 3, 5, or a valid 40GBASE-R4 or 100GBASE-R10 signal;
d) The transmitter is transmitting one of these signals using all lanes;
e) The transmitter and the receiver are not synchronous.

Cl  86  SC  86.7.5.9  P  269  L  34  #  216
Anslow, Peter  Nortel Networks

Comment Type  E  Comment Status  A
There are two tables numbered 86-17

SuggestedRemedy
Change Autonumber format of second instance from "H:Table <n>=<><><><><<><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><>
Cl: 86  SC: 86.7.5.9  P: 269  L: 48  #: 580
Dawe, Piers  Avago Technologies

Comment Type: T  Comment Status: A  Patterns

Patterns for transmit side for stressed sensitivity.

Suggested Remedy

Change TBD, or a valid 40GBASE-R4 or 100GBASE-R10 signal to Pattern 1, 2, 3, 5, or portion(s) of a 10GBASE-R, 40GBASE-R4 or 100GBASE-R10 signal. Also add:

If multiple copies of a single-lane pattern are used, they are arranged with adequate phase differences so that the bits on the lanes at any instant are not correlated. If a multi-lane pattern such as Pattern 5 is used, no dephasing is necessary.

Response

ACCEPT IN PRINCIPLE.

Change "TBD, or a valid 40GBASE-R4" to "Test patterns 3 or 5, or a valid 40GBASE-R4" Also add at the end of the paragraph:

If test pattern 3 is used for the Tx and Rx lanes not under test, there is at least 31 bits delay between the PRBS31 patterns generated on one lane and any other lane.

Cl: 86  SC: 86.7.5.9  P: 269  L: 48  #: 208
Anslow, Peter  Nortel Networks

Comment Type: T  Comment Status: A  Patterns

The bits or patterns in these tests are not data.

Suggested Remedy

Change the data being transmitted is asynchronous to the received data. to The compliance signal is not synchronous to the transmitter of the receiver under test.

Response

ACCEPT IN PRINCIPLE.

Change "The data being transmitted is asynchronous to the received data." to "The signal being transmitted is asynchronous to the received signal."

Cl: 86  SC: 86.8  P: 257  L: 47  #: 462
Dudek, Mike  JDSU

Comment Type: TR  Comment Status: A  TDP is the best aggregate signal metric for this system. It also enables a trade off between minimum OMA and signal impairments.

Suggested Remedy

In table 86-8 Replate Aggregate signal parameter TBD with Transmission and Dispersion Penalty (TDP) max value of 4dB. Change Optical Modulation Amplitude (OMA), each lane min from -3dBm to -6dBm Add a row "Optical Modulation Amplitude (OMA) minus TDP min -7dBm. Replace the TBD for Average launch power in with -8dBm

Also make equivalent changes to Table 86-9

Note that these are the proposed changes in Anslow_04

Also (not in Anslow_04) in table 86-16 page 264 change Aggregate TP2 metric to TDP.

Response

ACCEPT IN PRINCIPLE.

[Clause changed from 86-8 to 86.8]

For changes included in anslow_04_0109.pdf see response to comment 502

For changes to Table 86-16, see response to comment 566
Filling the TBDs in the channel S-parameter equation. This is for about 4 inches of PCB or 3.5 dB at Nyquist. The equations below are based on the SFP+ channel; the low loss limit is scaled by 0.6 and the high loss limit by 0.568, with a glitch around 250 MHz removed. Unlike the equation in the editor's note, it does not include the loss of the connector and the host compliance board, so it is more informative for IC and board designers (and it is 'informative').

**Suggested Remedy**

$$20 \log_{10} |S_{DD21}| \leq 0.3 - 0.3 f \quad 10^9 \leq f \leq 9.333 \times 10^9$$

$$20 \log_{10} |S_{DD21}| \leq -2.5 \quad 9.333 \times 10^9 \leq f \leq 11.1 \times 10^9$$

$$20 \log_{10} |S_{DD21}| \geq -0.3 \quad 10^6 \leq f \leq 135 \times 10^6$$

$$20 \log_{10} |S_{DD21}| \geq -0.61 - 0.48 \sqrt{f} - 0.456 \times 135 \times 10^6 \quad f \leq 7 \times 10^9$$

$$20 \log_{10} |S_{DD21}| \geq 11.36 - 2.727 \times f \quad 7 \times 10^9 \leq f \leq 8 \times 10^9$$

$$20 \log_{10} |S_{DD21}| \geq -0.8 \times 10^9 \quad f \leq 11.1 \times 10^9$$

Revise figure 86-7 to illustrate this.

Change 'between the PMA IC and TP1 or TP4,' to 'between the PMA IC (TP0 or TP5) and the back of the module electrical connector (i.e. not including the module connector').

**Response**

ACCEPT IN PRINCIPLE.

See Response to comment 85
Cl 87 SC 87.12.4.1 P 302 L 13 # 230
Anslow, Peter Nortel Networks
Comment Type E  Comment Status A
XLFX is optional so there should be a No [ ] option
SuggestedRemedy
Add a No [ ] option
Response Response Status C
ACCEPT.

Cl 87 SC 87.12.4.5 P 304 L 33 # 217
Anslow, Peter Nortel Networks
Comment Type E  Comment Status A
Value/comment says "Conforms to IEC 60950:1"
SuggestedRemedy
Change to "Conforms to IEC 60950-1"
Response Response Status C
ACCEPT.

Cl 87 SC 87.2 P 281 L 3742 # 334
CHANG, Frank Vitesse
Comment Type TR  Comment Status R
Baseline proposal cole_01_0908.pdf did not indicate clearly module implementation (Slide#4). I feel it's quite likely 40GBASE-LR4 will be based on 4x10GBASE-LR with CDR in the host, similar to 40GBASE-SR4, using limiting interface instead of retimed interface like XLAUI. So there is possibility that PMD service interface may be the actual interface between module and host, so not in an abstract manner.
SuggestedRemedy
Go ahead to define Tp1 or Tp4 specs??
Response Response Status C
REJECT.
Insufficient detail has been provided. Detailed proposals for how this would be implemented in the draft would be required.

Cl 87 SC 87.3.1 P 284 L 7 # 218
Anslow, Peter Nortel Networks
Comment Type T  Comment Status A
The max round trip delay including 2m of fiber for 40GBASE-LR4 is TBD. The values for 40GBASE-SR4 have been set at 1024 bit-times, or 2 pause_quanta and the delay for 40GBASE-LR4 should be similar.
SuggestedRemedy
Change "of not more than TBD (1536) bit-times, or TBD (3) pause_quanta" to "of not more than 1024 bit-times, or 2 pause_quanta"
Remove editor's note
Response Response Status C
ACCEPT.

Cl 87 SC 87.3.2 P 284 L 25 # 474
Dudek, Mike JDSU
Comment Type T  Comment Status A
A separate comment changes the skew value in Table 80-3. If that is accepted the skew values on lines 25 and 28 should change
SuggestedRemedy
SP3 skew changes from 44ns to 54ns and SP4 skew changes from 144ns to 134ns.
Response Response Status C
ACCEPT IN PRINCIPLE.
See Response to comment 280

Cl 87 SC 87.5 P L # 106
Bergmann, Ernie Circadian/JDSU
Comment Type T  Comment Status R
The PMD service interface in Figure 87-2 is similar to that of Figure 86-2 so why not have the PPI interface of section 86 (40G version) available as the physically instantiated PMD service interface for 40GBASE-LR4?
SuggestedRemedy
Copy where possible, sections of 86 relating to the PPI or Make references to those sections in 86 relating to PPI
Response Response Status C
REJECT.
Insufficient detail has been provided. Detailed proposals for how this would be implemented in the draft would be required.
Cl 87 SC 87.5.1 P 284 L 51 # 105
Bergmann, Ernie Circadiant/JDSU

Comment Type T Comment Status A
nonsensical reference:
"The PMD block diagram is shown in Figure 87-1."

SuggestedRemedy
replace with:
"The PMD block diagram is shown in Figure 87-2."

Response Response Status C
ACCEPT.

Cl 87 SC 87.5.1 P 284 L 51 # 229
Anslow, Peter Nortel Networks

Comment Type T Comment Status A
This says "The PMD block diagram is shown in Figure 87-1." this should be Figure 87-2

SuggestedRemedy
Correct cross reference to be Figure 87-2

Response Response Status C
ACCEPT.

Cl 87 SC 87.7.1 P 290 L 15 # 62
Cole, Chris Finisar

Comment Type T Comment Status A
40GBASE-LR4 Transmit Characteristics specifies:
Average Launch Power per Lane (max) 2.3dBm
However, there is no practical limit specified on Launch Power to limit Receiver TIA overload requirements.

SuggestedRemedy
Add a new Table 87-7 40BASE-LR4 Transmit Characteristics table entry:
Optical Modulation Amplitude (OMA), each lane (max) 3.5dBm

Response Response Status C
ACCEPT IN PRINCIPLE.
See Response to comment 484

[Editor's note: Changed clause number and page: This comment refers to Clause 87.7.1 and page number 290]

Cl 87 SC 87.7.1 P 290 L 18 # 484
Dudek, Mike JDSU

Comment Type T Comment Status A
In order to not require the receiver to tolerate an OMA of 5.3dBm and a peak power of 6.7dBm the max OMA and max peak power should be restricted, particularly as it is unlikely that a transmitter will be operating simultaneously with max average power, max extinction ratio and max overshoot.
The suggested values are equivalent at max average power to an ER of <= 6.8dB and an overshoot of 25%.

SuggestedRemedy
Add extra rows to tables 87-7 and 87-8.
Optical Modulation Amplitude (OMA) each lane (max) 3.5dBm
Peak Power per lane (max) 5.3dBm

Response Response Status C
ACCEPT IN PRINCIPLE.
In Table 87-7 add rows:
"Optical Modulation Amplitude (OMA), each lane (max)" with a value of 3.5 dBm
In Table 87-8 add rows:
"Receive power, each lane (OMA) (max)" with a value of 3.5 dBm
Do not add the peak power requirement
Comment Type T
Comment Status A

Footnote b, 'TDP is transmitter and dispersion penalty, see 87.8.6.' is anomalous. As we say right before the table, 'The 40GBASE-LR4 transmitter shall meet the specifications defined in Table 87-7 per the definitions in 87.8.' This footnote implies that the definitions of wavelength, OMA and the rest are not there. Footnoting each and every parameter would be silly.

Suggested Remedy
Delete footnote b. If others think some footnote is needed, footnote the first parameter (wavelength in this table) with a general footnote such as 'Parameters and associated test patterns are defined in 87.8'.
Also in Clause 88.

Response C
ACCEPT IN PRINCIPLE.
Delete footnote b in Tables 87-7 and 88-7
Also, if changes in anslew_04_0109.pdf are accepted, do not add proposed footnote shown as f in Table 86-8

Comment Type T
Comment Status A

In this:
Launch power per lane (min) in OMA minus TDP
We don't sum the powers and divide by the number of lanes. TDP may differ across the lanes. Min and max are generally at the end.

Suggested Remedy
Change to 'Launch power in OMA minus TDP, each lane (min)'. Change 'Average launch power per lane (max)' to 'Average launch power, each lane (max)'. Change 'Average launch power per lane (min)' to 'Average launch power, each lane (min)'. Also in Clause 88.

Response C
ACCEPT IN PRINCIPLE.

In Tables 87-7, 88-7 and 88-11 change:
From "Signaling speed per lane (range)" to "Signaling speed, each lane (range)"
From "Average launch power per lane (max)" to "Average launch power, each lane (max)"
From "Average launch power per lane (min)" to "Average launch power, each lane (min)"
From "Launch power per lane (min) in OMA minus TDP" to "Launch power in OMA minus TDP, each lane (min)"

In Tables 87-8, 88-8 and 88-12 change where necessary:
From "Signaling speed per lane" to "Signaling speed, each lane (range)"
From "Average receive power, per lane (max)" to "Average receive power, each lane (max)"
From "Receive power, per lane (OMA) (max)" to "Receive power, each lane (OMA) (max)"
From "Receive sensitivity (OMA), per lane (max)" to "Receive sensitivity (OMA), each lane (max)"
From "Stressed receive sensitivity (OMA), per lane (max)" to "Stressed receive sensitivity (OMA), each lane (max)"
From "Receive electrical 3 dB upper cutoff frequency, per lane (max)" to "Receive electrical 3 dB upper cutoff frequency, each lane (max)"
From "Vertical eye closure penalty, per lane" to "Vertical eye closure penalty, each lane"

Give editorial licence to change any other instances in clauses 86, 87 and 88 in a similar manner.
Comment Type E Comment Status A

"Transmitter and dispersion penalty, each lane(min)" is a variation in wording from elsewhere, leading to possible confusion.

Suggested Remedy

replace with:
"Transmitter and dispersion penalty (TDP), each lane(min)"

["(TDP)" inserted]

Response Response Status C

ACCEPT IN PRINCIPLE.
See Response to comment 605

[Editor's note: Changed to subclause 87.7.1 from Table 87-7]

Comment Type T Comment Status A

Table uses the abbreviation for OMA but not for TDP. This makes it easy to miss the TDP spec especially if using a string search.

Suggested Remedy

Change 'Transmitter and dispersion penalty, each lane' to 'Transmitter and dispersion penalty (TDP), each lane'. Also in Clause 88.

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "Transmitter and dispersion penalty, each lane" to "Transmitter and dispersion penalty (TDP), each lane" in Tables 87-7 and 88-7.

Also, if changes in anslow_04_0109.pdf are accepted, make the same change in Table 86-8.

See also comments 108 and 120
<table>
<thead>
<tr>
<th>Cl.</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>87</td>
<td>87.7.2</td>
<td>291</td>
<td>1</td>
<td>378</td>
</tr>
</tbody>
</table>

O'Mathuna, Padraig
GigOptix

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

Table 87-8
Should specify a maximum ER, otherwise the dynamic range is poorly defined.

**Suggested Remedy**
Recommended value of <9dB

**Response**
Response Status C
ACCEPT IN PRINCIPLE.
Dynamic range is better defined with a max OMA see resolution of comment 93 and 484

[Editor's note: Clause number changed from 87.7 to 87.7.2 and line number set to 1.]

<table>
<thead>
<tr>
<th>Cl.</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>87</td>
<td>87.7.2</td>
<td>291</td>
<td>11</td>
<td>95</td>
</tr>
</tbody>
</table>

Cole, Chris
Finisar

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

Table 87-8 40GBASE-LR4 Receive Characteristics specifies no limit on difference in launch power between any two lanes (max), to limit Receiver cross-talk requirements.

**Suggested Remedy**
Add a new Table 87-8 40GBASE-LR4 Receive Characteristics entry:
Difference in receive power between any two lanes (Average and OMA) (max) 7.5dB

**Response**
Response Status C
ACCEPT IN PRINCIPLE.
Add a new row to Table 87-8 for Difference in received OMA between any two lanes (max) with a value of 7.5dB

[Editor's note: Corrected clause number: This comment refers to Clause 87]
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>Page</th>
<th>Line</th>
<th>Type</th>
<th>Status</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>87</td>
<td>87.7.3</td>
<td>292</td>
<td>18</td>
<td>T</td>
<td>A</td>
<td>Comment in Table 87-9 footnote b contains an editor's note. This note is no longer needed as the value of 2.3 dB for penalties has been stable for some time. Remove editor's note from footnote b. ACCEPT.</td>
</tr>
<tr>
<td>87</td>
<td>87.8.1</td>
<td>292</td>
<td>38</td>
<td>T</td>
<td>A</td>
<td>Square wave pattern is not a necessary pattern if a short PRBS (PRBS9) pattern is included in the test pattern list. Remove square wave pattern from test pattern list. Replace square wave with short PRBS (in OMA evaluation section). ACCEPT IN PRINCIPLE.</td>
</tr>
<tr>
<td>87</td>
<td>87.8.1</td>
<td>292</td>
<td>41</td>
<td>T</td>
<td>A</td>
<td>Pattern 4 is TBD. Since PRBS9 is required for DDPWS in clause 86, change TBD to PRBS9. Change pattern 4 from &quot;TBD&quot; to PRBS9. ACCEPT IN PRINCIPLE. See response to comment 438.</td>
</tr>
<tr>
<td>87</td>
<td>87.8.1</td>
<td>292</td>
<td>42</td>
<td>T</td>
<td>A</td>
<td>TBD should be removed. Replace TBD with PRBS9 and do this elsewhere for the short test pattern such as commented for page 193. ACCEPT IN PRINCIPLE. See response to comment 438.</td>
</tr>
<tr>
<td>87</td>
<td>87.8.1</td>
<td>292</td>
<td>47</td>
<td>T</td>
<td>A</td>
<td>TBD test patterns are designed. The square wave isn't really designed to emulate system operation and pattern 5 is a valid 40GBASE-R signal. Remove TBD. Change &quot;TBD test patterns are designed&quot; to &quot;Test patterns 3 and 4 are designed&quot;. Also remove double &quot;.&quot;. Delete entire note. ACCEPT IN PRINCIPLE. Delete entire note.</td>
</tr>
<tr>
<td>87</td>
<td>87.8.1</td>
<td>292</td>
<td>48</td>
<td>E</td>
<td>A</td>
<td>Delete the double period at the end of the NOTE- below Table 87-10. ACCEPT.</td>
</tr>
</tbody>
</table>
In Table 87-11 most of the test patterns are undefined.

SuggestedRemedy
Leave "Optical modulation amplitude (OMA)" as "Square"
Change parameter name "RINxOMA" to "RIN20OMA" and leave as "Square"
Set "Calibration of OMA for receiver tests" to "Square"
Set the pattern for all other rows to: "3, 5 or valid 40GBASE-LR signal"

Response
ACCEPT IN PRINCIPLE.
See Response to comment 223
See also comments 562 and 563

Of the available patterns PRBS31 or valid 40GBASE-LR Signal is appropriate for all the tests that have TBD except Calibration of OMA which should be square.

However Clause 52 deemed it necessary to create a more stressful pattern than PRBS31 for testing CDR's.

SuggestedRemedy
Make this change
Consider however whether a pattern such as pattern 2 in clause 52 should be used for stressed receiver sensitivity testing.

Response
ACCEPT IN PRINCIPLE.
See Response to comment 223
See also comments 562 and 563
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>A</td>
<td>Delete subclause 87.8.10</td>
</tr>
</tbody>
</table>

**Response**

Response Status: C

see also comments 487 226

---

<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>A</td>
<td>Remove clause 87.8.10 entirely.</td>
</tr>
</tbody>
</table>

**Response**

Response Status: C

see also comments 487 226

---

<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>A</td>
<td>Remove Table 87-13 and refer to Table 52-19 instead.</td>
</tr>
</tbody>
</table>

**Response**

Response Status: C

Populate the table as per Table 52-19
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>A</td>
<td>Remove TBD</td>
</tr>
<tr>
<td>T</td>
<td>C</td>
<td>change &quot;TBD, or valid&quot; to &quot;Test patterns 3 or 5, or valid&quot;</td>
</tr>
<tr>
<td>T</td>
<td>A</td>
<td>Change TBD to PRBS31</td>
</tr>
<tr>
<td>T</td>
<td>C</td>
<td>Replace TBD with PRBS31</td>
</tr>
<tr>
<td>T</td>
<td>A</td>
<td>PRBS31 is a suitable pattern for the lanes not under test</td>
</tr>
<tr>
<td>T</td>
<td>C</td>
<td>After &quot;is as defined in 52.9.5&quot; insert &quot;or 68.6.2&quot;</td>
</tr>
</tbody>
</table>

**Response**

Default answer: ACCEPT IN PRINCIPLE.

**Grant editorial licence to correct any reference changes**

**Comment**

Clause 87.8.2 Total Skew and Dynamic Skew consists of only an editor's note.

**Suggested Remedy**

Replace the editor's note with:

"Total Skew and Dynamic Skew are defined in 82.2.12. The measurement of Total Skew and Dynamic Skew is made by separating optical lanes with an optical de-multiplexer and then acquiring the data on each lane using a clock and data recovery unit with high frequency corner bandwidth as specified in Table 86-17 and a slope of -20 dB/decade. The arrival times of the one to zero transition of the alignment marker sync bits on each lane are then compared. This arrangement ensures that any high frequency jitter that is present on the signals is not included in the skew measurement."

**Response**

Default answer: ACCEPT IN PRINCIPLE.

Replace the editor's note with:

"Skew and Skew Variation are defined in 82.2.12 and are required to remain within the limits given in 87.3.2 over the time that the link is in operation. The measurement of Skew and Skew Variation is made by separating optical lanes with an optical demultiplexer and then acquiring the data on each lane using clock and data recovery units with high frequency corner bandwidths as specified in Table 86-17 and a slope of -20 dB/decade. The arrival times of the one to zero transition of the alignment marker sync bits on each lane are then compared. This arrangement ensures that any high frequency jitter that is present on the signals is not included in the skew measurement."

**Grant editorial licence to correct any reference changes**

**Comment**

OMA measurement is defined in 52, for a square wave. Definition of a test method using PRBS9 is needed.

**Suggested Remedy**

After "is as defined in 52.9.5" insert "or 68.6.2"
The OMA measurement has become less variable than what is given in 52.9.5 with the LRM and SFP+ work.

Suggested Remedy
Can add a sentence that the test pattern is to be a square wave consisting of 8 zeros and 8 ones. [NOT just N zeros and N ones where N is in the range of 4 to 11]

Response
ACCEPT IN PRINCIPLE.
Pattern to be used is 8 ones, 8 zeros
See Response to comment 438

Crosstalk within the PMD Tx needs to be part of this test.

Suggested Remedy
Add. The lanes not under test shall be operating with PRBS31 or valid 64/66B data.

Response
ACCEPT IN PRINCIPLE.
Add. The lanes not under test shall be operating with PRBS31 or valid 40GBASE-LR4 bit streams.

The rise/fall times and RIN requirements for the reference transmitter are TBD. Since each lane of 40GBASE-LR4 is similar to 10GBASE-LR, use the values from 52.9.10.1 of 30 ps and -136 dB/Hz

Suggested Remedy
change "less than TBD ps at 20% to 80%" to "less than 30 ps at 20% to 80%"
change "less than -TBD dB/Hz" to "less than -136 dB/Hz"

Response
ACCEPT IN PRINCIPLE.
change "less than TBD ps at 20% to 80%" to "less than 25 ps at 20% to 80%"
change "less than -TBD dB/Hz" to "less than -136 dB/Hz"

see also comment 224 477
Comment Type T  Comment Status A
Table 87-11 does not contain mask parameters
SuggestedRemedy
replace:
"and 87-11 are"
with
"is"
Response Response Status C
ACCEPT IN PRINCIPLE.
Delete entire editor's note

Comment Type T  Comment Status A
The max round trip delay including 2m of fiber for 100GBASE-LR4 and ER4 is TBD. The values for 100GBASE-SR10 have been set at 2048 bit-times, or 4 pause_quanta and the delay for 100GBASE-LR4 or ER4 should be similar.
SuggestedRemedy
Change "of not more than TBD (1536) bit-times, or TBD (3) pause_quanta" to "of not more than 2048 bit-times, or 4 pause_quanta"
Response Response Status C
ACCEPT.

Comment Type T  Comment Status A
A separate comment changes the skew value in Table 80-3. If that is accepted the skew values on lines 25 and 28 should change
SuggestedRemedy
SP3 skew changes from 44ns to 54ns and SP4 skew changes from 144ns to 134ns.
Response Response Status C
ACCEPT IN PRINCIPLE.
[Editor's note: Missing comment type set to T]
See Response to comment 280.
See also comments 445, 471 and 474

Comment Type T  Comment Status A
In analogy to Table 8-11, should there be an entry for "Difference in launch power between any tow lanes (max)?"
SuggestedRemedy
Add such an entry with a value (3 dB?)
Response Response Status C
ACCEPT IN PRINCIPLE.
[Editor's note: Subclause field changed from Table 88-7 to 88.7.1]
See response to comment 96
Comment Type: T  Comment Status: A

Table 88-7 100GBASE-LR4 Transmit Characteristics specifies no limit on Difference in Launch power between any two lanes (max), to limit Receiver cross-talk requirements.

Suggested Remedy
Add a new Table 88-7 100GBASE-LR4 Transmit Characteristics entry:

| Difference in launch power between any two lanes (Average and OMA) (max) 5.0dB |

Response  Response Status: C

ACCEPT IN PRINCIPLE.

Add a row to Table 88-7 for Difference in launch power between any two lanes (OMA) (max) with a value of 5.0dB

see also comment 116.

Comment Type: T  Comment Status: R

It is expected that external modulators with high extinction ratios could be used for this system and therefore specifying a minimum average power that is not equivalent to the minimum OMA at infinite extinction ratio is a significant restriction.

Suggested Remedy

In Table 88-7 Change Average power per lane min from -4.3dBm to -5.3dBm.

In Table 88-8 Change Average receive power per lane (min) from -10.6dBm to -11.6dBm.

Response  Response Status: C

REJECT.

This comment was WITHDRAWN by the commenter.

The D 1.1 OMA per lane min is -1.3 dBm. At infinite extinction ratio this is -4.3 dBm

Comment Type: E  Comment Status: A

"Transmitter and dispersion penalty, each lane (max)"

Suggested Remedy

replace with:

"Transmitter and dispersion penalty (TDP), each lane (max)"

Response  Response Status: C

ACCEPT IN PRINCIPLE.

This comment was WITHDRAWN by the commenter.

See Response to comment 605
In Table 88-7, the value 2.2 for "Transmitter and dispersion penalty, each lane (max)" has an associated editor's note. Since there have been no proposals to change this value, remove the editor's note. Also applies to Allocation for penalties in Table 88-9.

Suggested Remedy:
Remove editor's note and show values of 2.2 in normal font in Tables 88-7 and 88-9.

Response: ACCEPT IN PRINCIPLE.
See Response in comment 488.

With the specification of OMA minus TDP there is no need to have a tight specification on RIN or such a tight specification on TDP. Relaxations in these values allow implementers more possible trade-offs without degrading the link budget. There is no drawback to increasing RIN max. The only drawback to increasing the maximum value of TDP is that the receiver needs to be tested with somewhat larger VECP, but at a higher power.

Note that the LR TDP max was 3.2dB.

Suggested Remedy:
In table 88-7
Increase RIN specification to -130dB/Hz.
Increase TDP max to 2.8dB.

In table 88-8
Increase stressed receiver sensitivity to -6.2dBm
Increase VECP to 2.4dB.

In table 88-9
Increase power budget to 9.1, increase the allocation for penalties to 2.8dB. Also add a footnote to these rows. Footnote to say "The link power budget is with the maximum TDP allowed."

delete the editors notes related to TDP value.

Response: ACCEPT IN PRINCIPLE.

In table 88-7
Increase RIN specification to -130dB/Hz.
Set TDP max to 2.2 dB
Delete editors note.

Make no changes to Table 88-8.

The TDP max value requires further discussion commenter is invited to resubmit on future draft.

In Table 88-9 only change "Power budget" to "Power budget (for max TDP)" and "Allocation for penalties" to "Allocation for penalties (for max TDP)."

See also comment 232.
Cl 88  SC 88.7.1  P 316  L 47  # 233  
Anslow, Peter  Nortel Networks

Comment Type  T  Comment Status  A
Beneath Tables 88-7 and 88-11 there are notes stating "a possible peak power specification is under consideration for 100GBASE-LR4 and ER4".

SuggestedRemedy
Either introduce such a specification and remove the editor's notes or just remove the editor's notes.

Response  Response Status  C
ACCEPT IN PRINCIPLE.
Remove editor's note

Cl 88  SC 88.7.1  P 316  L 50  # 406  
D'Ambrosia, John  Force10 Networks

Comment Type  TR  Comment Status  A
The Statistical Eye Ad hoc has not met in several months and is not providing any feedback into the task force.

[Editor's note (to be removed prior to publication) - Details of the transmit eye mask measurement are being studied by the Statistical Eye Ad Hoc and consequently the contents of clause 88.9.8 together with the mask parameters in Tables 88-7 and 88-11 are provisional.]

SuggestedRemedy
delete editor's notes related to Statistical Eye Ad Hoc throughout the document

Response  Response Status  C
ACCEPT.

See also comments 257 and 567
Table 88-8 100GBASE-LR4 Receive Characteristics specifies no limit on difference in launch power between any two lanes (max), to limit Receiver cross-talk requirements.

**SuggestedRemedy**

Add a new Table 88-8 100GBASE-LR4 Receive Characteristics entry:

| Difference in receive power between any two lanes (Average and OMA) (max) | 5.5dB |

- **Response**
  - **Response Status**: C
  - **Comment Status**: A

Stressed eye jitter, each lane is TBD in Tables 88-8 and 88-12.

Since each lane of 100GBASE-LR4/ER4 is similar to 10GBASE-LR except for the higher lane rate, use the value from Table 52-13 of 0.3 UI pk-pk

**SuggestedRemedy**

- set the Stressed eye jitter, each lane to 0.3 UI pk-pk in Tables 88-8 and 88-12

- **Response**
  - **Response Status**: C

Table 88-8 and Table 88-12: the -21.4 dBm sensitivity needs to be better defined for the specification for both the PD and the TIA. We should have more information about the overall system:

- APD instead of PIN photodiode?
- Optical amplifier at the TIA input?

We should also consider that if APD of Optical amplifier comes into the picture, it will imply a tight constraint on the overload specification.

**SuggestedRemedy**

- **Response**
  - **Response Status**: C

The 802.3ba specification should not restrict the implementation. Even though the specifications have been generated with an SOA based pre-amplifier in mind, any implementation that meets the specifications is allowed.

Overload considerations were discussed in cole_02_0108.pdf
Comment Type: T  Comment Status: A

There is no TDP specification in this table, but one would expect one in analogy to Table 88.9.5, page 322, line 46.

Suggested Remedy

Add an entry:
"Transmitter and dispersion penalty (TDP), each lane (max)" with a value (2.2 dB?)

Response: C

ACCEPT IN PRINCIPLE.

[Editor's note: Subclause field changed from Table 88-11 to 88.8.1]

See response to comment 491

Comment Type: T  Comment Status: A

Table 88-11 100GBASE-ER4 Transmit Characteristics specifies a limit on:

- Difference in Launch power between any two lanes (max) 3.0 dB

- to limit SOA crosstalk requirements. This limit has been found difficult to support in practical transmitter implementations.

Suggested Remedy

Change Table 88-11 100GBASE-ER4 Transmit Characteristics entry to:

- Difference in launch power between any two lanes (Average and OMA) (max) 3.6 dB

Response: C

ACCEPT.

[Editor's note: Clause number set to 88 and missing comment type set to T]
Comment Type TR  Comment Status A
There is no specification that requires good transmitter signal quality other than the eye
diagram which is not a good predictor of system performance, also there is no restriction
on chirp. By adding the TDP specification and using OMA minus TDP as the key
specification metric (like LR4) the chirp specification hole is filled and trade-offs are allowed
that don't impact the system budget but make it easier to make transmitters.

It is also then unnecessary to have such a tight RIN spec

SuggestedRemedy
In table 88-11
Insert row Transmitter and Dispersion Penalty (max) 3.5dB.
Insert row Optical Modulation Amplitude minus TDP each lane (min) -3.4dBm
Row Optical Modulation Amplitude each lane min change 0.1dBm to -2.4dBm.
Row Average launch power per lane min from -2.9dBm to -5.4dBm.
Rin change from -132dB/Hz to -130dB/Hz.

In table 88-13
Add footnote to the power budget and allocation for penalties. Footnote to say "This link
budget is with the maximum TDP allowed"

Response  Response Status C
ACCEPT IN PRINCIPLE.

In Table 88-11 add a row for TDP with a value of 2.5 dB
Change the Rin to -130 dB/Hz
Do not make the other proposed changes
Modifying the budget to include OMA-TDP is considered high risk due to the combination
of 25 Gbit/s lane rate and an SOA based receiver.

Comment Type T  Comment Status A
It is bad practice to duplicate values for parameters in several places.

SuggestedRemedy
Replace 4 entries of wavelength ranges with: "see Table 88-5".

Response  Response Status C
REJECT.
[Editor's note: Subclause field changed from Table 88-11 to 88.8.1]
The existing format allows the reader of the tables a more complete view of the Tx or Rx
requirements

Comment Type T  Comment Status A
Table 88-12 100GBASE-ER4 Receive Characteristics specifies:
Difference in launch power between any two lanes (max) 4.0dB
to limit SOA cross-talk requirements. This limit has been found difficult to support in practical transmitter implementations.

SuggestedRemedy
Change Table 88-12 100GBASE-ER4 Receive Characteristics entry to:
Difference in receive power between any two lanes (Average and OMA) (max) 4.5dB

Response  Response Status C
ACCEPT.
[Editor's note: Clause number set to 88 and missing comment type set to T]

Comment Type T  Comment Status A
It would be good to explain the reason for the large maximum average receiver power

SuggestedRemedy
in table 88-12 Add a footnote to the Average receive power per lane (max), footnote to say
"The Average receive power per lane (max) is larger than the transmitter value for compatibility with 100BASE-LR4 units at short distances."

Response  Response Status C
ACCEPT IN PRINCIPLE.
In Table 88-12, add a footnote to the Average receive power, per lane (max) to say "The
Average receive power per lane (max) is larger than the 100BASE-ER4 transmitter value
to allow compatibility with 100BASE-LR4 units at short distances."
It is bad practice to have multiple locations where the same parametric value is specified.

Suggested Remedy:
Replace the 4 wavelength range entries with "see table 88-5".

Response:
REJECT.

[Editor's note: Subclause field changed from Table 88-12 to 88.8.2]

The existing format allows the reader of the tables a more complete view of the Tx or Rx requirements.

Comment Type: T   Comment Status: A
Square wave pattern is not a necessary pattern if a short PRBS (PRBS9) pattern is included in the test pattern list.

Suggested Remedy:
Remove square pattern from test pattern list. Replace square wave with short PRBS (in OMA evaluation section)

Response:
ACCEPT IN PRINCIPLE.
Use square or PRBS9
See response to comment 439
See also comments 636, 438 and 441

Comment Type: T   Comment Status: A
Pattern 4 is TBD. Since PRBS9 is required for DDPWS in clause 86, change TBD to PRBS9

Suggested Remedy:
Change pattern 4 from "TBD" to "PRBS9"

Response:
ACCEPT IN PRINCIPLE.
See response to comment 439
See also comments 221, 109, 123

Comment Type: T   Comment Status: A
In Table 88-15 most of the test patterns are undefined.

Suggested Remedy:
Leave "Optical modulation amplitude (OMA)" as "Square"
Change parameter name "RINxOMA" to "RIN20OMA" and leave as "Square"
Set "Calibration of OMA for receiver tests" to "Square"
Set the pattern for all other rows to: "3, 5 or valid 100GBASE-R signal"

Response:
ACCEPT IN PRINCIPLE.
See response to comment 223
See also comment 475
Some CDRs will not support a square wave test pattern because the transition density is too low for clock rate acquisition. An equivalent measurement can be made using PRBS9 (pattern 4).

Add "or 4" to Square on line 11 in table 88-15 and add "or 68.6.2" after "88.9.4" in the ‘related subclause’ column.

In the row for Pattern 4 in Table 88-14, change "TBD" to "PRBS9".

In the row for “Optical modulation amplitude (OMA)” in Table 88-15, change “Square” to “Square, 4”, the “Related subclause” entry to remain as it is.

OMA measurement is defined in 52, for a square wave. Definition of a test method using PRBS9 is needed.

The rise/fall times and RIN requirements for the reference transmitter are TBD. Since each lane of 100GBASE-LR4/ER4 is similar to 10GBASE-LR except for the higher lane rate, use the values from Table 52-19 with the frequencies scaled by the relative lane rates.

Set the Jitter values according to the values in Table 52-19 with the three rows as:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Jitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>f &lt; 100 kHz</td>
<td>Not specified</td>
</tr>
<tr>
<td>100 kHz</td>
<td>f &lt;= 10 MHz, 2 x 10^5/5 f + S - 0.05</td>
</tr>
<tr>
<td>10 MHz</td>
<td>f &lt; 100 kHz, 0.05 &lt;= S &lt;= 0.15</td>
</tr>
</tbody>
</table>

with a note for S "S is the magnitude of sine jitter actually used in the calibration of the stressed eye per the methods of 52.9.9.3".

Give editorial licence.

In clause 88.9.4 change "OMA is as defined in 52.9.5 with the exception that..." to "OMA is as defined in 52.9.5 for measurement with a square (8 ones, 8 zeros) test pattern or 68.6.2 (from the variable MeasuredOMA in 68.6.6.2) for measurement with a PRBS9 test pattern with the exception that...".

See also comments 636, 637, 438 and 441.
Comment Type   T   Comment Status   A
The filter tolerances are TBD. The tolerances specified for STM-64 in G.691 are:
+/- 0.85 dB for f/fr from 0.001 to 1 and +/- 0.85 dB to +/- 4.0 dB for f/fr from 1 to 2

Suggested Remedy
Change "filter tolerances TBD" to "filter tolerances as specified for STM-64 in ITU-T G.691"

Response   Response Status   C
ACCEPT.

Comment Type   T   Comment Status   A
Remove TBD

Suggested Remedy
change ", such as TBD signal, are likely" to ", such as a 223-1 PRBS, are likely" where 223 is 2 raised to the power 23

Response   Response Status   C
ACCEPT IN PRINCIPLE.

In clauses 88.9.8, 87.8.9 and 86.7.5.7 delete "or with other patterns, such as TBD signal"
See also comments 468, 207 and 225

Comment Type   T   Comment Status   A
Clause 88.9.9 consists only of an editor's note. The PMD specifications for 10GBASE-LR and -ER in clause 52 do not have separate transmitter jitter requirements and 100GBASE-LR4/ER4 is similar to this so remove this clause

Suggested Remedy
Remove clause 88.9.9 entirely.

Response   Response Status   C
ACCEPT.
See also comments 226 and 487
Comment Type E Comment Status A
TOC for Clause 73: Subclauses are shown indented under wrong top clauses. For example 73.5.1 is shown indented under 73.3.
This is also happening for TOC for clause 74
SuggestedRemedy correct the subclauses so they are shown indented under the correct top clauses.
Response Response Status C
ACCEPT IN PRINCIPLE.
This is Heading numbering issue in Clause 73 and Clause 74, check and fix the issue in Clause 73 and Clause 74 where possible
The Heading 2 is indented to the left compared to Heading 3. Since this amendment does not include the Heading 2 for 73.5.1 this heading 3 shows up to the right of the previous heading. This cannot be fixed in TOC, top level headings should also be included in the amendment if this needs to be fixed. As a workaround add a line feed above this Heading 3.

Comment Type E Comment Status A
83A.2 is not shown in TOC. Also, 83A.7.2.x is shown indented under 83A7.1.
SuggestedRemedy correct properties of 83A.2 so it shows up in ToC. Make sure 83A.7.2 is included in ToC, and that subclauses 83A.7.2.x are indented under it.
Response Response Status C
ACCEPT IN PRINCIPLE.
This is Heading numbering issue in Annex 83A.2 and 83A.7.x. Check and fix the issue in Annex 83A

Comment Type ER Comment Status A
Check with 802.3 Chair and add new sections to the front matter regarding "Laws and regulations", "copyright" message and "revisions" to IEEE documents.
SuggestedRemedy As per comment.
Response Response Status C
ACCEPT IN PRINCIPLE.
Replace the front matter with the revised 2009 front matter.
Comment Type: E

Comment Status: A

There is a newer version of this page.

Suggested Remedy

Ask P802.3av for it.

Response Status: C

ACCEPT IN PRINCIPLE.

See response to comment #335.

Replace with new 2009 front matter that includes a newer version of symbols page.