The draft is not consistent in its use of significant digits. For example, Table 86-11 has limits of 4.0 V and 5 %. 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

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.

Affects all clauses, needs further discussion.

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.
Change 'Total Skew' to 'All-lanes Skew' (unless people prefer something else, e.g. 'Maximum Skew' or 'Greatest Skew').

Proposed Response
PROPOSED REJECT.

Needs further discussion in the task force.

Proposed Response
PROPOSED ACCEPT.

[This comment applies to layer diagrams in all PMD clauses]
Delete MEDIUM and leave the abbreviations S, C, K, L, E in respective layer diagrams
**Comment 336**

**Comment Type:** ER  
**Comment Status:** D  
**Suggested Remedy:**  
New references have been added to 1.3, hence delete Editor's note.  
**Proposed Response:** PROPOSED ACCEPT.

---

**Comment 383**

**Comment Type:** E  
**Comment Status:** D  
**Suggested Remedy:** Change "A 4 lane" to "An"  
**Proposed Response:** PROPOSED ACCEPT.

---

**Comment 384**

**Comment Type:** E  
**Comment Status:** D  
**Suggested Remedy:** Change "A 10 lane" to "An"  
**Proposed Response:** PROPOSED ACCEPT.

---

**Comment 385**

**Comment Type:** E  
**Comment Status:** D  
**Suggested Remedy:** Change "A 4 lane" to "An"  
**Proposed Response:** PROPOSED ACCEPT.
Comment Type: ER
Comment Status: D
Since there are no changes identified for 30.2.5 Capabilities, delete this subclause title.

Suggested Remedy:
Delete 30.2.5 Capabilities

Proposed Response: Response Status: W
PROPOSED ACCEPT.

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

Suggested Remedy:
Add "Change 30.3.2.1.3 for PHY type list:

Proposed Response: Response Status: W
PROPOSED ACCEPT.

Comment Type: TR
Comment Status: D
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

Suggested Remedy:
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.

Proposed Response: Response Status: W
PROPOSED 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 1 to N, 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
### Comment: 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."

**Proposed Response**

PROPOSED ACCEPT.

### Comment: 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

**Proposed Response**

PROPOSED REJECT.

None of the other clauses mentioned in this section have cross references in the base document. That is the reason that none of the other clauses are printed in blue text for this draft.
Cl 30  SC 30.5.1.1.2  P 30  L 4  # 386
D'Ambrosia, John  Force10 Networks

Comment Type  E  Comment Status  D
Listing of PHYs defines the number of conductors or fibers formedium 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

Proposed Response  Response Status  W
PROPOSED ACCEPT IN PRINCIPLE.

See #340

Cl 30  SC 30.5.1.1.4  P 32  L 9  # 592
Dawe, Piers  Avago Technologies

Comment Type  T  Comment Status  D
In clause 45, the MDIO bits are not 'logic one' and 'logic zero', they are just one and zero.

Suggested Remedy
Delete 'logic', 7 times on this page.

Proposed Response  Response Status  W
PROPOSED ACCEPT.

Note that this is changing the text from the base document.

Cl 30  SC 30.6.1.1.5  P 34  L 14  # 546
Ganga, Ilango  Intel

Comment Type  T  Comment Status  D
30.6.1.1.5 aAutoNegLocalTechnologyAbility
Mapping of FEC Requested bit is missing in the list for aAutoNegLocalTechnologyAbility attribute.

This has been missing in the base spec as well.

Suggested Remedy
Add the following sentence to the list below "FEC Capable"
FEC Requested  FEC Requested as specified in Clause 73 (See 73.6.5) and Clause 74.
Also update the sentence for FEC Capable to included reference to Clause 73 and Clause 74 as follows:
FEC Capable  FEC ability as specified in Clause 73 (See 73.6.5) and Clause 74.

Proposed Response  Response Status  W
PROPOSED REJECT.

FEC requested is not an ability.
It is appropriate that "FEC capable" is listed as an ability, not "FEC requested."

Cl 45  SC 45  P 35  L 3  # 191
Anslow, Peter  Nortel Networks

Comment Type  E  Comment Status  D
The actions in the Editor's note have been performed.

Suggested Remedy
Remove note.

Proposed Response  Response Status  W
PROPOSED ACCEPT.
Comment Type: ER  Comment Status: D
Delete Editor's note below Clause 45 title
Add the following subclause title "45.2 MDIO Interface Registers" next to Editing instructions, since table 45-1 is under subclause 45.2

Suggested Remedy
As per comment.

Proposed Response: PROPOSED ACCEPT.

Comment Type: T  Comment Status: D
The editor's note asks if a figure describing the PMA numbering as well as possibly showing the system and line loopback definitions would be useful.

Suggested Remedy
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.

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

See also #344
Comment Type: T  Comment Status: D
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.

SuggestedRemedy
Provide a diagram and additional clarification for second sentence in 45.2.1

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.

Fig 83-2 shows the multiple sublayers.

Add a reference to fig 83-2 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: D
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

SuggestedRemedy
As per comment

Proposed Response  Response Status: W
PROPOSED ACCEPT.

See also #192
Cl 45 SC 45.2.1 P 37 L 46 # 128
Barrass, Hugh Cisco
Comment Type T Comment Status D
Two sets of registers are needed for PRBS error counters.
SuggestedRemedy
  Change PRBS31 error counters to PRBS Tx error counters
  Add PRBS Rx error counters, lane 0 through lane 9 (registers 1.30 - 1.39)
Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 45 SC 45.2.1 P 37 L 9 # 124
Barrass, Hugh Cisco
Comment Type E Comment Status D
MMD1 - missingspace
SuggestedRemedy
add a space
Proposed Response Response Status W
PROPOSED ACCEPT.
See also #192

Cl 45 SC 45.2.1 P 37 L 9 # 125
Barrass, Hugh Cisco
Comment Type E Comment Status D
45.2, Table 45-2.
SuggestedRemedy
Change to a reference - Table 45-2
Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 45 SC 45.2.1.4a P 42 L 10 # 195
Anslow, Peter Nortel Networks
Comment Type E Comment Status D
83.xxxx should be a cross-reference to 83.5.7
SuggestedRemedy
change 83.xxxx to a cross-reference to 83.5.7
Proposed Response Response Status W
PROPOSED ACCEPT.
Cl 45 SC 45.2.1.1.4a P 42 L 11 # 194
Anslow, Peter Nortel Networks

Comment Type E Comment Status D
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.

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

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

Change to "remote" if #193 & #201 are accepted.

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

Comment Type E Comment Status D
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

SuggestedRemedy
As per comment

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 45 SC 45.2.1.12a.9 P 51 L 21 # 649
Trowbridge, Stephen Alcatel-Lucent

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

SuggestedRemedy
Replace with 83.5.9 or 83.6 depending on what was intended.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

Replace with 83.5.9
**Comment Type**: T  
**Comment Status**: D  
**Task force Review**

Table 45-12b 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 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 testing 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.

**Comment Type**: TR  
**Comment Status**: D  
**Task force Review**

Clause 83 indicates separate enable for test pattern generate and test pattern detect. 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.

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

PROPOSED ACCEPT IN PRINCIPLE.

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.

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

PROPOSED ACCEPT.
Comment Type TR Comment Status D
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)

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

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

See resolutions to #128

Comment Type T Comment Status D
Register name needs to change

SuggestedRemedy
Change PRBS31 to PRBS Tx

Proposed Response Response Status W
PROPOSED ACCEPT.

Comment Type E Comment Status D
Double period..

SuggestedRemedy
Delete one of the periods.

Proposed Response Response Status W
PROPOSED ACCEPT.

Comment Type ER Comment Status D
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

SuggestedRemedy

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

(changed subclause designation)

Change to 83.5.9

Comment Type T Comment Status D
Add a set of registers for Rx direction error counters.

SuggestedRemedy
Add subclause 45.2.1.12d

Proposed Response Response Status W

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.

Proposed Response Response Status W
PROPOSED 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.

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

**Proposed Response**  
PROPOSED ACCEPT.
### Comment 388

**Comment Type:** E  
**Comment Status:** D  
**Comment:** 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.

**Proposed Response:** PROPOSED ACCEPT.

### Comment 317

**Comment Type:** T  
**Comment Status:** D  
**Comment:** 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".

**Proposed Response:** PROPOSED ACCEPT.  
[Editor's note: The commenter did not indicate the comment type, hence added comment type as Technical]

### Comment 311

**Comment Type:** T  
**Comment Status:** D  
**Comment:** 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".

**Proposed Response:** PROPOSED ACCEPT.

### Comment 193

**Comment Type:** T  
**Comment Status:** D  
**Comment:** 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".

**Proposed Response:** PROPOSED ACCEPT.

See #201, resolution must match between Clauses 45 & 83.
Cl 69 SC 69.2.3 P 91 L 28 # 534
Dawe, Piers Avago Technologies

Comment Type E Comment Status D
AUTO-NEGOTIATION

Suggested Remedy
Auto-Negotiation

Proposed Response Response Status W
PROPOSED REJECT.

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

Cl 69 SC 69.3 P 92 L 1 # 389
D'Ambrosia, John Force10 Networks

Comment Type T Comment Status D
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

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 69B SC 69.3 P 93 L 29 # 390
D'Ambrosia, John Force10 Networks

Comment Type E Comment Status D
The use of "AUTONEG" in the figure is inconsistent with other layer diagrams that use "AN"

Suggested Remedy
Change "AUTONEG" to "AN"

Proposed Response Response Status W
PROPOSED ACCEPT.

This comment refers to Figure 73-1
Comment Type T  Comment Status D

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."

PROPOSED ACCEPT IN PRINCIPLE.

[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 D  Response Status W

Valliappan, Magesh Broadcom

Ganga, Ilango Intel

Comment Type T  Comment Status D

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

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

PROPOSED ACCEPT.

Comment Type E  Comment Status D

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

D'Ambrosia, John Force10 Networks

This comment refers to Figure 74-1.
IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments

Draft 1.1 Comments

Comment Type: ER/Editorial required
Comment Status: D/Dispatched

Cl 74 SC 74.3 P 101 L 51 # 347
Ganga, Ilango Intel

Change Figure 74-1 title to BASE-R (from 10GBASE-R) as suggested:

BASE-R FEC relationship to ISO/IEC Open Systems Interconnection (OSI) reference model and the IEEE 802.3 CSMA/CD LAN model

SuggestedRemedy

Change Figure 74-1 title as follows:

BASE-R FEC relationship to ISO/IEC Open Systems Interconnection (OSI) reference model and the IEEE 802.3 CSMA/CD LAN model

Proposed Response: PROPOSED ACCEPT.

Cl 74 SC 74.4 P 102 L 1 # 292
Marris, Arthur Cadence

Need to remove gearbox for 40G and 100G operation as this has a bit stream interface

SuggestedRemedy

As above and also check for any places where Clause 74 needs to be updated for the 40G/100G service interface definition.

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

see comment 351

Cl 74 SC 74.5 P 103 L 5 # 392
D'Ambrosia, John Force10 Networks

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.

SuggestedRemedy

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.

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

Add sentence after first sentence in first paragraph of 74.5:

"The FEC service interface is equivalent to 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 may also be used for the FEC service interface."

also see comment 395 against Clause 83

Cl 74 SC 74.5.2 P 105 L 12 # 348
Ganga, Ilango Intel

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

SuggestedRemedy

Change sentence as follows:

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

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

see response to comment 392

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: E  Comment Status: D
Gbd s/b/ GBd.

Suggested Remedy
as above.

Proposed Response  Response Status: W
PROPOSED ACCEPT.
also see comment 157

---

Comment Type: E  Comment Status: D
Hence rephrase the appropriate sentences in 74.5.2.3.1 to provide clarity.

Suggested Remedy
Change two sentences in 74.5.2.3.1 as follows:
"..PMA sublayer indicated by the fec_signal_ok variable equal to true, for all data streams, and this payload.."
"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.."

Proposed Response  Response Status: W
PROPOSED ACCEPT.

---

Comment Type: TR  Comment Status: D
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.

Proposed Response  Response Status: W
PROPOSED ACCEPT.
also see comment 157

---

Comment Type: T  Comment Status: D
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

Suggested Remedy
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.

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
implement the changes suggested in ganga_02_0109.pdf
also check for any places where Clause 74 needs to be updated for the 40G/100G service interface definition and fix accordingly.
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.

Suggested Remedy
Do the analysis.
If it does, several options are available.

Proposed Response
PROPOSED REJECT.

Suggested remedy is not complete

Comment 322 against D1.0 requested the ability to detect FEC errors without correcting them. For reference the final accepted response was:

"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."

The last sentence of the last paragraph contains a "shall" statement but there is no corresponding PICS

Suggested Remedy
Generate PIC statement

Proposed Response
PROPOSED ACCEPT.

According to comment#466 in 'p8023ba-D10_AcceptedResponses_by_Clause.pdf', 'at least' which described operating distance of PHY was changed to 'up to at least', because the wording 'at least' implied that shorter cables are not compliant. Thus, to avoid any misunderstanding, 'at least' in 80.1.2 shuld be changed to 'up to at least'.

The use of phrase "at least" is same as in 40G and 100G objectives. However phrase "up to at least" was added to text in 80.1.4 for better clarity during D1.0 comment resolution. Hence propose to change 80.1.2 to use "up to at least" for consistency.

Also see comment # 171
Cl 80 SC 80.1.3 P 114 L 48 # 640
Trowbridge, Stephen Alcatel-Lucent
Comment Type E Comment Status D
physically implemented or physically instantiated?

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

Proposed Response  Response Status W
PROPOSED REJECT.

This use of this phrase is consistent with Clause 44 in base standard

Cl 80 SC 80.1.3 P 114 L 7 # 594
D'Ambrosia, John Force10 Networks
Comment Type T Comment Status D
In Fig 80-1 FEC sub-layer is noted as being "conditional", but it is actually conditional for the PHY type, but then optional.

SuggestedRemedy
add second note that indicates that the FEC sub-layer is also optional. Apply to other layer diagrams throughout the document, where appropriate.

Proposed Response  Response Status W
PROPOSED REJECT.

The tables in PMD clauses and in Clause 80 provides information on which layer/interface is optional or mandatory.

It was decided in earlier TF discussions to not use optional in the layer diagrams.

Cl 80 SC 80.1.4 P 115 L 22 # 434
Abbott, John Corning Incorporated
Comment Type TR Comment Status D
Subclause 80.1.4(Nomenclature) page 115 lines 22-25

For 10GBASE, The letters S and L represent the wavelength, with S being approximately 850nm and L being approximately 1300nm+. For example 10GBASE-LX4 and 10GBASE-LRM use 1310nm lasers, while 10GBASE-SR uses 850nm lasers over the same link distance as LX4.

SuggestedRemedy
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.

Proposed Response  Response Status W
PROPOSED REJECT.

The nomenclature employed by the 40 and 100 Gigabit physical layers is defined in 80.1.4 since it is different from 10G.

Cl 80 SC 80.1.4 P 115 L 27 # 650
Trowbridge, Stephen Alcatel-Lucent
Comment Type T Comment Status D
Should we say here that links >30km are engineered links with attenuation below the limits described in clause 88?

SuggestedRemedy
Qualify the 40km of SMF optical fiber to be 40km with attenuation less than the worst case specified for B1.1 or B1.3 SMF.

Proposed Response  Response Status W
PROPOSED REJECT.

The intent of 80.1.3 is to define the nomenclature employed by 40G and 100G, so it not necessary to be so specific in this subclause.
**Cl 80 SC 80.1.4 P 115 L 29 # 396**

D'Ambrosia, John Force10 Networks

Comment Type: E  Comment Status: D

use of "optical lanes" should clarify that optical lanes can either be via wavelengths or number of fibers

**Suggested Remedy**

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.

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

PROPOSED ACCEPT IN PRINCIPLE.

**Cl 80 SC 80.2.1 P 115 L 36 # 172**

Gustlin, Mark Cisco

Comment Type: T  Comment Status: D

Remove the editor's note. It is made clear what the 40 and 100G instantiations of the MII are.

**Suggested Remedy**

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

PROPOSED ACCEPT.
In Table 80-1, the clause 74 heading is 10GBASE-R FEC, but now we differentiate FEC based on 40GBASE-R and 100GBASE-R, so we should add columns for 40GBASE-R FEC and 100GBASE-R FEC, then mark the columns appropriately.

**Suggested Remedy**
As above.

**Proposed Response**
Response Status: **W**
PROPOSED ACCEPT IN PRINCIPLE.

---

**Comment Type:** E  **Comment Status:** D
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"

**Proposed Response**
Response Status: **W**
PROPOSED ACCEPT.

---

**Comment Type:** T  **Comment Status:** D
In addition the PMAs perform clock recovery from the received data stream and optionally provide data loopback at the PMA service interface, and optionally provide test pattern generation and checking.

**Suggested Remedy**
As above.

**Proposed Response**
Response Status: **W**
PROPOSED ACCEPT.
### Table of Delay Limits is Incomplete

#### Comment Type: T

**Comment Status:** D  
**Delay**

Table of delay limits is incomplete.

#### Suggested Remedy

- 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.

#### Proposed Response  
**Response Status:** W  
**PROPOSED ACCEPT IN PRINCIPLE.**

Add row for FEC to Table 80-2

---

### Defining Delay for PMA or PMD in MAC Bit Times is Inappropriate as Well As Misleading;

#### Comment Type: T

**Comment Status:** D  
**Delay**

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.

#### Suggested Remedy

- 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.

#### Proposed Response  
**Response Status:** W  
**PROPOSED ACCEPT IN PRINCIPLE.**

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.

Discuss and add additional notes for better clarity or add an additional column with absolute delay as appropriate.
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 * 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.

Suggested Remedy
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)

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

Discuss PMA delay constraints in the Task Force

Mark the XLAUIs and CAUIs with 1 for optional.

Suggested Remedy
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.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

Task force discussion: See supporting presentation dambrosia_01_0109

D'Ambrosia, John
Force10 Networks

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

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.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

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.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

See comment #411
Comment on Chapter 80, Subclause 80.4, Page 119, Line 7

**Comment Type:** T
**Comment Status:** D
**Comment:** 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."

**Proposed Response:** PROPOSED ACCEPT.

---

Comment on Chapter 80, Subclause 80.4, Page 120, Line 1

**Comment Type:** ER
**Comment Status:** D
**Comment:** 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.Notes 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?

**Proposed Response:** PROPOSED ACCEPT IN PRINCIPLE.

---

Comment on Chapter 80, Subclause 80.4, Page 121, Line 1

**Comment Type:** TR
**Comment Status:** D
**Comment:** 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 Table 80-3, 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.

**Proposed Response:** PROPOSED ACCEPT IN PRINCIPLE.

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

Also see comment #445

Discuss in Task Force
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>Page</th>
<th>Line</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Issue Type</th>
<th>Suggested Remedy</th>
<th>Proposed Response</th>
<th>Comment Status</th>
<th>Response Status</th>
<th>Proposed Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>80.4</td>
<td>121</td>
<td>10</td>
<td>TR</td>
<td>D</td>
<td>Skew</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>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 table 80-3. Also in clause 83 section 83.5.3.5 page 190 line 53 change 144ns to 134ns.</td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td>D</td>
<td>W</td>
</tr>
<tr>
<td>22</td>
<td>80.4</td>
<td>121</td>
<td>44</td>
<td>T</td>
<td>D</td>
<td>Skew</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>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>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td>D</td>
<td>W</td>
</tr>
<tr>
<td>49</td>
<td>81.1</td>
<td>123</td>
<td>49</td>
<td>T</td>
<td>D</td>
<td>Skew</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>Add in 21 UI for a pcs lane dynamic skew at the 100GBASE-R rx pcs.</td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td>D</td>
<td>W</td>
</tr>
</tbody>
</table>

**Discussion:**
- Discuss proposed limits in Task Force.
- Discuss in Task Force.
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.

**Proposed Response**

**Response Status**

PROPOSED ACCEPT.

---

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.

**Proposed Response**

**Response Status**

PROPOSED ACCEPT.

---

Don’t need to phrase descriptive text as a requirement.

**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”

**Proposed Response**

**Response Status**

PROPOSED REJECT.

This is consistent with clause 46.

---

There are two types of description for ‘signalling’ in D1.1 such as ‘singling’ or ‘signalling.’ Both description are correct, but ‘signaling’ 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 351, line 46  
page 352, line 17 & line 24  
page 352, line 35, ...

**Suggested Remedy**

PROPOSED ACCEPT.

Note that this will also impact clause 86 and 83A. We will go with Signaling.

---

This is consistent with clause 46, and also has a PICS associated with it.

**Proposed Response**

**Response Status**

PROPOSED REJECT.

This is consistent with clause 46.
Cl 81 SC 81.3.4 P 138 L 20 # 275
Chang, Sun Hyok ETRI
Comment Type E Comment Status D 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'.

Proposed Response Response Status W
PROPOSED ACCEPT.
Also a duplicate of #158 and #310.

Cl 81 SC 81.3.4 P 138 L 20 # 197
Anslow, Peter Nortel Networks
Comment Type E Comment Status D
"Clause 46" is an external link

SuggestedRemedy
Make it dark blue

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 81 SC 81.3.4 P 138 L 20 # 310
Estes, Dave UNH - IOL
Comment Type E Comment Status D signaling
"signalling" should be "signaling"

SuggestedRemedy
change "signalling" to "signaling"

Proposed Response Response Status W
PROPOSED ACCEPT.
Agreed, this is a duplicate of #158.

Cl 81 SC 81.3.4 P 138 L 21 # 639
Trowbridge, Stephen Alcatel-Lucent
Comment Type T Comment Status D osets
Since the same external encoding is used for ordered sets as in clause 46, better to say that they are aligned to 8-byte boundaries rather than that they are extended to 8 bytes.

SuggestedRemedy
Replace "The behavior of the fault signalling is the same as it is for Clause 46 with the exception that the ordered sets are extended to eight bytes." with "The behavior of the fault signalling is the same as it is for Clause 46 with the exception that the ordered sets are aligned to eight byte boundaries."

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
[Editor's note: Commenter has not indicated the comment type. Assigned comment type as Technical]
Replace
"The behavior of the fault signalling is the same as it is for Clause 46 with the exception that the ordered sets are extended to eight bytes."
with
"The behavior of the fault signalling is the same as it is for Clause 46 with the exception that the ordered sets are aligned to eight byte boundaries, padding the upper four bytes with 0's."
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 ..."

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

Chang:
"When the transmit channel is operating in test-pattern mode, it sends the test pattern in 4 separate data streams (for 40GBASE-R) or 20 separate data streams (for 100GBASE-R) of test pattern at a time via PMA_UNITDATA.request primitives. The test-pattern generator shall be implemented."

There is a single type of required PCS transmit test pattern: pseudo-random. The pseudo-random test-pattern mode is suitable for receiver tests and for certain transmitter tests.

When pseudo-random pattern is selected, the test pattern is generated by the scrambler. No seeding of the scrambler is required during test pattern operation. The input to the scrambler is a control block (block type=0x1e) with all idles as defined in figure 82-5. Note that the alignment markers are also added to the stream so that the receive PCS can align and deskew the lanes."

To:
"There is a single type of required PCS transmit test pattern: pseudo-random. The pseudo-random test-pattern mode is suitable for receiver tests and for certain transmitter tests.

When pseudo-random pattern is selected, the test pattern is generated by the scrambler. No seeding of the scrambler is required during test pattern operation. The input to the scrambler is a control block (block type=0x1e) with all idles as defined in figure 82-5. Note that the alignment markers are also added to the stream so that the receive PCS can align and deskew the lanes.

When the transmit channel is operating in test-pattern mode, the encoded data stream is distributed to the PCS Lanes in the same way as normal packet data. There will be four separate data streams (for 100GBASE-R) of test pattern at a time via PMA_UNITDATA.request primitives. The test-pattern generator shall be implemented."

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"

Proposed Response

PROPOSED ACCEPT.

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

At line 31.

There is a single type of required PCS transmit test pattern: pseudo-random. The pseudo-random test-pattern mode is suitable for receiver tests and for certain transmitter tests.

When pseudo-random pattern is selected, the test pattern is generated by the scrambler. No seeding of the scrambler is required during test pattern operation. The input to the scrambler is a control block (block type=0x1e) with all idles as defined in figure 82-5. Note that the alignment markers are also added to the stream so that the receive PCS can align and deskew the lanes."

Comment Type：T  Comment Status：D  
Proposed Response：Response Status：W

PROPOSED ACCEPT IN PRINCIPLE.

Chang:
"When the transmit channel is operating in test-pattern mode, it sends the test pattern in 4 separate data streams (for 40GBASE-R) or 20 separate data streams (for 100GBASE-R) of test pattern at a time via PMA_UNITDATA.request primitives. The test-pattern generator shall be implemented."

There is a single type of required PCS transmit test pattern: pseudo-random. The pseudo-random test-pattern mode is suitable for receiver tests and for certain transmitter tests.

When pseudo-random pattern is selected, the test pattern is generated by the scrambler. No seeding of the scrambler is required during test pattern operation. The input to the scrambler is a control block (block type=0x1e) with all idles as defined in figure 82-5. Note that the alignment markers are also added to the stream so that the receive PCS can align and deskew the lanes."

To:
"There is a single type of required PCS transmit test pattern: pseudo-random. The pseudo-random test-pattern mode is suitable for receiver tests and for certain transmitter tests.

When pseudo-random pattern is selected, the test pattern is generated by the scrambler. No seeding of the scrambler is required during test pattern operation. The input to the scrambler is a control block (block type=0x1e) with all idles as defined in figure 82-5. Note that the alignment markers are also added to the stream so that the receive PCS can align and deskew the lanes.

When the transmit channel is operating in test-pattern mode, the encoded data stream is distributed to the PCS Lanes in the same way as normal packet data. There will be four separate data streams (for 100GBASE-R) of test pattern at a time via PMA_UNITDATA.request primitives. The test-pattern generator shall be implemented."

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"

Proposed Response

PROPOSED ACCEPT.

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

At line 31.

There is a single type of required PCS transmit test pattern: pseudo-random. The pseudo-random test-pattern mode is suitable for receiver tests and for certain transmitter tests.

When pseudo-random pattern is selected, the test pattern is generated by the scrambler. No seeding of the scrambler is required during test pattern operation. The input to the scrambler is a control block (block type=0x1e) with all idles as defined in figure 82-5. Note that the alignment markers are also added to the stream so that the receive PCS can align and deskew the lanes."

Comment Type：E  Comment Status：D  
Proposed Response：Response Status：W

Figure 82-10

The block labeled "TSEST_SH2" should be "TEST_SH2"

Suggested Remedy
Change label to "TEST_SH2"

Proposed Response

PROPOSED ACCEPT.
Cl 82 SC 2.18.3 P 170 L 24 # 315

Comment Type E Comment Status D

Cl 82 SC 2.4.4 P 155 L 22 # 289

Comment Type T Comment Status D

Ofelt, David Juniper Networks

Goto labels are different style than other figures.

Figure 82-11

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.

Proposed Response PROPOSED ACCEPT.

Szczepanek, Andre Texas Instruments

Proposed Response PROPOSED 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 four zero data characters on the MII.

**Proposed Response**

PROPOSED ACCEPT.

---

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

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

**Suggested Remedy:** Delete the word "directly"

**Proposed Response**

PROPOSED ACCEPT.

---

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

(skew definition)

This definition (a) needs to be located in subclause 80.4 and (b) needs to be modified to include definitions for multimode and single mode fiber if necessary. For the definition of dynamic skew the definition of "time that the link is operational" needs to be more specific.

**Suggested Remedy:**

(a) move to subclause 80.4 and refer to 80.4 at this point in text.
(b) make sure definition is consistent for all link types.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Move to 80.4 and refer to 80.4 in this subclause.
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"

Suggested Remedy
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

Proposed Response
PROPOSED ACCEPT.

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.

Suggested Remedy
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.

Proposed Response
PROPOSED 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 preset to the group to justify the request.

Text does not make the relationship between Total Skew and Dynamic Skew clear. It Total Skew the average difference between the earliest PCS lane and the latest, or is it the maximum difference. In other words, is Dynamic Skew as subset of Total Skew, or is Dynamic Skew to be added to Total Skew?

Suggested Remedy
Modify text to clarify the intended relationship.

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Change:
"Total Skew is defined as the difference between the times of the earliest PCS lane and latest PCS lane for the one to zero transition of the alignment marker sync bits. Dynamic Skew is defined as the change in Total Skew over the time that the link is operational." To:
"Skew is defined as the difference between the times of the earliest PCS lane and latest PCS lane for the one to zero transition of the alignment marker sync bits. Skew Change is defined as the difference between the lowest value of Skew and the highest value of Skew over the entire time that the link is operational."

Note that this assumes that we rename the skew components which depends on the outcome of #622.
Comment Type: T  Comment Status: D  osets
"00D1D2D3D4D5D6D7" at the Data Block Format column is wrong description.

Suggested Remedy:
Should be changed from "00D1D2D3D4D5D6D7" to "00D1D2D3C4C5C6C7"

Proposed Response
Response Status: W
PROPOSED REJECT.

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

Comment Type: E  Comment Status: D
At the sentence "Receipt of an /S/ on any other octet of TxD indicates an error. ", TxD is wrong spelling.

Suggested Remedy:
Spelling: TxD should be changed TXD.

Proposed Response
Response Status: W
PROPOSED ACCEPT.

Comment Type: T  Comment Status: D  osets
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.

Suggested Remedy:
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.

Proposed Response
Response Status: W
PROPOSED REJECT.

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

Comment Type: E  Comment Status: D
Add a period at the end.

Suggested Remedy:
PROPOSED ACCEPT.

Comment Type: E  Comment Status: D
PCS distributes the 66-bit block to n lanes. Actually figure 82-6 shows (n+1) distributions.

Suggested Remedy:
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.

Proposed Response
Response Status: W
PROPOSED ACCEPT.

Change numbering to 0 to n-1 in figure 82-6.
Comment Type: T  Comment Status: D

Actually figure 82-7 and 82-8 shows n lanes.

SuggestedRemedy
Lane start with Lane0 and finish Lane n. The number of Lane is n+1. Lane n should be (n-1) Lane n-1

Proposed Response  Response Status: W

PROPOSED ACCEPT. [Editor's note: Commenter has not indicated the comment type.Assigned comment type as Editorial to be consistent with #443 and #646 which are on the same topic]

Change to 0 to n-1 numbering in figures 82-7 and -8.

---

Comment Type: E  Comment Status: D

Better to consider "n" to be the number of PCS lanes which are numbered 0 through n-1

SuggestedRemedy
Replace largest lane number by n-1

Proposed Response  Response Status: W

PROPOSED ACCEPT. Same as comment #442.

---

Comment Type: TR  Comment Status: D

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.

SuggestedRemedy
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.

Proposed Response  Response Status: W

PROPOSED ACCEPT.

Change the document per the presentation, with editorial license.
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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.

**Proposed Response** Response Status W

PROPOSED ACCEPT.

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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-CR4, or 100GBASE-KR10.

**Suggested Remedy**
change "one" to "any"

**Proposed Response** Response Status W

PROPOSED ACCEPT.

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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.

**Proposed Response** Response Status W

PROPOSED ACCEPT.
Cl 83 SC 83.1.3 P 182 L 47 # 201
Anslow, Peter Nortel Networks
Comment Type T Comment Status D
The terms "system loopback" and "line loopback" do not clearly convey what function they perform. Also, clause 45 uses the term "line-side loopback"
A separate comment is submitted against clause 45 - these comments must be resolved together.
SuggestedRemedy
Change all instances of "system loopback" to "local loopback" and all instances of "line loopback" to "remote loopback".
Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE. Align with resolution of clause 45 comment.

Cl 83 SC 83.1.3 P 182 L 47 # 619
Dawe, Piers Avago Technologies
Comment Type TR Comment Status D
There seem to be more test pattern and loopback options than are needed.
SuggestedRemedy
See presentation.
Proposed Response Response Status W
PROPOSED REJECT. Could change based on presentation not yet seen. Same issue addressed in trowbridge_02_0109 with recommendation to stay with current approach.

Cl 83 SC 83.1.3 P 182 L 49 # 633
Latchman, Ryan Gennum Corp
Comment Type T Comment Status D
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)
SuggestedRemedy
Change "Provide test pattern generation and detection" to "Optionally provide test pattern generation and detection"
Proposed Response Response Status W
PROPOSED ACCEPT.
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.

PROPOSED 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: D

Proposed Response
Response Status: W

PROPOSED ACCEPT.

The text describes the MMD register numbering scheme.

"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.."

Proposed Response
Response Status: W

PROPOSED ACCEPT. (also addressed in other comments) [Editor's note: The commenter did not indicate the comment type, hence added comment type as Technical]

Comment Type: T
Comment Status: D

Proposed Response
Response Status: W

PROPOSED ACCEPT.

Provide additional examples in an informative annex as per Editor's note and/or delete the Editors note.

Suggested Remedy

As per comment

Proposed Response
Response Status: W

PROPOSED ACCEPT.

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

Proposed Response
Response Status: W

PROPOSED ACCEPT.
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

---

Comment Type: TR  Comment Status: D

Referring to Fig. 83-2, \{1,2,4\} or \{1,2,4,5,10,20\} causes confusion for PMA input/output lanes.

Suggested Remedy: Actually only one option \{4\} for 40G-R; while \{4,10,20\} for 100G-R.

Or to take the whole paragraph out.

Proposed Response  Response Status: W

PROPOSED REJECT. This was the compromise agreed in Dallas. The problem is how much to describe for what the PMA is architecturally capable of vs. what it actually does in this version of the standard.

---

Comment Type: TR  Comment Status: D

Text says all these pattern generators, checkers and loopbacks are optional. This diagram implies otherwise.

Suggested Remedy: Add new first note: Loopbacks and test pattern generators and detectors are optional.

Proposed Response  Response Status: W

PROPOSED ACCEPT.

---

Comment Type: T  Comment Status: D

In figure 83-5, the indications and requests should have an x to indicate that they apply to multiple bits.

Suggested Remedy: Add the italic x to each indication and request (except for the status).

Proposed Response  Response Status: W

PROPOSED ACCEPT.

---

Comment Type: T  Comment Status: D

If the PMD uses Auto-negotiation, there is another primitive AN\_LINK.indication which think is passed without modification from PMD to PCS.

Suggested Remedy: Add conditional AN\_LINK.indication.

Proposed Response  Response Status: W

PROPOSED REJECT. AN is below the PMD, so the PMD should turn AN\_LINK.indication into PMD\_SIGNAL.indication.

---

Comment Type: T  Comment Status: D

Following D1.1 comment 335 through.

Suggested Remedy: Change

PMA\_UNITDATA.indication\(x (rx\_bit)\)

to

PMA\_UNITDATA.indication\(x (rx\_bit)\)
i.e. without the space. Same in following subclauses e.g. 83.3.3.1.

Proposed Response  Response Status: W

PROPOSED ACCEPT.
If we have PMAserver_SIGNAL.indication(SIGNAL_OK) it would be better to:

**Suggested Remedy**

Change Signal Indicate Logic to Signal Indication Logic, throughout.

**Proposed Response**

Response Status: W

PROPOSED ACCEPT.

---

Other PMD clauses refer back to this subclause regarding the effect of receipt of this primitive etc. So organize the description of PMA server service interface similar to be consistent with other service interface definitions in Clause 83 and other Clauses.

**Suggested Remedy**

Organize the description with the following outline as example.

83.4 PMA server service interface:
- List all the server interface primitives and provide any overview
- 83.4.1 PMAserver_UNITDATA.request
  - Move the definition of this primitive under this subclause
  - 83.4.1.1 Semantics of the service primitive
  - 83.4.1.2 When generated
  - 83.4.1.3 Effect of receipt

Similarly structure for descriptions of other server interface primitives.

In Figure 83-5 name the primitives as per the exact definition of the primitives, as follows:

PMAserver_UNITDATA.request
PMAserver_UNITDATA.indication
PMAserver_SIGNAL.indication

and

PMA_UNITDATA.request
PMA_UNITDATA.indication
PMA_SIGNAL.indication

**Proposed Response**

Response Status: W

PROPOSED ACCEPT.

---

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.

**Suggested Remedy**

Change 'nominal bit-rate' to 'nominal signaling rate', twice in this paragraph.

**Proposed Response**

Response Status: W

PROPOSED ACCEPT.

---

Depending CDR or serdes implementation, PMA don't have to recover clock from the received signal if for CDR.

**Suggested Remedy**

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

**Proposed Response**

Response Status: W

PROPOSED ACCEPT.

---

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).

**Suggested Remedy**

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.

**Proposed Response**

Response Status: W

PROPOSED 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
Comment Type: T  Comment Status: D
the PMA adjacent to SP5 shall tolerate at least 3.6ns of Dynamic Skew seems incorrect, as the point was to limit dynamic skew to keep the channel to the same physical channel. The current wording does not put an upper bound on the amount of dynamic skew.

Suggested Remedy:

suggest rewording.

change "shall tolerate at least to
"shall tolerate a maximum of"

This sentence is repeated throughout Clause 83, and suggested remedy should be used throughout it.

Proposed Response: 

PROPOSED ACCEPT.

---

Comment Type: TR  Comment Status: D
It is unclear that for physical instantations XLAUI / CAUI that retiming is required and no apparent PIC for it.

Suggested Remedy:

Presentation with proposed remedy to be provided.

Proposed Response: 

PROPOSED ACCEPT IN PRINCIPLE. TBD based on presentation.

---

Comment Type: ER  Comment Status: D
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.

Suggested Remedy:

Should add 87.2.

Proposed Response: 

PROPOSED REJECT. 40G-LR4 is patterned after 100G-LR4, and we are not specifying a physical instantiation for the PMD service interface in that case. Could change based on clause 87 evolution.

---

Comment Type: T  Comment Status: D
Fix the TBDs

Suggested Remedy:

Replace: TBD control register TBD

with: the PMA/PMD control 1 register (register 1.0.0, see 45.2.1.1.4)

Proposed Response: 

PROPOSED ACCEPT IN PRINCIPLE. Actual comment applies to p192? (Double check)

---

Comment Type: E  Comment Status: D
this Clause (83.5.7).

Suggested Remedy:

this subclause (83.5.7). Also for 83.5.8.

Proposed Response: 

PROPOSED REJECT. Awaiting guidance from Ilango on appropriate use of clause/subclause.

---

Comment Type: T  Comment Status: D
Combine system side loopbacks 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.

Suggested Remedy:

As above.

Proposed Response: 

PROPOSED ACCEPT IN PRINCIPLE. Align with discussion of rowbridge_02_0109. Whether this is explicit or not, there is probably not an issue with the management interface as MDIO 1, 8, 9, 10 could each be the uppermost PMA and would have a control bit for system side loopback.
Having the PMA system loopback at the top of the PMA stack (i.e. inside the same chip as the PCS) means that 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 reordered, 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**

**Comment**

The PMA system 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.

**Proposed Response**

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

**Recommended Changes**

- **Change**
  - If a Clause 45 MDIO is implemented, then the ability to perform this function is indicated in register 1.8.0 (45.2.1.7.15).

**PROPOSED ACCEPT.**

**Comment**

In Clause 45, the MDIO bits are not 'logic one' and 'logic zero', they are just one and zero.

**Suggested Remedy**

Delete 'logic', four times on this page.

**PROPOSED ACCEPT.**

**Comment**

This paragraph should point to the Clause 45 ability & control bits

**Suggested Remedy**

Replace the first sentence

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

**PROPOSED ACCEPT.**

**Comment**

PROPOSED REJECT. Other comments cover possible adjustments to the loopbacks offered. There are several issues with the proposed change: we have referred to the loopback provided by the lowest PMA of input lanes to output lanes as "line loopback" rather than "system loopback". The purpose of a line loopback is to verify the link, so you really want to do this at the lowest PMA and not at the lowest exposed connector. For example, you wouldn't want to loop back a 10-lane CAUI module interface instead of the 4-lane PMD for 100GBASE-LR4.

**Proposed Response**

PROPOSED REJECT. Other comments cover possible adjustments to the loopbacks offered. There are several issues with the proposed change: we have referred to the loopback provided by the lowest PMA of input lanes to output lanes as "line loopback" rather than "system loopback". The purpose of a line loopback is to verify the link, so you really want to do this at the lowest PMA and not at the lowest exposed connector. For example, you wouldn't want to loop back a 10-lane CAUI module interface instead of the 4-lane PMD for 100GBASE-LR4.

**Proposed Response**

PROPOSED REJECT. Needs consensus of TF to make this mandatory. See comment 624 about why line loopback may be difficult for some implementations.
Comment Type: TR  Comment Status: D

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 83.6.7.

Proposed Response  Response Status: W
PROPOSED REJECT. Line loopback is only meaningful if you can loop back the lanes of the PMD. If there are compelling reasons not to provide it for a particular implementation, loopback is optional.

Comment Type: T  Comment Status: D

Anslow, Peter
Nortel Networks

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."

Proposed Response  Response Status: W
PROPOSED ACCEPT.

Comment Type: T  Comment Status: D

Barrass, Hugh
Cisco

The reference to Clause 45 should be fixed - it also should align with 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).

Proposed Response  Response Status: W
PROPOSED ACCEPT.
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<td>Control register bit reference needs fixing</td>
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<td>83.5.9</td>
<td>192</td>
<td>35</td>
<td>Cole, Chris Finisar</td>
<td>T</td>
<td>PMA test patterns sub-clause states in the text 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.</td>
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<td>83.5.9</td>
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<td>40</td>
<td>Dawe, Piers Avago Technologies</td>
<td>T</td>
<td>These test patterns are not intended to traverse more than one sublayer or to be carried over an end-to-end Ethernet link. These test patterns may not be recoverable if they are rearranged through the bit multiplexing operations described in 83.5.2. I expect they may be used for e.g. stressed sensitivity or TDP testing where they will traverse at least a whole PMD sublayer plus part of a PMA. I believe that PRBS9 and PRBS31 are always recoverable even if rearranged through the bit multiplexing operations described in 83.5.2.</td>
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**SuggestedRemedy**
- After "PMA/PMD Control register 1"
  
  Add "(register 1.0.1, see 45.2.1.1.4a)"

**Proposed Response**
PROPOSED ACCEPT.

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<td>83.5.9</td>
<td>192</td>
<td>3546</td>
<td>CHANG, Frank Vitesse</td>
<td>ER</td>
<td>to define various test patterns.</td>
<td>D</td>
</tr>
</tbody>
</table>

**SuggestedRemedy**
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.

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE. Adding (optional) to the titles as requested is OK. But test patterns remain optional without task force consensus to change this.

**Proposed Response**
PROPOSED 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.

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE. Accept the substitute text in the remedy rather than just deleting the sentences.
Comment Type T Comment Status D
If the PMA doesn't generate test patterns it should at least support them (ie, allow them to be transmitted through the PMA)

SuggestedRemedy
Add after "....operations described in 83.5.2.": If the PMA does not generate the test patterns, it should at least support them.

(or words to that effect)

Proposed Response Response Status W
PROPOSED REJECT. The only test pattern supported (in general) through the PMA is scrambled idles from the PCS. You can't gearbox a PRBS31, PRBS9, or square 8 and get a recognizable signal from a PMA(m:n) where m<>n.

Comment Type T Comment Status D
Much more description is needed to map the functions to Clause 45.

SuggestedRemedy
Replace "If a Clause 45 MDIO is supported, then these functions map to the PMA test pattern functions as specified in TBD."

With

If a Clause 45 MDIO is implemented, then the ability to perform this function is indicated in PRBS pattern testing control and status (register 1.19.15, see 45.2.1.1.12b). Support for PRBS31 is indicated by bit 1.19.14, support for PRBS9 is indicated by bit 1.19.13.

Support for transmit direction generation is indicated by 1.19.11 and checking by 1.19.10; support for receive direction generation is indicated by 1.19.9 and checking by 1.19.8.

Proposed Response Response Status W
PROPOSED ACCEPT.

Comment Type TR Comment Status D
There is no requirement stated for the relative positions of the prbs sequences on the various lanes.

SuggestedRemedy
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.

Proposed Response Response Status W
PROPOSED REJECT. This is likely implementation specific whether to stagger alternate lanes or "any other lane", which could require 310 bits for a 10-lane interface. I don't know of other requirements like this in 802.3.
Barrass, Hugh Cisco

Comment Type: T  Comment Status: D

Need a reference for Clause 45 register.

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

PROPOSED ACCEPT.

---

Barrass, Hugh Cisco

Comment Type: T  Comment Status: D

Ditch the TBD!

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

PROPOSED ACCEPT.

---

Dawe, Piers Avago Technologies

Comment Type: T  Comment Status: D

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.

Suggested Remedy:
Change to 'does not indicate a valid signal since the test pattern is not meaningful to the PCS.'
Same at line 46.

PROPOSED REJECT. You only get PRBS31 out of a PMA(m:n) when m=n.
Cl 83 SC 83.5.9 P 193 L 23 # 447
Dudek, Mike JDSU

Comment Type TR Comment Status D
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

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 83 SC 83.5.9 P 193 L 23 # 147
Dudek, Mike JDSU

Comment Type TR Comment Status D
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

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 83 SC 83.5.9 P 193 L 23 # 596

Barrass, Hugh Cisco

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

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

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 83 SC 83.5.9 P 193 L 26 # 149
Barrass, Hugh Cisco

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

SuggestedRemedy
After "is enabled" add "by register 1.19.2 (see 45.2.1.1.12b)"

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 83 SC 83.5.9 P 193 L 34 # 151
Barrass, Hugh Cisco

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

SuggestedRemedy
After "is enabled" add "by register 1.19.2 (see 45.2.1.1.12b)"

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 83 SC 83.5.9 P 193 L 36 # 156

Barrass, Hugh Cisco

Comment Type T Comment Status D
Ditch the TBD!

SuggestedRemedy
Replace "TBD count" with "registers 1.20 through 1.29 (see 45.2.1.1.12c)"

Proposed Response Response Status W
PROPOSED ACCEPT.
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.

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE. See presentation trowbridge_02_0109. If it is decided to only generate test patterns in the Tx path and detect in the Rx path, the problem goes away. Per presentation, if there is a decision to retain detection in Tx path, just gearbox test pattern even though garbage is sent downstream.

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.

**Proposed Remedy**
Change
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.

**Proposed Response**
PROPOSED REJECT. The concern is covered by the fact that test patterns are optional.
<table>
<thead>
<tr>
<th>Cl 83</th>
<th>SC 83.5.9</th>
<th>P 193</th>
<th>L 44</th>
<th># 152</th>
</tr>
</thead>
</table>
| Barrass, Hugh Cisco | **Comment Type** T **Comment Status** D | Ditch the TBD! | **SuggestedRemedy** | Replace "TBD count" with "registers 1.30 through 1.39 (see 45.2.1.1.12d)"
| **Proposed Response** | **Response Status** W | PROPOSED ACCEPT. |

<table>
<thead>
<tr>
<th>Cl 83</th>
<th>SC 83.5.9</th>
<th>P 193</th>
<th>L 50</th>
<th># 544</th>
</tr>
</thead>
</table>
| Dawe, Piers Avago Technologies | **Comment Type** T **Comment Status** D | 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. | **SuggestedRemedy** | 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.
| **Proposed Response** | **Response Status** W | PROPOSED ACCEPT IN PRINCIPLE. See presentation trowbridge_02_0109 and resolve per discussion consensus |

<table>
<thead>
<tr>
<th>Cl 83</th>
<th>SC 83.5.9</th>
<th>P 193</th>
<th>L 6</th>
<th># 143</th>
</tr>
</thead>
</table>
| Barrass, Hugh Cisco | **Comment Type** T **Comment Status** D | Ditch the TBD! | **SuggestedRemedy** | Replace TBD with "registers 1.20 through 1.29 (see 45.2.1.1.12c)"
| **Proposed Response** | **Response Status** W | PROPOSED ACCEPT. |

<table>
<thead>
<tr>
<th>Cl 83</th>
<th>SC 83.5.9</th>
<th>P 194</th>
<th>L 1</th>
<th># 657</th>
</tr>
</thead>
</table>
| Trowbridge, Stephen Alcatel-Lucent | **Comment Type** T **Comment Status** D | 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? | **SuggestedRemedy** | 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.
| **Proposed Response** | **Response Status** W | PROPOSED ACCEPT IN PRINCIPLE. See presentation trowbridge_02_0109 and resolve per discussion consensus |

<table>
<thead>
<tr>
<th>Cl 83</th>
<th>SC 83.5.9</th>
<th>P 194</th>
<th>L 3</th>
<th># 448</th>
</tr>
</thead>
</table>
| Dudek, Mike JDSU | **Comment Type** TR **Comment Status** D | 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. | **SuggestedRemedy** | At this sentence change "on each of the lanes" to "on the specified lane". 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.
| **Proposed Response** | **Response Status** W | PROPOSED ACCEPT IN PRINCIPLE. See trowbridge_02_0109. Suggest that the specified lane transmit Square 8 and the other lanes transmit PRBS31. There is no point to transmitting a normal signal on the other (non square wave) lanes since a normal signal is meaningless without all of the lanes. |

<table>
<thead>
<tr>
<th>Cl 83</th>
<th>SC 83.5.9</th>
<th>P 194</th>
<th>L 0</th>
<th># 0</th>
</tr>
</thead>
</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 47 of 131 1/9/2009 6:32:04 PM
Cl  83  SC  83.5.9  P 194  L  5  #  597
Dawe, Piers  Avago Technologies

Comment Type T  Comment Status D
When transmit test pattern is disabled

Suggested Remedy
When transmit square wave test pattern is disabled
These sentences 'When ... is disabled, the PMA returns to normal operation' need
reworking or removal anyway, as another bit may divert the PMA from normal operation.

Proposed Response  Response Status W
PROPOSED REJECT. Seems like overkill to try to spell out interaction and priorities
between modes that are intended for use one at a time.

Cl  83  SC  83.6  P 194  L 13  #  598
Dawe, Piers  Avago Technologies

Comment Type T  Comment Status D
four addressable instances for each possible PMA sublayer.

Suggested Remedy
four addressable instances, one for each possible PMA sublayer.
or four addressable instances for each port.

Proposed Response  Response Status W
PROPOSED ACCEPT.

Cl  83  SC  83.6  P 194  L  7  #  167
Gustlin, Mark  Cisco

Comment Type T  Comment Status D
Table 83-1.

Suggested Remedy
Add in the PMA round trip delay constraints, and make it consistent with the summary of
constraints in clause 80. Also add in an appropriate PICS for this.

Proposed Response  Response Status W
as above

Cl  83  SC  83.6  P 195  L  5  #  155
Barrass, Hugh  Cisco

Comment Type T  Comment Status D
Register names & locations to be filled in.

Suggested Remedy
Each lane...

Proposed Response  Response Status W
PROPOSED ACCEPT IN PRINCIPLE. Seems to be asking for a missing requirement -
may be better to put near the skew requirements rather than in the indicated location.

Cl  83  SC  83.6  P 195  L 16  #  153
Barrass, Hugh  Cisco

Comment Type T  Comment Status D
Ditch the TBD!

Suggested Remedy
Replace "as described in 45.TBD" with "at identical locations in MMD 8, 9 and 10."

Proposed Response  Response Status W
PROPOSED ACCEPT.
<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>Proposed Response</th>
<th>Response Status</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Proposed Response</th>
<th>Response Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>83.6.4</td>
<td>191</td>
<td>10</td>
<td>TR</td>
<td>D</td>
<td>This should be a requirement</td>
<td>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.</td>
<td>PROPOSED ACCEPT.</td>
<td>W</td>
<td>T</td>
<td>Comment Status D</td>
<td>PROPOSED ACCEPT IN PRINCIPLE. Add to PICS for lanes above and below and split SP15P6 for XLAUI/CAUI above or below.</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T</td>
<td>D</td>
<td>PICS overlooks some of the basics</td>
<td>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 SP15P6 needs to be split in two: nAUI above and nAUI below</td>
<td>PROPOSED ACCEPT.</td>
<td>W</td>
<td>E</td>
<td>XLAUI / CAUI are optional, but not noted that way in Fig 83A-1.</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>83</td>
<td>83.7.3</td>
<td>197</td>
<td>5</td>
<td>T</td>
<td>D</td>
<td>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.</td>
<td>Delete. If kept, correct 'ethernet' to 'Ethernet'.</td>
<td>PROPOSED ACCEPT.</td>
<td>W</td>
<td>E</td>
<td>Note that xlaui / caui are optional in figure</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>83</td>
<td>83.7.5</td>
<td>198</td>
<td>24</td>
<td>T</td>
<td>D</td>
<td>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.</td>
<td>Delete. If kept, correct 'ethernet' to 'Ethernet'.</td>
<td>PROPOSED ACCEPT.</td>
<td>W</td>
<td>E</td>
<td>Note that xlaui / caui are optional in figure</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>Comment Number</td>
<td>Type</td>
<td>Comment</td>
<td>Suggested Remedy</td>
<td>Proposed Response</td>
<td>Response Status</td>
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<tr>
<td>P 350 L 26 #509</td>
<td>T</td>
<td>Cl 83A SC 83A.1</td>
<td>What does ‘Self-timed interface allows timing control at higher layers’ mean?</td>
<td>Delete ‘allows timing control at higher layers’</td>
<td>PROPOSED REJECT.</td>
<td></td>
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<tr>
<td>P 350 L 21 #480</td>
<td>T</td>
<td>Cl 83A SC 83A.1.1</td>
<td>XLAUI/CAUI is the physical instantiation of the PMA to PMA interface. For correct operation XLAUI/CAUI requires the CDR of the PMA and the scrambling, and MLD coding of the PCS it therefore cannot be used for chip to chip communication other than from PMA to PMA.</td>
<td>Delete bullet a).</td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>P 350 L 26 #516</td>
<td>TR</td>
<td>Cl 83A SC 83A.1.1</td>
<td>The project objective is 10^-12 BER. This draft says [Editor's note: (to be removed prior to publication) - condition for total jitter error rate at 1E-15 is proposed] which is not consistent with the objective. For those who want a very low BER nAUI-like non-Ethernet interface, when we have a spec for nAUI with module connector, they will have an ideal basis for a 10^-15 link without connector. Alternatively, we have FEC available. So there is no need to divert this project.</td>
<td>Remove Editor's note:</td>
<td>PROPOSED ACCEPT.</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
Cl 83A SC 83A.2 P 350 L 51 # 617
Dawe, Piers Avago Technologies

Comment Type TR
Comment Status D

The primary purpose of the nAUI spec is the same as the XFI spec at 10G: to provide a standardised and interoperable spec for plugging retimed transceiver modules into line cards or similar. Like XFI (part of XFP), it needs to take a connector into account (does not need to define the connector mechanicals) and define the compliance points with reference to the connector.

As the reflector thread said, having this incomplete spec would be worse than no spec in 802.3ba at all.

Suggested Remedy
Use the six TP compliance points and the compliance card transfer characteristics defined in 86.7.1, relegate the points in Fig 83A-2 to informative reference points like A and D in SFP+. Or if desperate, delete all of 83A.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Proposal to include in Annex 83B

Cl 83A SC 83A.2.1 P 351 L 1 # 638
Latchman, Ryan Gennum Corp

Comment Type T
Comment Status D

KR felt it sufficient to state that the path between the transmitter 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"

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.

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

Too many "Therefore" in last line. Change last line to:
It is therefore recommended that this path be carefully designed.

Cl 83A SC 83A.2.2 P 351 L 12 # 49
Ghiasi, Ali Broadcom

Comment Type TR
Comment Status D

Per ghiasi_01_0708 page 16
SDD11= -12.5 dB from 0.01 to 5 Ghz
SDD11= -12.5 + 27.5*log10(f/5) f is from 0.01 to 5 to 11.1 GHz

Suggested Remedy
PROPOSED REJECT.
Already defined in 83A-2
Comment Type: T  Comment Status: D  compliance point

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"

Suggested Remedy

Change

Any interconnect which has a loss less than (SDD21(dB) (TBD) ) 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.

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
Too many "Therefore" in last line. Change last line to:
It is therefore recommended that this path be carefully designed.

Comment Type: TR  Comment Status: D  compliance point

sdd21 MASK was defined in ghiasi_01_0708 but is TBD in the draft

Suggested Remedy

please use the mask definition of ghiasi_01_0708
SDD21= -0.108 - 0.845*sqrt(f) from 0.01 to 7 GHz
SDD21=20-4*f from 7 to 8 GHz
SDD21= -21 dB from 8 to 11.1 GHz

Also see ghiasi_01_0109

Proposed Response  Response Status: W
PROPOSED REJECT.
6.5dB sounds significant given the channel loss budget is 10dB at 5.5GHz.
Comment Type: T  Comment Status: D
"eyemask as defined in Figure 83A-5" appears to contain a bad reference.

Suggested Remedy:
replace the reference 83A-5 -----> 83A-6

Proposed Response: Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.

Remove Editors Note

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

Proposed Response: Response Status: W
PROPOSED ACCEPT.

This comment was originally intended to highlight the lack of a de-emphasis spec, which is required to meet the Rx mask requirements. Additional presentation material required to justify reduction in X2

SuggestedRemedy
In both SFPe+ 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 componnets 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

Proposed Response: Response Status: W
PROPOSED REJECT.
DJ / RJ continues to be used through out the document (CL84, CL85, CL87, CL88) and has served more than adquately as a jitter methodology for many years.
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>ER</th>
<th>Comment Status</th>
<th>D</th>
<th>Comment</th>
<th>Task force Review</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Add an additional column to Table 83A-1 and provide reference to appropriate subclause where the transmit parameters are specified (See tables in Clause 84 or 85 for reference).</td>
<td><strong>Draft 1.1 Comments</strong></td>
</tr>
<tr>
<td><strong>Cl 83A SC 83A.3.3</strong></td>
<td><strong>P 352</strong></td>
<td><strong>L 20</strong></td>
<td>#568</td>
<td>Ganga, Ilango Intel</td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>ER</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>D</strong></td>
<td><strong>Add an additional column to Table 83A-1 and provide reference to appropriate subclause where the transmit parameters are specified (See tables in Clause 84 or 85 for reference).</strong></td>
<td><strong>IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments</strong></td>
</tr>
<tr>
<td><strong>Ghiasi, Ali Broadcom</strong></td>
<td><strong>Cl 83A SC 83A.3.3</strong></td>
<td><strong>P 352</strong></td>
<td><strong>L 30</strong></td>
<td>#53</td>
<td></td>
</tr>
<tr>
<td><strong>Comment Type</strong></td>
<td><strong>TR</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>D</strong></td>
<td><strong>To guarantee min eye opening at the receiver the transmitter output VMA or eye opening with de-emphasis must be defined.</strong></td>
<td><strong>Task force Review</strong></td>
</tr>
<tr>
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<td><strong>P 352</strong></td>
<td><strong>L 27</strong></td>
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<td><strong>To guarantee min transmitter pre-emphasis must be defined.</strong></td>
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<td><strong>Comment Status</strong></td>
<td><strong>D</strong></td>
<td><strong>Min receiver eye opening can not be guaranteed with min transmitter level and slow rise time and fall time.</strong></td>
<td><strong>Dudek, Mike JDSU</strong></td>
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<td><strong>Comment Status</strong></td>
<td><strong>D</strong></td>
<td><strong>The specifications in this clause are for a transmitter without pre-emphasis (low Tx jitter) and a receiver with equalization (separate spec for non-equalizable jitter). It is intended that this transmitter will have pre-emphasis and the receiver will not require equalization. A transmitter with pre-emphasis is unlikely to meet these specs. Note it is unacceptable in a standard to say measure with pre-emphasis turned off and then turn on pre-emphasis with an assumption that this doesn’t degrade the effective jitter as a solution to this.</strong></td>
<td><strong>Proposed Response</strong></td>
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<td><strong>Proposed Response</strong></td>
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<td><strong>L 39</strong></td>
<td>#481</td>
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<td><strong>Comment Type</strong></td>
<td><strong>TR</strong></td>
<td><strong>Comment Status</strong></td>
<td><strong>D</strong></td>
<td><strong>The methodology of turning off emphasis for output jitter measurements has been used in the past (KR).</strong></td>
<td><strong>Proposed Response</strong></td>
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<td><strong>L 40</strong></td>
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**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  83A  SC 83A.3.3  P 352  L 46  # 249
Latchman, Ryan  Gennum Corp

Comment Type  T  Comment Status  D  De-emphasis

XLAUI / CAUI Receive Eye mask can only be met by specifying a minimum level of de-emphasis.

Suggested Remedy
Add De-emphasis Specification to table

Parameter: Minimum De-emphasis
Value: 3.5dB

Proposed Response  Response Status  W
PROPOSED ACCEPT IN PRINCIPLE.
See comment 50

Cl  83A  SC 83A.3.3  P 352  L 47  # 513
Dawe, Piers  Avago Technologies

Comment Type  T  Comment Status  D
defined in where?

Suggested Remedy
Change ‘83A.4.4’ to a proper cross-reference to 86.7.4.3.

Proposed Response  Response Status  W
PROPOSED ACCEPT IN PRINCIPLE.

Cl  83A  SC 83A.3.3.1  P 353  L 2  # 250
Latchman, Ryan  Gennum Corp

Comment Type  T  Comment Status  D  de-emphasis

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

Proposed Response  Response Status  W
PROPOSED ACCEPT IN PRINCIPLE.

Modify Text to:
Driver differential output amplitude shall be less than Y2 and greater than Y1 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
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

**Proposed Response**

**Response Status**: W

PROPOSED ACCEPT.

---

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.

**Proposed Response**

**Response Status**: W

PROPOSED ACCEPT IN PRINCIPLE.

---

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]

**Suggested Remedy**

remove editors comment

**Proposed Response**

**Response Status**: W

PROPOSED ACCEPT.
Cl 83A SC 83A.3.3.3 P 354 L 32 # 507
Dawe, Piers Avago Technologies
Comment Type E Comment Status D obsolete editor's note
Suggested Remedy Delete
Proposed Response W

Cl 83A SC 83A.3.3.5 P 355 L 33 # 55
Ghiasi, Ali Broadcom
Comment Type TR Comment Status D jitter
Jitter methodology need to be updated
Suggested Remedy
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

Proposed Response W

Cl 83A SC 83A.3.3.5 P 355 L 31 # 261
Latchman, Ryan Gennum Corp
Comment Type T Comment Status D de-emphasis
Transmitter jitter specification should be measured with de-emphasis off since this will unnecessarily contribute to the transmitter DJ
Suggested Remedy
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.
Proposed Response W

Cl 83A SC 83A.3.3.5 P 355 L 40 # 252
Latchman, Ryan Gennum Corp
Comment Type T Comment Status D Incorrect reference
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.
Suggested Remedy
Remove
Proposed Response W
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)

Suggested Remedy
Remove

Proposed Response: Response Status: W
PROPOSED ACCEPT.

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).

Suggested Remedy
Remove Minimum Differential Input Voltage Parameter

Proposed Response: Response Status: W
PROPOSED ACCEPT.

‘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 ;-)  

Suggested Remedy
Find a better metric, or explain these terms.

Proposed Response: Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
See comment 255

Sine xAUI has defined mandatory de-emphasis there is little benefit to define non-EQJ which is difficult parameter to test or verify

Suggested Remedy
Replace 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

Instead of J2 and J12, use DJ and RJ terms

Proposed Response: Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.

Maximum non-EQ Jitter is not well defined.

Suggested Remedy
Change Parameter to Maximum Deterministic Jitter

Proposed Response: Response Status: W
PROPOSED ACCEPT.
Comment Type: T  Comment Status: D
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.

Proposed Response  Response Status: W
PROPOSED REJECT.
Simulation results verify that after the channel, 45mV is an appropriate spec.

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

SuggestedRemedy
Change TBD to 1E-12

Proposed Response  Response Status: W
PROPOSED ACCEPT.

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

Cl 83A  SC 83A.3.4.2  P 357  L 38  # 483
Dudek, Mike  JDSU

Comment Type: TR  Comment Status: D
To test the receiver the worst case input should be used.

SuggestedRemedy
Replace "does not exceed" with "equals"

Proposed Response  Response Status: W
PROPOSED 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: D
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

Proposed Response  Response Status: W
PROPOSED ACCEPT.

Cl 83A  SC 83A.3.4.3  P 358  L 23  # 258
Latchman, Ryan  Gennum Corp

Comment Type: E  Comment Status: D
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

Proposed Response  Response Status: W
PROPOSED ACCEPT.
### IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments

#### Task force Review

**Draft 1.1 Comments**

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<th>CI 83A</th>
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**Comment Type** T  **Comment Status** D

- **Figure 83A-8 Differential input return loss is the same as Figure 83A-4 Differential Output Returnloss.**
- The file for D1.1 is already nearly as big as 802.3 Section 5 (3 projects, 19 clauses).

**Suggested Remedy**

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

**Proposed Response**

- **Proposed REJECT.**
- *Keeping input and output separate makes the document cleaner.

<table>
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<th>SC 83A.3.4.8</th>
<th>P 289</th>
<th>L 14</th>
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**Comment Type** TR  **Comment Status** D

- 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.

**Suggested Remedy**

- 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.

**Proposed Response**

- **Proposed REJECT.**
- XLAUI / CAUI specs ensure retimed interface interoperability

<table>
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<tr>
<th>CI 83A</th>
<th>SC 83A.3.4.8</th>
<th>P 360</th>
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<th># 259</th>
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<td>Gennum Corp</td>
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**Comment Type** T  **Comment Status** D

- Non-EQJ jitter is no longer specified. Replace with DJ / RJ terms

**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

**Proposed Response**

- **Proposed ACCEPT IN PRINCIPLE.**
  - **Proposed addition to section on 1E-15 section.**
  - Use TJ at a given BER instead of (J12), (J15) terms
  - State that additional jitter would be comprised of RJ as per jitter tolerance test requirement

**Proposed Response**

- **Proposed REJECT.**
  - XLAUI / CAUI specs ensure retimed interface interoperability

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<td>Broadcom</td>
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**Comment Type** TR  **Comment Status** D

- No-EQJ require definition of channel s-parameter response too much complications when xAUI 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

**Proposed Response**

- **Proposed ACCEPT IN PRINCIPLE.**
  - Modify non-EQJ to DJ. Additional input on E-15 operation required (additional section).
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

Proposed Response

Response Status W

PROPOSED ACCEPT.

---

XLAUI/CAUI in addition to loss definition it also require min return loss definition.

Proposed Response

Response Status W

PROPOSED ACCEPT.

---

Per ghiasi_01_0708 page 16
SDD11=-12.5 dB from 0.01 to 5 GHz
SDD11=-12.5 + 27.5*log10(f/5) f is from 0.01 to 5 to 11.1 GHz

Proposed Response

Response Status W

PROPOSED ACCEPT.

---

SDD21 MASK was defined in ghiasi_01_0708 but is TBD in the draft

Proposed Response

Response Status W

PROPOSED REJECT.

At 5.5GHz, this corresponds to -6.5dB. XLAUI / CAUI channel should support -10dB.
The XLAUI/CAUI is primarily intended as a point-to-point interface of up to approximately 25 cm between integrated circuits using controlled impedance traces on low-cost printed circuit boards (PCBs). Longer reaches for the XLAUI / CAUI may be achieved by the use of better PCB materials, as the performance of an actual XLAUI/CAUI interconnect is highly dependent on the implementation.

**Proposed Response**

PROPOSED ACCEPT.

---

No input on eye template measurements. Remove section.

**Proposed Response**

Remove

PROPOSED ACCEPT.

Also remove reference in 83A.3.4.2

"The template measurement requirements are specified in 83A.5.1."

**Proposed Response**

Remove

PROPOSED ACCEPT.

---

The following sections describe how to measure transmit jitter compliance and receive jitter compliance.

**Proposed Response**

PROPOSED ACCEPT.
Cl 83A SC 83A.5.2.1 P 362 L 43 # 265
Latchman, Ryan Gennum Corp

Comment Type T Comment Status D

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 singlepole 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 CCCCC. 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.

PROPOSED ACCEPT.

Cl 83A SC 83A.5.2.2 P 363 L 38 # 279
Suzuki, Toshihiro Anritsu Company

Comment Type T Comment Status D

Interference Test

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.

PROPOSED ACCEPT IN PRINCIPLE.
Work with comment 268

PROP. ACCEPT IN PRINCIPLE.

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
Rise/fall time is defined in 86.7.4.3 Transition time. No need to do it again.

Suggested Remedy
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.

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.
Rise fall time with de-emphasis is being defined in: 83A.3.3.2 see comment 269

Remove section (rise/fall time measurement is described in rise/ fall time section)

Suggested Remedy
Remove 83A.5.3

Proposed Response
PROPOSED ACCEPT.
Ensure all PICS have corresponding Shall statement

**Suggested Remedy**
modify text to include shall statements as per the PICS

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.
Text proposals needed

---

**Comment**
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,
or
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.'

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.
Propose separate section for chip to module application
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.

Proposed Response
PROPOSED ACCEPT IN PRINCIPLE.

Concensus required for 83B
**Comment**

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.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

...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.

---

**Comment**

Remove TBDs for the delay constraints

**Suggested Remedy**

It is OK to make these the same as Clause 72 as the delays will be equivalent to 10GBASE-KR.

Change TBD (1024) to 1024 and TBD (160) to 160.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

For pause control we are interested in the amount of data in flight not the transit time. Given the same channel/phy/pcs characteristics, 40G has 4x, and 100G 10x the data in flight as 10G.

Therefore the numbers need to be four times those of Clause 72.

Change TBD (1024) to 4096 and TBD (160) to 640.

---

**Comment**

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

**Suggested Remedy**

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.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

The numbers need to be four times those of Clause 72.

Change TBD (1024) to 4096 and TBD (160) to 640.

---

**Comment**

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.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

The numbers need to be four times those of Clause 72.

Change TBD (1024) to 4096 and TBD (160) to 640.
Figure 80-3 does not apply to 40GBASE-KR4.

Suggested Remedy: Remove reference.

PROPOSED REJECT.

Yes it does for the case with a separate FEC chip.

Measurement total skew and dynamic skew for 40GBASE-KR4 is not defined and is left to the implementors to comply with the skew requirements.

Hence delete the last sentence of 84.5.

Suggested Remedy: Delete the following sentence at the end of 84.5

The measurements of Total Skew and Dynamic Skew are defined in 84.xx.xx.

PROPOSED ACCEPT.

Table number is wrong

Suggested Remedy: Change Table 84-1 on page 203 to 84-2 and similarly for Table 84-2 on page 204

PROPOSED ACCEPT.

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.

Suggested Remedy: 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.

PROPOSED ACCEPT.

Also see comment 91
IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments

Comments

Comment status D
Response status W

Cl 84 SC 84.7.10 P 206 L 22 # 91
Marris, Arthur Cadence

Comment Type T
Comment Status D

Missing shalls

Suggested Remedy
- Line 22 change 'uses' to 'shall use'
- Line 37 change 'is' to 'shall be'
- Line 41 change 'are' to 'shall be'
- Page 207 line 3 change 'are' to 'shall be'
- Also change PICS as necessary

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
- Also line 32 change 'are' to 'shall be'
- Also see comment 364 and 365

Cl 84 SC 84.7.4 P 205 L 1 # 360
Ganga, Ilango Intel

Comment Type TR
Comment Status D

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

Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 84 SC 84.7.5 P 205 L 19 # 361
Ganga, Ilango Intel

Comment Type T
Comment Status D

Add a subclause below 84.7.5 for lane by lane signal detect function and renumber the subclauses accordingly.

Suggested Remedy
- Add 84.7.5 PMD lane-by-lane signal detect function
- When the MDIO is implemented, each PMD_signal_detect_n value, where n represents the lane number in the range 0:3, shall be continuously updated according to the requirements of 84.7.4.
- Add description for lane by lane signal detect 0 to 3 in 84.7.5 (see 85.7.4 for reference or 84.7.4 last paragraph has description for PMD_signal_detect_n).
- Add corresponding register bit references to Table 84-1.
- Add corresponding PICS entry

Proposed Response Response Status W
PROPOSED ACCEPT.
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.

**Proposed Response**

*PROPOSED 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.”
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.

**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.

**Proposed Response**

PROPOSED 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.

The return loss spec needs to be modified to accept short cables with bad return loss and longer cables with good return loss.

**Suggested Remedy**

Consider adding an insertion loss to return loss ratio similar to the ICR curve.

(Presentation will be provided)

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

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

\[
\text{Return Loss}(f) = 10 \text{ for } 100 \text{ MHz} < f < 1250 \text{ MHz}
\]

\[
\text{Return Loss}(f) = 10 - 7 \times \log_{10}(f/1250) \text{ for } 1250 \text{ MHz} = f < 10000 \text{ MHz}
\]

---

**Comment Status**

D

Response Status

W

**Reported By:** Balasubramanian, Vittal FCI USA, Inc.

**Proposed Response**

PROPOSED 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.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

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

\[
\text{Return Loss}(f) = 10 \text{ for } 100 \text{ MHz} < f < 1250 \text{ MHz}
\]

\[
\text{Return Loss}(f) = 10 - 7 \times \log_{10}(f/1250) \text{ for } 1250 \text{ MHz} = f < 10000 \text{ MHz}
\]

**Comment Status**

D

Response Status

W

**Reported By:** Balasubramanian, Vittal FCI USA, Inc.

**Proposed Response**

PROPOSED REJECT

**Comment Status**

D

Response Status

W

**Reported By:** Palkert, Thomas Luxtera

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

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

\[
\text{Return Loss}(f) = 10 \text{ for } 100 \text{ MHz} < f < 1250 \text{ MHz}
\]

\[
\text{Return Loss}(f) = 10 - 7 \times \log_{10}(f/1250) \text{ for } 1250 \text{ MHz} = f < 10000 \text{ MHz}
\]
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<th>Suggested Remedy</th>
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<tr>
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<td>85.1</td>
<td>171</td>
<td>30</td>
<td>613</td>
<td>TR</td>
<td>D</td>
<td>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.</td>
<td>Add text in Clause 85 saying that 40GBASE-CR4 and 100GBASE-CR10 use Parallel Detection.</td>
<td>PROPOSED REJECT.</td>
</tr>
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</table>

Dawe, Piers, Avago Technologies

<table>
<thead>
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<tr>
<td>85</td>
<td>85.10</td>
<td>228</td>
<td>228</td>
<td>601</td>
<td>T</td>
<td>D</td>
<td>The SFP+ direct attach cable specification includes DC blocking capacitors. Maybe this has grounding advantages.</td>
<td>Why doesn't this cable specification?</td>
<td>PROPOSED REJECT.</td>
</tr>
</tbody>
</table>

Dawe, Piers, Avago Technologies

<table>
<thead>
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<td>85.10</td>
<td>228</td>
<td>228</td>
<td>601</td>
<td>TR</td>
<td>D</td>
<td>Remove TBD- 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)</td>
<td>Please add pulse response for the cable, for response see ghiasi_03_0109</td>
<td>PROPOSED REJECT.</td>
</tr>
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</table>

Ghiasi, Ali, Broadcom

<table>
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<td>85.10</td>
<td>229</td>
<td>10</td>
<td>70</td>
<td>TR</td>
<td>D</td>
<td>Cable missing pulse response or group delay, this is required for development of comprehensive stress generator as well as non compliant cables</td>
<td>Pulse response provided is not sufficient i.e., it's not the pulse response of minimally compliant CR4/CR10 cable assembly.</td>
<td>PROPOSED REJECT.</td>
</tr>
</tbody>
</table>

Ghiasi, Ali, Broadcom
Comment Type: TR
Comment Status: D

Insertion loss deviation cell should be min=-1.73 dB and max=1.73 per equations (85-16) and (85-17).

Suggested Remedy
Table 85.6 delete "Maximum" in "description" cell for insertion loss deviation at 5.15625 GHz and delete "8.89" in "value" cell. Replace deleted cell with min=-1.73 and max=1.73. The values were determined using equations (85-16) and (85-17).

Proposed Response Response Status: W
PROPOSED ACCEPT.

Comment Type: T
Comment Status: D

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.

Proposed Response Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
Suggested remedy comment #300

Comment Type: TR
Comment Status: D

Return loss missing

Suggested Remedy
Add differential return loss=-12 + 2\times\sqrt{f} f from 0.01 to 4.1 GHz = -6.3 + 13\log_{10}(f/5.5) from 4.1 to 11.1 GHz Add common mode return loss = -7.51 + 1.1 \times f from 0.01 to 4.1 GHz and -3 dB from 4.1 to 11.1 GHz

Proposed Response Response Status: W
PROPOSED REJECT.
Differential return loss specified. See remedy comment #663.

Common mode return loss proposal insufficiently supported or justified.
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
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<th>Comment Type</th>
<th>Comment Status</th>
<th>Task force Review</th>
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| 85 | 85.13.4 | 242 | L  | 32 | 358 | T            | D              | **Add a separate PICS entry for the AN service interface primitive for the PCS associated with CR PMD. (See 84.11.4.1 for reference or Clause 72 in base standard)**
| Ganga, Ilango | Intel | **Suggested Remedy** | **Insert a separate subclause 85.13.4.1 PCS requirements for AN Service interface below and add the PICS entry named PR1 as shown below:**
| Item: PR1, Feature: AN service interface primitive, Subclause: 85.3, Value/Comment: The PCS associated with this PMD supports the AN service interface primitive AN_LINK.indication defined in 73.9, Status: M, Support: Yes | | **Proposed Response** | **PROPOSED ACCEPT.** |

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<th>SC</th>
<th>P</th>
<th>L</th>
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<th>#</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Task force Review</th>
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</thead>
</table>
| 85 | 85.2 | 215 | L  | 29 | 506 | E            | D              | **Could parameterize description of primitives.**
| Trowbridge, Stephen | Alcatel-Lucent | **Suggested Remedy** | **Describe as PMD_UNITDATA.request/indication0 through PMD_UNITDATA.request/indication n-1 for an n-lane interface (n=4 or 10)**
| **Proposed Response** | **PROPOSED ACCEPT IN PRINCIPLE.** | **For sub-task force discussion** |
**Comment Type:** TR  **Comment Status:** D

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.

**Suggested Remedy**

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.

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

**Proposed Response**

Response Status: W

PROPOSED ACCEPT.

---

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

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.

**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-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"

**Proposed Response**

Response Status: W

PROPOSED 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"

---

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

The measurements of Total Skew and Dynamic Skew are outside the scope of an interoperability standard i.e., 802.3ba.

**Suggested Remedy**

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

**Proposed Response**

Response Status: W

PROPOSED ACCEPT.
Comment Type: T  Comment Status: D
Measurement total skew and dynamic skew for 40GBASE-CR4 and 100GBASE-CR10 is not defined and is left to the implementors to comply with the skew requirements.

Hence delete the last sentence of 85.5.

SuggestedRemedy
Delete the following sentence at the end of 84.5
The measurements of Total Skew and Dynamic Skew are defined in 85.xx.xx.

Proposed Response
Response Status: W
PROPOSED ACCEPT.

Suggested remedy comment #304

Comment Type: T  Comment Status: D
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.

SuggestedRemedy
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.

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

Proposed Response
Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.

Sub-task force to consider on implementation of test point comments.
Comment Type: T  Comment Status: D
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.

Suggested Remedy:
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 72.6.10.

Proposed Response: Response Status: W
PROPOSED ACCEPT.

Comment Type: T  Comment Status: D
Remove editors note. Subclause 85.7.5 text is sufficient to describe lane-by-lane signal detect function.

Suggested Remedy:
Remove editors note line 40-41.

Proposed Response: Response Status: W
PROPOSED ACCEPT.

Comment Type: T  Comment Status: D
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

Suggested Remedy:
As per comment

Proposed Response: Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.

Suggested remedy in comment#298.
<table>
<thead>
<tr>
<th>CI</th>
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<th>Number</th>
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<th>Broadcom</th>
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<td>#63</td>
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</table>

**Comment Type**: TR

**Comment Status**: D

DDPW 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

**Proposed Response**

PROPOSED REJECT.

See comment#284 for rationale.

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<tr>
<th>CI</th>
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</table>

**Comment Type**: T

**Comment Status**: D

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.

**Proposed Response**

PROPOSED ACCEPT.

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**Comment Type**: TR

**Comment Status**: D

TP0 specifications are missing

**SuggestedRemedy**

Duplicate table 85-4 at TP0 with folowing row

<table>
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<th>signaling speed</th>
<th>same</th>
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<tbody>
<tr>
<td>Unit interval</td>
<td>-same</td>
</tr>
<tr>
<td>Differential output voltage</td>
<td>-same</td>
</tr>
<tr>
<td>Common mode volatage limit</td>
<td>-same</td>
</tr>
<tr>
<td>Differential Output return loss</td>
<td>see ghiasi_03_0109</td>
</tr>
<tr>
<td>Common mode return loss</td>
<td>see ghiasi_03_0109</td>
</tr>
<tr>
<td>transition time</td>
<td>24 ps min</td>
</tr>
<tr>
<td>common mode output voltage</td>
<td>-12 mV RMS</td>
</tr>
</tbody>
</table>

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

See suggested remedy comment#307.
Cl 85 SC 85.8.3 P 224 L 11 # 65
Ghiasi, Ali Broadcom
Comment Type TR Comment Status D
Table is missing vertical eye opening or Qsq per CL68 definition, since there is channel and connector there could be several dB of penalty
SuggestedRemedy
Add Qsq to table 85-4 with linear value of 63.1
Proposed Response Response Status W
PROPOSED REJECT.
Proposal insufficiently supported with justification for recommended change.

Cl 85 SC 85.8.3 P 224 L 11 # 550
Dawe, Piers Avago Technologies
Comment Type T Comment Status D
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.
Proposed Response Response Status W
PROPOSED REJECT.
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 P 224 L 11 # 74
Ghiasi, Ali Broadcom
Comment Type TR Comment Status D
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
Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Committee to decide the limit value.
[Editor's note: this comment was submitted against 86.8.3.]

Cl 85 SC 85.8.3 P 224 L 13 # 307
DiMinico, Christopher MC Communications
Comment Type TR Comment Status D
Define Table 85-4 Transmitter characteristics to be met at TP0 for consistent test/reference point consistent with 10GBASE-KR.
In addition, to maintain test/reference point at TP2, specify transmitter characteristics to be met at TP2 to account for Tx_PCB, mated connector, and test fixture insertion loss between TP1 and TP2.
SuggestedRemedy
(1)Page 223 line 1 replace TP2 with TP0.
Transmitter characteristics in Table 85-4 shall meet specifications at TP0, unless otherwise noted.
(2)Page 225 line 6-7 replace 85.8.3 with new reference for TP2 transmitter characteristics including TP2 transmitter characteristics. See supporting presentation for recommended transmitter characteristics at TP2.
(3)Update resultant changes in PICs.
(4)Page 219 line 46-54 revise text in subclause 85.7.1 Link block diagram...add reference to TP0.
(5)Add TP0>>>The electrical transmit signal is defined at (TP0) and TP2.
(6)Replace current reference to TP2 with TP0 in sentences>> Unless specified otherwise, all transmitter measurements and tests defined in Table 85-4 are made at TP0.
(7)Add sentence to link TP2 with adjusted transmit characteristics>>Unless specified otherwise, all transmitter measurements and tests defined in Table 85-X are made at TP2.
(8)Revise 85.8.3.1 Test fixtures and 85.8.3.2 Test-fixture impedance to reference 10GBASE-KR including the return loss TBD and add additional text for testing at TP2.

See presentation material to be submitted in support of Clause 85 Draft 1.1. comment resolutions.
Proposed Response Response Status W
PROPOSED ACCEPT.
See suggested remedy comment#307.
and supporting presentation diminico_04_0109.pdf
### Comment 85 SC 85.8.3.1 P 225 L 17

**Dawe, Piers Avago Technologies**

**Comment Type**: TR

**Comment Status**: D

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.

**Suggested Remedy**: 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.

**Proposed Response**: PROPOSED 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).

### Comment 85 SC 85.8.4 P 225 L 49

**DiMinico, Christopher MC Communications**

**Comment Type**: TR

**Comment Status**: D

Table 85-5 is missing Differential to common mode conversion.

**Suggested Remedy**: Add row to Table 85-5 for SCD11 with value of -10 dB max from 0.01 to 11.1 GHz.

**Proposed Response**: PROPOSED ACCEPT IN PRINCIPLE.

See presentation material to be submitted in support of Clause 85 Draft 1.1. comment resolutions and ghaisi_03_0109.pdf.

### Comment 85 SC 85.8.4 P 226 L 19

**Ghiasi, Ali Broadcom**

**Comment Type**: TR

**Comment Status**: D

Table 85-5 is missing Differential to common mode conversion.

**Suggested Remedy**: Add row to Table 85-5 for SCD11 with value of -10 dB max from 0.01 to 11.1 GHz.

**Proposed Response**: PROPOSED ACCEPT IN PRINCIPLE.

See presentation material to be submitted in support of Clause 85 Draft 1.1. comment resolutions and ghaisi_03_0109.pdf.

### Comment 85 SC 85.8.4 P 226 L 50

**Ghiasi, Ali Broadcom**

**Comment Type**: TR

**Comment Status**: D

Comprehensive stress receiver is required for both TP0 and TP3.

**Suggested Remedy**: Please see ghaisi_03_0109 for block diagram and test method for comprehensive receiver test method.

**Proposed Response**: PROPOSED ACCEPT IN PRINCIPLE.

See presentation material to be submitted in support of Clause 85 Draft 1.1. comment resolutions and ghaisi_03_0109.pdf.

### Comment 85 SC 85.8.4.1 P 226 L 29

**Dudek, Mike JDSU**

**Comment Type**: T

**Comment Status**: D

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”.

**Proposed Response**: PROPOSED 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.
Remove editors note.

SuggestedRemedy

[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.

PROPOSED ACCEPT IN PRINCIPLE.

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

(1) Remove editors note Page 220 line 11-12.
(2) Remove editors note page 226 line 42-43.
(3) Provide TBD capacitor value.

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

PROPOSED ACCEPT IN PRINCIPLE.

See remedy in comment #285.

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.

change to

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

PROPOSED ACCEPT.
**Comment Type:** T  **Comment Status:** D

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.

**Suggested Remedy**
Per comment.

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

PROPOSED ACCEPT.

---

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

Current ILPCB limit Eq 85-1 only allow about 5" of PCB traces on FR-6 not meeting nicole_01_0708 objective of 4". Transmit and receive PCB loss each must be specified with max limit.

**Suggested Remedy**
Propose to allocate 3.5 dB of loss for the TX and RX PCB loss to allow 4" on FR4-6 or 6" on FR4-13. Change 0.2032 to 0.15 then the loss for both TX and RX are given by EQ 85-1

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

PROPOSED REJECT.

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.

---

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

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.

**Suggested Remedy**
I think this would be a more useful standard if the allocation for PCB loss were increased and the allocation for cable loss reduced in step.

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

PROPOSED REJECT.

The copper length objective for 40 and 100 Gigabit Ethernet is at least 10 m over a copper cable assembly.
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR</td>
<td>D</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>
</tr>
<tr>
<td>E</td>
<td>D</td>
<td>SuggestedRemedy: Extend the range of Cable assembly insertion loss, Cable assembly return loss, Near-End Crosstalk, MDNEXT, FEXT and MDELFEEXT and maximum insertion loss allocation for the transmitter and receiver differential controlled impedance printed circuit boards to at least 10 MHz to 10 GHz.</td>
</tr>
<tr>
<td>E</td>
<td>D</td>
<td>SuggestedRemedy: Change units to metric in figures.</td>
</tr>
<tr>
<td>T</td>
<td>D</td>
<td>Note states that &quot;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.&quot; 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.</td>
</tr>
</tbody>
</table>

Proposed Response: Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

See presentation material to be submitted in support of Clause 85 Draft 1.1. comment resolutions. healey_01_0109.pdf and diminico_04_0109.pdf
Comment Type: TR  Comment Status: D
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.

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.

Proposed Response  Response Status: W
PROPOSED REJECT.

See comment #667 for rationale.

Comment Type: T  Comment Status: D
'These two subclauses are not consistent with other pluggables subclauses.'

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

The root cause is that the lanes are numbered from 0, which isn't intuitive. In the format "PMD_UNITDATA.requestn(x_bit)" we need a symbol for the last lane ID: "PMD_UNITDATA.requestn-1(x_bit)" isn't good. Change the lane numbering throughout or make the lane ID a subscript (both need agreement across the task force) or define m=3 or 9, n=4 or 10 (the number of lanes), and number primitives and lanes throughout the clause as 0 through m.

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.

The root cause is that the lanes are numbered from 0, which isn't intuitive. In the format "PMD_UNITDATA.requestn(x_bit)" we need a symbol for the last lane ID: "PMD_UNITDATA.requestn-1(x_bit)" isn't good. Change the lane numbering throughout or make the lane ID a subscript (both need agreement across the task force) or define m=3 or 9, n=4 or 10, m+1=n.

It would be nice if other clauses then used i or x for an example lane rather than n (or m).

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.

Reference material has moved.

Proposed Response  Response Status: W
PROPOSED ACCEPT.
<table>
<thead>
<tr>
<th>Cl</th>
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<th>P</th>
<th>L</th>
<th>Type</th>
<th>Status</th>
<th>Proposed Response</th>
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<td>86.1</td>
<td>248</td>
<td>2</td>
<td>T</td>
<td>D</td>
<td>Waste of space</td>
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<td>Change:</td>
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<td>LAN CSMA/CD</td>
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<td>LAYERS</td>
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<td>to: LAN CSMA/CD</td>
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<td>LAYERS or better,</td>
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<td></td>
<td>LAN CSMA/CD layers or even better, Ethernet layers</td>
</tr>
<tr>
<td>86</td>
<td>86.10.1</td>
<td>271</td>
<td>50</td>
<td>T</td>
<td>D</td>
<td>Review the 1.9 dB allocation and delete footnote c.</td>
</tr>
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<td>PROPOSED ACCEPT.</td>
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<td>[Editor's note: page number was 71]</td>
</tr>
<tr>
<td>86</td>
<td>86.10.1</td>
<td>272</td>
<td>20</td>
<td>T</td>
<td>D</td>
<td>100ns of skew is much more than is needed.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>A separate comment has been made to reallocate 20ns of this skew to the PMD's.</td>
</tr>
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<td>PROPOSED ACCEPT.</td>
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<td>See other comments</td>
</tr>
</tbody>
</table>
| 86  | 86.10.1| 272 | 31   | T    | D      | Change the description to "Fiber cable attenuation at 850 nm (max)"
|     |     |       |      |      |        | PROPOSED ACCEPT IN PRINCIPLE. |
| 86  | 86.10.2.1| 272 | 11   | TR   | D      | The "Fiber cable attenuation (max)" description is incomplete. The wavelength must also be specified as the attenuation value changes with wavelength. The nominal operating wavelength of clause 86 is 850 nm. |
|     |     |       |      |      |        | PROPOSED ACCEPT IN PRINCIPLE. |
|     |     |       |      |      |        | The same point applies to skew. See response to 582. |
1. At 86.10.2.1 optical fiber cable, line 46, correct typo. 'fulfil' to 'fulfill'.

2. The chromatic dispersion specifications were modified by comment to draft 1.0, but contain an error. The upper wavelength limit for the 0.105 value should be 1310 nm not 1305 nm to be consistent with the fiber specification standards in TIA and IEC. The existing value leaves a 5 nm range unspecified.

3. 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.

4. 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.
A specific optical connector form should be selected within the subclause to provide users with unambiguous understanding of the standard physical hardware connectivity for patch cords. The selection of the connector form should be compatible with structured cabling practices for array connectivity defined in TIA-568 and draft ISO 24764.

Suggested Remedy
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 86.10.2.3 are so entitled atop each slide. The proposed content is intended to be a replacement for the present text. Note: This contribution also contains proposed content for related subclauses 86.5.1 and 86.5.2.

Proposed Response
PROPOSED REJECT.
Any connector form can connect to structured cabling as long as the fiber is the right kind (my computer’s mains lead has two different connectors). See response to 186.

A specific optical connector form should be selected within the subclause to provide users with unambiguous understanding of the standard physical hardware connectivity for patch cords. The selection of the connector form should be compatible with structured cabling practices for array connectivity defined in TIA-568 and draft ISO 24764.

Suggested Remedy
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 86.10.2.3 are so entitled atop each slide. The proposed content is intended to be a replacement for the present text. Note: This contribution also contains proposed content for related subclauses 86.5.1 and 86.5.2.

Proposed Response
PROPOSED REJECT.
Any connector form can connect to structured cabling as long as the fiber is the right kind (my computer’s mains lead has two different connectors). See response to 186.

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.

Proposed Response
PROPOSED ACCEPT.

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

Suggested Remedy
Change ‘n’ to ‘4 or 10’.

Proposed Response
PROPOSED ACCEPT.
Comment Type  T  Comment Status  D
PMD lane by lane signal detect function would be implemented by the same methods (various implementations are permitted) as PMD global signal detect function. 'the magnitude of the optical signal' while suitably un-defined, might be read as denying this.

SuggestedRemedy
Delete 'the magnitude of'.

Proposed Response  W
PROPOSED ACCEPT.

---

Comment Type  T  Comment Status  D
Changes to the last draft made things worse; electrical lanes should not get a special mention when optical lanes are in the same situation. The empty 86.5.1 and 86.5.2 are unnecessary. Stop digging a hole. But it's worth pointing out that e.g. optical receive lane and signal detect lanes should correspond.

SuggestedRemedy
Change
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.

to
A common lane numbering is used for optical transmitter and lane by lane transmit disable. A common lane numbering is used for optical receiver and lane by lane signal detect. 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.

Proposed Response  W
PROPOSED ACCEPT.
Comment Type: TR
Comment Status: D

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.

Suggested Remedy:
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.

Proposed Response: Response Status W

PROPOSED REJECT.
The commenter brings very useful information in his presentation. 802.3 does not standardize patch cords, or optical connectors away from the MDI, and does not specify optical connector format at the MDI. The PCS is capable of receiving the lanes in any arrangement, so lane numbering is not a concern. MSAs define transmit and receive sides, in a way compatible with the "installed" cabling, as commenter shows. If the present dominant connectors remain dominant in future, no further specification in the standard would be necessary. If new, better, perhaps higher lane count, connectors appear in future, further specification in the standard would be obstructive. The commenter's presentation will remain in the public record.

Comment Type: T
Comment Status: D

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'.

Proposed Response: Response Status W

PROPOSED ACCEPT IN PRINCIPLE.
Make consistent with 278 and other comments.

Comment Type: T
Comment Status: D

At line 37, Table 86-18 is referenced. However, I think the specifications of multimode fibers is written in Table 86-19.

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

Proposed Response: Response Status W

PROPOSED REJECT.
I think it's correct but will check.

Comment Type: T
Comment Status: D

Table 86-7
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

Proposed Response: Response Status W

PROPOSED ACCEPT IN PRINCIPLE.
We don't specify Vsupply. Note AC coupling. This is the extreme of the waveform per Figure 83A-3. For discussion.
As far as I can see, all the specifications in Table 86-6 will be appropriate and applicable to the electrical transmit signal.

Suggested Remedy
Delete 'appropriate', twice. Also in 86.6.5.

Proposed Response
Response Status: W
PROPOSED ACCEPT.

Excessive cross-referencing. We have already told the reader at line 40 that test points are defined in 86.7.1.

Suggested Remedy
Delete the second `(see 86.7.1)`

Proposed Response
Response Status: W
PROPOSED ACCEPT.

D1.0 jitter specifications in those tables were specified in terms of conventional TJ and DJ. However, in the D1.1 editor's notes, it is recorded that proposals were made to replace DJ with the so-called 99% jitter. 99% jitter is nothing but a TJ at higher probability (approx. 10^-4) that has a mixture of both DJ and RJ. In the case when the DJ pk-to-pk occurs at a smaller probability (e.g., 10^-8), 99% jitter will not be able to bound the DJ, and much larger DJ exists in the link can break the link.

Suggested Remedy
Keep the deterministic jitter since it has been used and worked well for many other standards (FC, GBE (e.g., 802.3ae, 802.3ap), PCI Express, CEI/OIF, SATA, etc.).

Proposed Response
Response Status: W
PROPOSED REJECT.

The system effects of jitter and better represented by the jitter probabilities at 1% jitter and 1e^-9. A good value for DDPWS is 0.07

Suggested Remedy
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
Replace the TBD for DDPWS with 0.07
Remove the editors footnotes.

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

Proposed Response
Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.
<table>
<thead>
<tr>
<th>C/ 86</th>
<th>SC 86.6.1</th>
<th>P 256</th>
<th>L 15</th>
<th>D556</th>
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<tbody>
<tr>
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<td>Avago Technologies</td>
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<td><strong>Comment Type</strong></td>
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<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td><strong>D</strong></td>
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<tr>
<td>Filling the TBDs and other improvements.</td>
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<td><strong>SuggestedRemedy</strong></td>
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<tr>
<td>Accept the changes proposed in anslow_04_0109 with exceptions as resolved.</td>
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<tr>
<td><strong>Proposed Response</strong></td>
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<td><strong>Response Status</strong></td>
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</tr>
<tr>
<td><strong>W</strong></td>
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<td>Broadcom</td>
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<td><strong>TR</strong></td>
<td><strong>D</strong></td>
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<tr>
<td>DDPWS and DJ are TBD, based on the value of DJ then TJ need to be adjusted</td>
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<tr>
<td><strong>SuggestedRemedy</strong></td>
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</tr>
<tr>
<td>TJ(J9)=0.26 UI, J2=0.18 UI, DDPWS=0.07 UI please see anslow_04_0109</td>
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<th>P 256</th>
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<td>Dawe, Piers</td>
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<td><strong>TR</strong></td>
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<tr>
<td>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.</td>
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<tr>
<td><strong>SuggestedRemedy</strong></td>
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<tr>
<td>Reduce X2. Apply a relative mask with the same X1, X2, and Y1, Y2 of 0.25, 0.25.</td>
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<td><strong>Proposed Response</strong></td>
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<td>Note dawe_0x_0109.</td>
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<td><strong>T</strong></td>
<td><strong>D</strong></td>
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<tr>
<td>Some of the specifications (return losses) in table 86-7 apply at TP1 while others apply at TP1a.</td>
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<td><strong>SuggestedRemedy</strong></td>
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<tr>
<td>In the table title change &quot;TP1a&quot; to &quot;TP1 and TP1a&quot;, 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.</td>
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<tr>
<td><strong>Proposed Response</strong></td>
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<td>As decided for comment 78. [Editor’s note: comment was entered against 226]</td>
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<tr>
<td>Referring to Fig. 86-3, TP1a could be critical interface between module to host board. Taking into account of existing SFP+ implementation, pre-emphasis would be likely necessary for system robustness.</td>
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<tr>
<td><strong>SuggestedRemedy</strong></td>
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<tr>
<td>Suggest to add a row into Table 86-6 for transmit pre-emphasis with optional pre-emphasis as 6dB (or TBD), plan to present one slide.</td>
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<tr>
<td>PROPOSED REJECT.</td>
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<tr>
<td>We specify at the connector (actually, at the compliance board’s output) not at the IC. Because there is only &lt;3.5 dB PCB loss expected on the host side, and less on the module side, an additional spec is not needed.</td>
<td></td>
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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
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<tr>
<td>78</td>
<td>86</td>
<td>TR</td>
<td>D</td>
<td>DDPWS and DJ are TBD, based on the value of DJ then TJ need to be adjusted</td>
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<td>TJ(J9)=0.26 UI, J2=0.18 UI, DDPWS=0.07 UI please see anslow_04_0109</td>
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<td>79</td>
<td>86</td>
<td>TR</td>
<td>D</td>
<td>It would be better to separate the equation into two</td>
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<td>SDD11=-12 + 2<em>SQRT(f) from 0.01 to 4.1 GHz SDD11=-6.3 +13</em>log10(f/5.5) from 4.1 to 11.1 GHz</td>
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<tr>
<td>557</td>
<td>86</td>
<td>T</td>
<td>D</td>
<td>Illustrate the reflection specs.</td>
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<td></td>
<td></td>
<td>Show the reflection specs in a figure, delete [To do: illustrate these specs]</td>
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<tr>
<td>80</td>
<td>86</td>
<td>TR</td>
<td>D</td>
<td>SCC22 at TP1a and TP4 is little too tight with some of the connectors</td>
<td></td>
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<td>SCC22=-7.51 + 1.11* f from 0.01 to 4.1 GHz and -3 from 4.1 to 11.1 GHz</td>
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<tr>
<td>558</td>
<td>86</td>
<td>T</td>
<td>D</td>
<td>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.</td>
<td></td>
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<td></td>
<td>Delete the RIN12OMA row in Table 86-9. Here, add &quot;The transmitter's RIN12OMA should not exceed -128 dB/Hz.&quot;</td>
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**Notes:**
- **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 92 of 131*
**Comment Type** TR  **Comment Status** D

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.

**Suggested Remedy**

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

**Proposed Response**  
PROPOSED REJECT.  
Editor believes that the modal noise model is just as valid with discrete lines as it is with a Gaussian.

---

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

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

**Suggested Remedy**

Accept the changes in anslow_04_0109 for table 86-6.

**Proposed Response**  
PROPOSED ACCEPT IN PRINCIPLE.

---

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

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.'

**Proposed Response**  
PROPOSED ACCEPT.

Note other comments 420, 426 and 558 tagged "RIN". Just delete the row.
Comment Type | TR | Comment Status | D | RIN
--- | --- | --- | --- | ---
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.

Proposed Response | Response Status | W
--- | --- | ---
PROPOSED ACCEPT IN PRINCIPLE.
Note other comments 558, 420 and 608 tagged "RIN". Follow response to 608.

Comment Type | TR | Comment Status | D | 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 SRn. 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.

Proposed Response | Response Status | W
--- | --- | ---
PROPOSED ACCEPT IN PRINCIPLE.
A presentation, petrilla_01_0109, will be provided in support.

Comment Type | TR | Comment Status | D | RIN
--- | --- | --- | --- | ---
To be clear, we should give the eye mask hit ratio spec in the table as we do for the other eye masks. Also this is preparation towards a common definition of eye mask.

Suggested Remedy
Insert row in table under Transmitter eye mask definition, (indented) Eye hit ratio 5 x 10^-5 hits per sample.
In 86.7.5.7.1, change
The transmitter shall achieve a hit ratio lower than 5 × 10-5 hits per sample, where "hits" are... to
The transmitter shall achieve a hit ratio lower than the limit of hits per sample specified in the appropriate table e.g. Table 86-8 or 5 × 10-5 hits per sample if not otherwise specified. "Hits" are...
Revise PICS SOM8 to match.
Consider making similar changes in tables 87-7, 88-7 and 88-11 and clauses 86.7.3.2.1, 86.7.5.7, 86.7.5.7.1, 87.8.9 and 88.9.8.

Proposed Response | Response Status | W
--- | --- | ---
PROPOSED ACCEPT IN PRINCIPLE.

Comment Type | TR | Comment Status | D | RIN
--- | --- | --- | --- | ---
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.)

Proposed Response | Response Status | W
--- | --- | ---
PROPOSED ACCEPT IN PRINCIPLE. Page number was 257-9
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.

**Proposed Response**

PROPOSED ACCEPT.

---

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

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.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

---

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

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.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

See response to comment 610.

---

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

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, 3.5) (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:

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.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

See response to 579. Note comment 333 proposes an alternative remedy.

---

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

PROPOSED ACCEPT IN PRINCIPLE.
Comment Type: T  Comment Status: D

Needless repetition; the 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.
And similarly in Clauses 87 and 88.

PROPOSED ACCEPT.

Comment Type: T  Comment Status: D

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

PROPOSED ACCEPT IN PRINCIPLE.

Comment Type: T  Comment Status: D

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.

Suggested Remedy

In Tables 86-11 and 86-12
Change X1 value to 0.29 and add "Hit Ratio = 5x10^-5 to the conditions for both tables.

Note that these are proposed changes in Anslow_04

PROPOSED ACCEPT IN PRINCIPLE.
While this may not be the optimum hit ratio, it's a reasonable choice.

Comment Type: T  Comment Status: D

Is this the best choice for AC blocking?

Suggested Remedy

Consider having the AC coupling in the host receiver rather than the PMD receive side.
If not, Table 86-11 should say 'Single ended output voltage tolerance' and Table 86-12 should say 'Single ended output voltage'.

PROPOSED ACCEPT IN PRINCIPLE.
Discuss.
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.

**Proposed Remedy**
Propose to use J9=0.63 and J2=0.46 UI per anslow_04_0109

**PROPOSED ACCEPT IN PRINCIPLE.**

---

In table 86-11, jitter parameters, TP4 TJ and DJ, are noted for further study.

**Proposed Remedy**
Accept the changes in anslow_04_0109 for table 86-6, for table 86-11 jitter parameters.

**PROPOSED ACCEPT IN PRINCIPLE.**

---

From a system standpoint J9 and J2 are better specification parameters than Dj and Tj. Also some relaxation in the requirements for the electrical receiver appears to be a better compromise.

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

**PROPOSED ACCEPT IN PRINCIPLE.**

---

It would be better to separate the equation in to two

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

**PROPOSED ACCEPT IN PRINCIPLE.**

Equation is a duplicate: see response to 79 and 560.
## Draft 1.1 Comments

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<th>SC</th>
<th>Page</th>
<th>L</th>
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<td>261</td>
<td>8</td>
<td>458</td>
<td>E</td>
<td>Comment Status D</td>
<td>two &quot;where&quot;s</td>
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<td>86.6.6</td>
<td>261</td>
<td>10</td>
<td>433</td>
<td>TR</td>
<td>Comment Status D</td>
<td>lines 10-37</td>
<td>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 <a href="http://ieee802.org/3/ae/public/index.html">http://ieee802.org/3/ae/public/index.html</a> (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.</td>
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<td>86</td>
<td>86.6.6</td>
<td>261</td>
<td>22</td>
<td>459</td>
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<td>Comment Status D</td>
<td>The link budget is with the largest TDP</td>
<td>Add &quot;for max TDP&quot; to the Power budget and allocation for penalties rows.</td>
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<tr>
<td>86</td>
<td>86.6.6</td>
<td>261</td>
<td>22</td>
<td>561</td>
<td>T</td>
<td>Comment Status D</td>
<td>Power budget may change as a consequence of other changes.</td>
<td>Revise entries in power budget table 86-13 following other changes.</td>
</tr>
</tbody>
</table>
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

PROPOSED ACCEPT.

In Figure 86-3 SP5 is shown as the same as TP4. However, in Figures 80-2 and 80-3 SP5 is shown as the input to the PMA and therefore includes all skew due to the interconnect between the PMD and the PMA.

Suggested Remedy

Move SP5 to be at TP5 in the figure.

PROPOSED REJECT.

In the PPI and (I hope) nAUI with connector, the PMA extends to the connector from one side and the PMD extends to the connector from the other side. This clause and others say "If the PMD service interface is physically instantiated so that the skew at SP5 can be measured, ...". The only suitable measurement point is as shown.

Suggested Remedy

Add SDD11/SDD22, SDD21/SDD12, SCC11/SCC22, SCD21/SCD12, and NEXT/FEXT for the mated HCB-MCB boards. In addition MCB and HCB PCB loss less the connector need to be defined. For detail description see ghiasi_02_0109

PROPOSED ACCEPT IN PRINCIPLE.

This says "NOTE-The longer test patterns are designed to emulate system operation; however, they do not do form valid 10GBASE-R, 40GBASE-R4 or 100GBASE-R10 frames."

This is a correction 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."

Pattern 4 (PRBS9) is not like system operation. The term "frame" is helpful for those used to Gigabit Ethernet. Could delete the note altogether.

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."

It's a multiway module connector, unlike in 87 and 88.
Table 86-15 lists pattern types that are appropriate for 10GBASE-R PHYs rather than 40/100GBASE-SR and is in a different format from Tables 87-10 and 88-14. Patterns 1 and 2 could never be seen in 40/100GBASE-SR and could only be generated by test gear. In this case there is a huge variety of test patterns that could be used. Why not add SONET/SDH or CEI test patterns? Also, it is poor practice to define the test pattern in two places. This is done in 83.5.9 with a reference to 49.2.8 for PRBS31, it should not be done again here. Why are there two square patterns?

**Suggested Remedy**

Replace Table 86-15 with the same table as 87-10

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

To be discussed by the Task Force. See slide 10 of anslow_05_0109.pdf.

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**

Turn the row for Pattern 1 from italic to upright. Move or remove the footnote depending on decision for Pattern 2.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

To be discussed by the Task Force. See slide 10 of anslow_05_0109.pdf.

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

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.

**Suggested Remedy**

Turn the row for Pattern 2 from italic to upright. Remove footnote a.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

To be discussed by the Task Force. See slide 10 of anslow_05_0109.pdf.

See also comments 562, 563, 564, 205, 463, 460, 634, 462, 565, 332.

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

Adopt PRBS9.

**Suggested Remedy**

Change 'Short TBD' to 'PRBS9', change '[PRBS9 (if chosen) is defined in 68.6.1]' to '68.6.1' (upright text).

**Proposed Response**

PROPOSED ACCEPT.

To be discussed by the Task Force. See slide 10 of anslow_05_0109.pdf.

See response to comment 505.

See also comments 562, 473, 563, 564, 205, 463, 460, 634, 462, 565, 332.
Table 86-15 pattern 4
Since the DDPWS measurement is specified to use PRBS9, make this the short TBD

SuggestedRemedy
Change "Short TBD" to "PRBS9"

Proposed Response
Response Status W
PROPOSED ACCEPT.
To be discussed by the Task Force. See slide 10 of anslow_05_0109.pdf.
See response to comment 505.
See also comments 562, 473, 564, 463, 460, 634, 462, 565, 332.

We should use the PRBS9 pattern as the short pattern

SuggestedRemedy
replace "short TBD" with PRBS9. Pattern defined in 68.6.1

Proposed Response
Response Status W
PROPOSED ACCEPT.
To be discussed by the Task Force. See slide 10 of anslow_05_0109.pdf.
See response to comment 505.
See also comments 562, 473, 564, 205, 460, 634, 462, 565, 332.

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.

SuggestedRemedy
Either delete pattern no 5 or add PCS between Gb/s and pseudo

Proposed Response
Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Perhaps we should have been clearer that we meant what comes out of (one lane of) the PMA stack if the PCS puts its test pattern into it.
To be discussed by the Task Force. See slide 10 of anslow_05_0109.pdf.
See response to comments 199, 603, 505.
See also comments 562, 473, 563, 205, 463, 634, 462, 565, 332.

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...

SuggestedRemedy
Delete the row 'Square'.

Proposed Response
Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
To be discussed by the Task Force. See slide 10 of anslow_05_0109.pdf.
See response to comment 505.
See also comments 562, 473, 564, 205, 463, 460, 634, 462, 332.

Many potential test patterns are listed. Suggest that square wave patterns are not necessary especially if short (PRBS9) patterns is included

SuggestedRemedy
remove square wave patterns from test pattern list (also change transmitter OMA test pattern to PRBS9)

Proposed Response
Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
To be discussed by the Task Force. See slide 10 of anslow_05_0109.pdf.
See response to comment 505.
See also comments 562, 473, 564, 205, 463, 460, 462, 565, 332.

Dawe, Piers Avago Technologies

Dudek, Mike JDSU

Latchman, Ryan Gennum Corp

Dawe, Piers Avago Technologies

Dudek, Mike JDSU

Latchman, Ryan Gennum Corp

Dawe, Piers Avago Technologies

Dudek, Mike JDSU

Latchman, Ryan Gennum Corp

Dawe, Piers Avago Technologies

Dudek, Mike JDSU

Latchman, Ryan Gennum Corp
IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments

Comment Type: T
Comment Status: D
Pattern: 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.

Proposed Response: PROPOSED ACCEPT.

Response Status: W

Note other comments 558, 426 and 608 tagged "RIN".
Follow response to 608.
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 "Calibration of OMA for receiver tests" to "Square"
- 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

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

To be discussed by the Task Force. See slide 11 of anslow_05_0109.pdf

See response to comment 566.

See also comments 437, 464, 635.

---

About 9.20, 31 in table 86-16

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).

Suggested Remedy

Add "or 4" after Square on lines 9, 20, 31 in Table 86-16

Add "or 68.6.2" to the Related Subclause column on lines 9, 20

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

To be discussed by the Task Force. See slide 11 of anslow_06_0109.pdf

See response to comment 566.

See also comments 206, 464, 635.

---

Table 86-16 contains a parameter, Aggregate TP2 metric. Anslow_04_0109 proposes TDP and OMA-TDP as aggregate metrics.

Suggested Remedy

If the TDP or OMA-TDP proposal in anslow_04_0109, is accepted, replace the term, 'aggregate TP2 metric' with TDP and/or OMA-TDP.

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

---

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).

Suggested Remedy

Add "or 4" after Square on lines 9, 20, 31 in Table 86-16

Add "or 68.6.2" to the Related Subclause column on lines 9, 20

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.

To be discussed by the Task Force. See slide 11 of anslow_06_0109.pdf

See response to comment 566.

See also comments 206, 464, 635.
Comment Type: TR
Comment Status: D

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.

Suggested Remedy
Accept the relevant change proposed in anslow_04_0109.pdf, 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.

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

Comment Type: TR
Comment Status: D

From the experience of LRM and SFP+, PRBS9 should be the short pattern

Suggested Remedy
PRBS9 in Table 86-15.

Same in Table 87-10.

Proposed Response: PROPOSED ACCEPT.

Comment Type: TR
Comment Status: D

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.

Suggested Remedy
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.

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

Timing uncertainty is made more consistent by removing ambiguity about clock recovery unit (comment 568). Insert in 86.7.4.5 before the last sentence "The reference measuring instrument has a bandwidth of 12 GHz and noise of ?? mV RMS for a 10.3125 GBD signal. Implementors should consider whether a correction is needed for actual instrument properties." No need for similar in 87, 88 because they don't specify electrical eyes. Insert in 86.7.5.7 before the last sentence "For 40GBASE-SR4 and 100GBASE-SR10, the reference measuring instrument has noise of ?? mW RMS of light. Implementors should consider whether a correction is needed for actual instrument properties." Add similar sentences in 87.8.9 and 88.9.8.
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 shortcuts 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**

Change

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.

**Proposed Response**

PROPOSED ACCEPT.

---

**Comment:**

Center the Eq.86-4.

**Proposed Response**

PROPOSED ACCEPT IN PRINCIPLE.

Find out what the house style is and follow it.

---

**Comment:**

Equation 86-6 uses a mixture of "x" and "." for multiply

**Suggested Remedy**

To be consistent with other equations in clause 86 change to "x"
Comment Type: E  SuggestedRemedy: spelling error - "w/ve"
Proposed Response: replace with "wave"

Comment Type: E  SuggestedRemedy: typo: square w/ve
Proposed Response: square wave

Comment Type: T  SuggestedRemedy: "In this case the 1% level and..."
Proposed Response: "In this case the 0% level and..." (the ZeroLevel is 0%)
### Draft 1.1 Comments

<table>
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<th>SC</th>
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<td>266</td>
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<td>T</td>
<td>D</td>
<td>J2 and J8 have optical application.</td>
<td>Define J2 and J9 at 86.7.3.3.</td>
<td>PROPOSED ACCEPT.</td>
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<td>86</td>
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<td>266</td>
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<td>T</td>
<td>D</td>
<td>Jitter methodology should use J2 and J9 and define these test methodologies.</td>
<td>Replace 86.7.4.4 with appropriate text from Anslow-04.</td>
<td>PROPOSED ACCEPT.</td>
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<td>267</td>
<td>11</td>
<td>T</td>
<td>D</td>
<td>Depending on the outcome of another comment, there may be both absolute and relative electrical masks.</td>
<td>Revise 86.7.4.5 as appropriate.</td>
<td>PROPOSED ACCEPT.</td>
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**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
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<th>P 267</th>
<th>L 39</th>
<th># 467</th>
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<td>JDSU</td>
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<td>Comment Status</td>
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<td>TDP should be used for the Aggregate TP2 signal</td>
<td>SuggestedRemedy</td>
<td>Replace section 86.7.5.4 with TDP as proposed in Anslow_04</td>
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<th>L 1</th>
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<td>Pettrilla, John</td>
<td>Avago Technologies</td>
<td>Comment Type</td>
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<td>TDP &amp; OMA-TDP have been proposed in anslow_04_0109 as aggregate signal parameters. Unfortunately there seems to be a minor error in calculation of the bandwidth of the reference receiver/filter combination.</td>
<td>SuggestedRemedy</td>
<td>Accept the changes to 86.7.5.4 in anslow_04_0109, except in item e, change 6.0 to 6.2.</td>
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| Having to provide lane-by-lane square wave generators would be a nuisance, especially as RIN12OMA should be just informative. | SuggestedRemedy | 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. |
| Proposed Response | Response Status | W |
| PROPOSED ACCEPT IN PRINCIPLE. Note other comments marked "RIN". Delete. |

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<td>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.</td>
<td>SuggestedRemedy</td>
<td>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.</td>
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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

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<td>change &quot;, such as TBD signal, are likely&quot; to &quot;such as a 223-1 PRBS, are likely&quot; where 223 is 2 raised to the power 23</td>
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<td>268</td>
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<td>With TDP, TDP-OMA and the eye mask in the draft we have adequate TP2 specs, although with more study, the mask could be better optimised.</td>
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<td>We do not need an additional TBD test signal.</td>
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<td>delete &quot;or with other patterns, such as TBD signal&quot;</td>
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<td>Are the 0 and 1 amplitudes or levels? Gratuitous capitals; Clause 45 doesn't use capitals.</td>
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<td>PROPOSED ACCEPT.</td>
<td></td>
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**Type:** TR/Technical required  
**Comment Status:** D/dispatched A/accepted R/rejected  
**Response Status:** O/open W/written  
**SORT ORDER:** Clause, Subclause, page, line
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<th>Cl 86 SC 86.7.5.7.1</th>
<th>P 269 L 17</th>
<th># 530</th>
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<td>Dawe, Piers</td>
<td>Avago Technologies</td>
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</tr>
<tr>
<td>Comment Type</td>
<td>E</td>
<td>Comment Status</td>
</tr>
<tr>
<td>The distance between -Y3 and 0 should be the same as between 1 and 1+Y3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggested Remedy</td>
<td>Move the -Y3 section lower down.</td>
<td></td>
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<tr>
<td>Proposed Response</td>
<td>W</td>
<td>PROPOSED ACCEPT.</td>
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<th>Cl 86 SC 86.7.5.8</th>
<th>P 269 L 24</th>
<th># 531</th>
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<tr>
<td>Comment Type</td>
<td>E</td>
<td>Comment Status</td>
</tr>
<tr>
<td>There are no optical transmit jitter specs in this clause, although J2 and J9 are used for stressed receiver signal calibration.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggested Remedy</td>
<td>Delete 86.7.5.8 Transmit jitter... and its Editor's note.</td>
<td></td>
</tr>
<tr>
<td>Proposed Response</td>
<td>W</td>
<td>PROPOSED ACCEPT.</td>
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<th>Cl 86 SC 86.7.5.9</th>
<th>P 269 L 31</th>
<th># 578</th>
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<tr>
<td>Dawe, Piers</td>
<td>Avago Technologies</td>
<td></td>
</tr>
<tr>
<td>Comment Type</td>
<td>T</td>
<td>Comment Status</td>
</tr>
<tr>
<td>Differences between this stressed receiver sensitivity procedure and 52.9.9 include:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sinusoidal amplitude interferer is replaced by a Gaussian noise generator.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The signal has the VECP, J2 and J9 given in Table 86-10.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggested Remedy</td>
<td>Revise text per list.</td>
<td></td>
</tr>
<tr>
<td>Proposed Response</td>
<td>W</td>
<td>PROPOSED ACCEPT IN PRINCIPLE.</td>
</tr>
</tbody>
</table>

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.

PROPOSED ACCEPT IN PRINCIPLE.
For the stressed receiver sensitivity, if any high frequency SJ is used, use just one SJ frequency, 80 MHz.
Delete the second Table 86-17 (on page 269). Add rows to Table 86-10:
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 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
d) The transmitter is transmitting one of these signals using all lanes, and
e) The transmitter and the receiver are not synchronous.

NOTE-Use of patterns ??? on the lane under test is expected to give similar results.
There are two tables numbered 86-17.

- **Change Autonumber format of second instance from "H:Table <n>=< >< >< >< ><  
  ><m>" to "H:Table <n>=< >< >< >< >< ><n+>m"**

  **PROPOSED ACCEPT IN PRINCIPLE.**

  Another comment may delete the second one. If not, will do.

---

Same argument to reuse 802.3ae 10GBASE-SR Stress RX sensitivity test for TP3 specs.

**To address two TBDs in Table 86-17 by referring 802.3ae 52.8.1.**

**same for Table 87-13.**

**PROPOSED ACCEPT IN PRINCIPLE.**

Another pair of comments propose a separate low frequency SJ spec, like LRM.

---

**PRBS31 is a good pattern for stressed sensitivity.**

**replace TBD with PRBS31.**

**PROPOSED ACCEPT IN PRINCIPLE.**

So is Pattern 5.

---

**Patterns for transmit side for stressed sensitivity.**

**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.**

- **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.**

**PROPOSED ACCEPT IN PRINCIPLE.**

Note many other comments on patterns. But is the dephasing requirement more important on the receive side? Make clear which side (or both) this applies to.
Comment Type: TR  Comment Status: D

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.

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.

[Dudek, Mike JDSU]

Comment Type: T  Comment Status: D

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 0.586, with a gitlch 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:
20xlog10(|SDD21|) <= 0.3 -0.3xf 10^9 <= f <= 9.333x10^9
20xlog10(|SDD21|) <= -2.5 9.333x10^9 <= f <= 11.1x10^9
20xlog10(|SDD21|) >= -0.3 10^6 <= f <= 135x10^6
20xlog10(|SDD21|) >= -0.061 -0.48xsqrt(f) -0.456xf 135x10^6 <= f <= 7x10^9
20xlog10(|SDD21|) >= 11.36 -2.272xf 7x10^9 <= f <= 8x10^9
20xlog10(|SDD21|) >= -0.8x10^9 <= f <= 11.1x10^9

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)’.

Proposed Response  Response Status: W
PROPOSED ACCEPT IN PRINCIPLE.

[Dawe, Piers Avago Technologies]
IEEE P802.3ba D1.1 40Gb/s and 100Gb/s Ethernet comments

Cl 87 SC 87.12.4.5 P 304 L 33 # 217
Anslow, Peter Nortel Networks

Comment Type E  Comment Status D
Value/comment says "Conforms to IEC 60950:1"
SuggestedRemedy
Change to "Conforms to IEC 60950-1"
Proposed Response Response Status W
PROPOSED ACCEPT.

Cl 87 SC 87.2 P 281 L 3742 # 334
CHANG, Frank Vitesse

Comment Type TR  Comment Status D
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??
Proposed Response Response Status W
PROPOSED REJECT.
We don't define implementations.
No specific remedy to clause 87 suggested.

[Editors note: Proposals for discussion within the task force welcomed.]

Cl 87 SC 87.3.1 P 284 L 7 # 218
Anslow, Peter Nortel Networks

Comment Type T  Comment Status D
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
Proposed Response Response Status W
PROPOSED ACCEPT.
This says "The PMD block diagram is shown in Figure 87-1." this should be Figure 87-2

Proposed Remedy
Correct cross reference to be Figure 87-2

PROPOSED ACCEPT.

Cole, Chris
Finisar

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.

Proposed Remedy
Add a new Table 87-7 40GBASE-LR4 Transmit Characteristics table entry:

Optical Modulation Amplitude (OMA), each lane (max) 3.5dBm

PROPOSED ACCEPT IN PRINCIPLE.

Optical Modulation Amplitude (OMA), each lane 3.5dBm.

Task force to decide between max OMA or max peak power spec.

[Editor's note: Changed clause number and page: This comment refers to Clause 87.7.1 and page number 290]

Proposed Remedy
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

PROPOSED ACCEPT IN PRINCIPLE.

task force to decide between max OMA or max peak power spec
Comment Type T Comment Status D
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.

SuggestedRemedy
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.

Proposed Response Response Status W
PROPOSED ACCEPT.

Comment Type T Comment Status D
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.

SuggestedRemedy
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.

Proposed Response Response Status W
PROPOSED ACCEPT.

Comment Type E Comment Status D
"Transmitter and dispersion penalty, each lane(min)" is a variation in wording from elsewhere, leading to possible confusion.

SuggestedRemedy
replace with:
"Transmitter and dispersion penalty (TDP), each lane(min)"
[‘(TDP)’ inserted]

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
replace with:
"Transmitter and dispersion penalty (TDP), each lane (min)"

[Editor's note: Changed to subclause 87.7.1 from Table 87-7]
With the specification of OMA minus TDP there is little downside to allowing a larger value of TDP. 10Gbase-LR allowed 3.2dB and didn't have potential crosstalk issues, however such a large value is unlikely to be needed with present technology. The only consequent change would be to increase the stressed sensitivity and vertical eye closure penalty for testing the Rx.

Suggested Remedy
In table 87-7 Change TDP max to 2.8dB
In table 87-8 change stressed sensitivity to max to -9.4 and increase the vertical eye closure penalty to 2.1 dB.

PROPOSED REJECT.
Allowing a larger than necessary TDP stresses other consequent specifications. Justification for increased TDP invited.
Table 87-8 40GBASE-LR4 Receive Characteristics specifies:

Average receive power, per lane (max) 2.3dBm

However, there is no practical limit specified to limit Receiver TIA overload requirements.

Suggested Remedy

Add a new Table 87-8 40GBASE-LR4 Receive Characteristics entry:

Receive Power per lane(OMA)(max) 3.5dBm

PROPOSED ACCEPT.

[Editor's note: Changed the clause number to Clause 87]

Stressed eye jitter, each lane is TBD.

Since each lane of 40GBASE-LR4 is similar to 10GBASE-LR, use the value from Table 52-13 of 0.3 UI pk-pk

Suggested Remedy

set the Stressed eye jitter, each lane to 0.3 UI pk-pk

PROPOSED ACCEPT.

This link budget is for one particular value of TDP. It would be good to note this.

Suggested Remedy

Add a footnote to the Power budget and allocation for penalties rows.

Footnote to say "This example power budget is with a TDP of 2.3dB.

PROPOSED ACCEPT IN PRINCIPLE.

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"

PROPOSED ACCEPT.

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
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<th>Suggested Remedy</th>
<th>Proposed Response</th>
<th>Response Status</th>
<th>Comment Status</th>
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</thead>
<tbody>
<tr>
<td>87</td>
<td>87.8.1</td>
<td>T</td>
<td>D</td>
<td>The TBD should be removed</td>
<td>The TBD should be removed</td>
<td>W</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>D</td>
<td>replace TBD with PRBS9 and do this elsewhere for the short test pattern such as commented for page 193</td>
<td>replace TBD with PRBS9 and do this elsewhere for the short test pattern such as commented for page 193</td>
<td>W</td>
<td>D</td>
</tr>
<tr>
<td>87</td>
<td>87.8.1</td>
<td>T</td>
<td>D</td>
<td>The square wave isn't really designed to emulate system operation and pattern 5 is a valid 40GBASE-R signal.</td>
<td>The square wave isn't really designed to emulate system operation and pattern 5 is a valid 40GBASE-R signal.</td>
<td>W</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
<td>D</td>
<td>Delete the double period at the end of the NOTE- below Table 87-10.</td>
<td>Delete the double period at the end of the NOTE- below Table 87-10.</td>
<td>W</td>
<td>D</td>
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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
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<th>Comment Status</th>
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<th>SuggestedRemedy</th>
<th>Proposed Response</th>
<th>Response Status</th>
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<tr>
<td>87</td>
<td>87</td>
<td>293</td>
<td>6</td>
<td>475</td>
<td>T</td>
<td>D</td>
<td>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.</td>
<td>Make this change</td>
<td>PROPOSED REJECT. No specific remedy to document suggested. Proposals and contributions welcome.</td>
<td></td>
</tr>
<tr>
<td>87</td>
<td>87</td>
<td>296</td>
<td>1</td>
<td>487</td>
<td>T</td>
<td>D</td>
<td>Clause 87.8.10 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 40GBASE-LR4 is very similar to this so remove this clause</td>
<td>Remove clause 87.8.10 entirely.</td>
<td>PROPOSED ACCEPT. see also comments 487 226</td>
<td></td>
</tr>
<tr>
<td>87</td>
<td>87</td>
<td>296</td>
<td>18</td>
<td>114</td>
<td>T</td>
<td>D</td>
<td>Table 87-13 for the applied sinusoidal jitter is TBD. Since each lane of 40GBASE-LR4 is similar to 10GBASE-LR, use the values from Table 52-19</td>
<td>Remove Table 87-13 and refer to Table 52-19 instead.</td>
<td>PROPOSED ACCEPT.</td>
<td></td>
</tr>
</tbody>
</table>
Cl 87 SC 87.8.12 P 296 L 34 # 478
Dudek, Mike JDSU
Comment Type T Comment Status D
PRBS31 is a suitable pattern for the lanes not under test
SuggestedRemedy
Replace TBD with PRBS31.
Proposed Response Response Status W PROPOSED ACCEPT.

Cl 87 SC 87.8.12 P 296 L 34 # 228
Anslow, Peter Nortel Networks
Comment Type T Comment Status D
Remove TBD
SuggestedRemedy
change "TBD, or valid" to "Test patterns 3 or 5, or valid"
Proposed Response Response Status W PROPOSED ACCEPT.

Cl 87 SC 87.8.2 P 292 L 51 # 503
Anslow, Peter Nortel Networks
Comment Type T Comment Status D
Clause 87.8.2 Total Skew and Dynamic Skew consists of only an editor's note.
SuggestedRemedy
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 the acquiring the data on each lane using a clock and data recovery unit with a 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."
Proposed Response Response Status W PROPOSED ACCEPT.

Cl 87 SC 87.8.5 P 293 L 44 # 441
king, jonathan finisar
Comment Type T Comment Status D
OMA measurement is defined in 52, for a square wave. Definition of a test method using PRBS9 is needed.
SuggestedRemedy
After "is as defined in 52.9.5" insert "or 68.6.2"
Proposed Response Response Status W PROPOSED ACCEPT.

Cl 87 SC 87.8.5 P 293 L 45 # 110
Bergmann, Ernie Circadian/JDSU
Comment Type T Comment Status D
The OMA measurement has become less variable than what is given in 52.9.5 with the LRM and SFP+ work.
SuggestedRemedy
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]
Proposed Response Response Status W PROPOSED REJECT.
Measurement uncertainty is not within scope of project.

Cl 87 SC 87.8.6 P 294 L 3 # 476
Dudek, Mike JDSU
Comment Type TR Comment Status D
Crosstalk within the PMD Tx needs to be part of this test.
SuggestedRemedy
Add. The lanes not under test shall be operating with PRBS31 or valid 64/66B data.
Proposed Response Response Status W PROPOSED ACCEPT IN PRINCIPLE.
Add. The lanes not under test shall be operating with PRBS31 or valid 40GBASE-LR4 data.
Cl 87  SC 87.8.6.1  P 294  L 10  # 224
Anslow, Peter  Nortel Networks

Comment Type  T  Comment Status  D
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"

Proposed Response  Response Status  W
PROPOSED ACCEPT IN PRINCIPLE.
25 or 30ps
-135 or -136dB/Hz

see also comment 224 477

Cl 87  SC 87.8.6.1  P 294  L 10  # 477
Dudek, Mike  JDSU

Comment Type  T  Comment Status  D
There are TBD's for the reference Tx rise/fall time and RIN. The exact values are not critical as their effect is to be calibrated out of the measurement, however they are specified so that the correction factor is not large (as it's calculation may not be that accurate)

Suggested Remedy
use 25ps for the rise/fall times and 135dB/Hz for RIN.

Proposed Response  Response Status  W
PROPOSED ACCEPT IN PRINCIPLE.

see also comment 224 477

Cl 87  SC 87.8.6.1  P 294  L 12  # 111
Bergmann, Ernie  Circadiant/JDSU

Comment Type  T  Comment Status  D
reference to 52.9.9.3 is not in accord with 52.9.10.2

Suggested Remedy
change reference to 52.9.9.2 [to align with 52.9.10.2]

Proposed Response  Response Status  W
PROPOSED ACCEPT.
also applies to clause 88

Cl 87  SC 87.8.9  P 295  L 10  # 112
Bergmann, Ernie  Circadiant/JDSU

Comment Type  T  Comment Status  D
The paragraph appears to be lifted from 52.9.10.3 but the reference to 52.9.7 was replaced by the reference to 87.8.9

Suggested Remedy
revert reference back to 52.9.7 [detailed description of BT characteristic]

Proposed Response  Response Status  W
PROPOSED REJECT.
ref to 87.8.9 refers to a slightly different eye mask test method than described in 52.9.7

Cl 87  SC 87.8.9  P 295  L 40  # 113
Bergmann, Ernie  Circadiant/JDSU

Comment Type  T  Comment Status  D
Table 87-11 does not contain mask parameters

Suggested Remedy
replace: "and 87-11 are" with "is"

Proposed Response  Response Status  W
PROPOSED REJECT.
Table 87-11 contains details pertinent to transmitter optical waveform measurement - the pattern to be used.

Cl 87  SC 87.8.9  P 295  L 49  # 225
Anslow, Peter  Nortel Networks

Comment Type  T  Comment Status  D
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

Proposed Response  Response Status  W
PROPOSED ACCEPT.
### Comment on Table 88-7: 100GBASE-LR4 Transmit Characteristics

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

The values in Table 88-7 for 100GBASE-LR4 Transmit Characteristics specify no limit on Difference in launch power between any two lanes (max), which is intended to limit Receiver cross-talk requirements. However, different values have been proposed by other comments.

**Suggested Remedy:**
- Change the limit on Difference in launch power between any two lanes (max) to a new value.
- A different value is proposed by comment 116. To be resolved by the Task Force.

**Proposed Response:** PROPOSED ACCEPT IN PRINCIPLE.

**Response Status:** W

**Comment on Table 88-8: 100GBASE-LR4 Receive Power**

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

It is expected that external modulators with high extinction ratios could be used for this system, so specifying a minimum average power that is not equivalent to the minimum OMA at infinite extinction ratio is considered a significant restriction.

**Suggested Remedy:**
- Change the minimum average power per lane from -4.3 dBm to -5.3 dBm.
- Change the minimum receive power per lane (min) from -10.6 dBm to -11.6 dBm.

**Proposed Response:** PROPOSED REJECT.

**Response Status:** W

This comment was WITHDRAWN by the commenter.

**Proposed Response:**
- The proposed OMA per lane is -1.3 dBm. At infinite extinction ratio, this is equivalent to -4.3 dBm.
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Comment</th>
<th>Proposed Response</th>
</tr>
</thead>
</table>
| T            | D              | With the specified max average power and max OMA and maximum overshoot the peak power into the receiver can be 7.3dBm. It would be good to reduce this by including a peak power specification. This will only significantly restrict the over-shoot for transmitters that have maximum average power and simultaneously maximum OMA. The value specified is equivalent to 20% overshoot with maximum average power and maximum OMA. | *Peak Power (max) 6.8dBm.**

**PROPOSED ACCEPT IN PRINCIPLE.**

see also comments 92 and 484

[Editor's note: Clause number changed from 87 to 88 and sub clause from 87.7.1 to 88.7.1]

**SuggestedRemedy**

Insert rows into Table 88-6 and 88-7.

<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Comment</th>
<th>Proposed Response</th>
</tr>
</thead>
</table>
| E            | D              | "Transmitter and dispersion penalty, each lane (max)" | replace with:

"Transmitter and dispersion penalty (TDP), each lane (max)"

[inserted "(TDP)"]

**PROPOSED ACCEPT.**

[Editor's note: Subclause field changed from Table 88-7 to 88.7.1]

See Response to comment 605
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

Proposed Response : Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Values to be discussed by the Task Force and recorded here. See slides 4 and 5 of anslow_05_0105.pdf

In Table 88-9 change "Power budget" to "Power budget (for max TDP)" and "Allocation for penalties" to "Allocation for penalties (for max TDP)"

See also comment 232

Beneath Tables 88-7 and 88-11 there are notes stating "a possible peak power specification is under consideration for 100GBASE-LR4 and ER4".

Suggested Remedy
Either introduce such a specification and remove the editor's notes or just remove the editor's notes.

Proposed Response : Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
Comment 489 proposes a peak power specification. See Response in comment 489

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.]

Suggested Remedy
delete editor's notes related to Statistical Eye Ad Hoc throughout the document

Proposed Response : Response Status W
PROPOSED ACCEPT.
See also comments 257 and 567

It is a bad practice to have variable values duplicated in several places

Suggested Remedy
replace the 4 wavelength range values by:
"see Table 88-5"

Proposed Response : Response Status W
PROPOSED REJECT.
[Editor's note: Subclause field changed from Table 88-7 to 88.7.1]
The existing format is consistent with the base standard. See Tables 53-7 and 53-8
Cl 88 SC 88.7.2 P 317 L 13 # 117
Bergmann, Emie Circadiant/JDSU
Comment Type T  Comment Status D
It is bad practice to have duplicate values for parameters in several places.

Suggested Remedy
Replace the 4 wavelength ranges given by "see Table 88-5"

Proposed Response Response Status W
PROPOSED REJECT.
[Editor's note: Subclause field changed from Table 88-8 to 88.7.2]
The existing format is consistent with the base standard. See Tables 53-7 and 53-8

Cl 88 SC 88.7.2 P 317 L 18 # 118
Bergmann, Emie Circadiant/JDSU
Comment Type T  Comment Status D
Shouldn't there be an entry: "Difference in receive power between any two lanes (max)"?
[cf. Table 88-12]

Suggested Remedy
Add such an entry with value (4 dB?)

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
[Editor's note: Subclause field changed from Table 88-8 to 88.7.2]
See response to comment 97

Cl 88 SC 88.7.2 P 317 L 19 # 97
Cole, Chris Finisar
Comment Type T  Comment Status D
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.

Suggested Remedy
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

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.
[Editor's note: Clause number set to 88]
A different value is proposed by comment 118. To be resolved by the Task Force

Cl 88 SC 88.7.2 P 317 L 36 # 234
Anslow, Peter Nortel Networks
Comment Type T  Comment Status D
Stressed eye jitter, each lane is TBD in Tables 88-8 and 88-12.
Since each lane of 100BASE-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

Suggested Remedy
set the Stressed eye jitter, each lane to 0.3 UI pk-pk in Tables 88-8 and 88-12

Proposed Response Response Status W
PROPOSED ACCEPT IN PRINCIPLE.

Cl 88 SC 88.7.2 P 317 L 7 # 375
O'Mathuna, Padraig GigOptix
Comment Type T  Comment Status D
Table 88-8 and Table 88-12: 3dB frequency is specified as max frequency (31 GHz). We
believe the reason for this is that the device with higher BW should be not able to filter
higher harmonics, but it should be important to have some specification about the
minimum BW or, taking into account that we refer to limiting devices, at least a spec for
jitter.

Suggested Remedy

Proposed Response Response Status W
PROPOSED REJECT.
[Editor's note: Subclause field changed from 88.7 to 88.7.2 and Line set to 7]
None of the optical receiver specs in 802.3 have had a minimum bandwidth requirement.
A receiver with too little bandwidth will fail the stressed receiver sensitivity as this is
measured with degraded transmitter eye opening.

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 D  
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

Proposed Response  Response Status W  
PROPOSED REJECT.  
[Editor's note: Subclause field changed from 88-8 to 88.8.2, Line set to 22]  
The 802.3ba specification does 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.

Bergmann, Ernie  Circadant/JDSU

Comment Type T  Comment Status D  
There is no TDP specification in this table, but one would expect one in analogy to Table 88-7 and the reference to a measurement for it in 88.9.5, page 322, line 46.

SuggestedRemedy

Proposed Response  Response Status W  
PROPOSED ACCEPT IN PRINCIPLE.  
[Editor's note: Subclause field changed from Table 88-11 to 88.8.1]  
See response to comment 491

Dudek, Mike  JDSU

Comment Type TR  Comment Status D  
Restricting the transmitter to a maximum OMA of only 4.0dBm when the receiver is specified to receive 4.5dBm OMA is unnecessary. It also seems surprising that the OMA max for the 40km part is less than for the 10km part. The same arguments hold for the maximum average power however there is no point in increasing this beyond 2.9dBm as the minimum ER allowed is 8dB.

SuggestedRemedy

Proposed Response  Response Status W  
PROPOSED ACCEPT IN PRINCIPLE.  
To be discussed by the Task Force.
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

Suggested Remedy

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"

Proposed Response

PROPOSED ACCEPT IN PRINCIPLE.
Insert a row for TDP with value to be agreed. 3.5 dB seems too high as this is the
maximum link penalty including polarization mode dispersion. 2.2 dB seems a better
value.
Change the Rin to -130 dB/Hz
Modifying the budget to include OMA-TDP was discussed in the Denver meeting and was
not agreed.
Only modify Table 88-13 if OMA-TDP is introduced.

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.

Suggested Remedy

Change Table 88-12 100GBASE-ER4 Receive Characteristics entry to:
Difference in receive power between any two lanes (Average and OMA) (max) 4.5dB

Proposed Response

PROPOSED ACCEPT.

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 100GBASE-ER4 transmitter value to allow compatibility with 100GBASE-LR4 units at short distances."

Suggested Remedy

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 100GBASE-LR4 units at short distances."

Proposed Response

PROPOSED 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 100GBASE-ER4 transmitter value
to allow compatibility with 100GBASE-LR4 units at short distances."

Suggested Remedy

It is bad practice to duplicate values for parameters in several places.

Suggested Remedy

Replace 4 entries of wavelength ranges with: "see Table 88-5".

Proposed Response

PROPOSED REJECT.
[Editor's note: Clause number set to 88 and missing comment type set to T]
Comment Type T  Comment Status D

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".

Proposed Response  Response Status W
- PROPOSED REJECT.
  [Editor's note: Subclause field changed from Table 88-12 to 88.8.2]
  The existing format is consistent with the base standard. See Tables 53-7 and 53-8

Comment Type T  Comment Status D

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)

Proposed Response  Response Status W
- PROPOSED ACCEPT IN PRINCIPLE.
  See Responses to comments 439 and 440
  See also comments 636, 438 and 441

Comment Type T  Comment Status D

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

Proposed Response  Response Status W
- PROPOSED ACCEPT.
  See also comments 221, 109, 123
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).

**Suggested Remedy**
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.

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE.

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 and clause 88.9.4 modified to refer to 68.6.2 as an alternative.
See Response to comment 440.
See also comments 636, 637, 438 and 441.

**Comment Status**
D

**Response Status**
W

**Anslow, Peter**
Nortel Networks

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE.

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.

**Suggested Remedy**
Set the Jitter values according to the values in Table 52-19 with the three rows as:
- f < 100 kHz, Not specified
- 100 kHz < f < 10 MHz, 2×10⁻⁵f + S - 0.05
- 10 MHz < f < 10 LB, 0.05 ≤ S ≤ 0.15
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."

**Proposed Response**
PROPOSED ACCEPT IN PRINCIPLE.
239

Comment Type: T  Comment Status: D

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"

Proposed Response: PROPOSED ACCEPT.

Cl 88 SC 88.9.8 P 324 L 48 # 240

Anslow, Peter Nortel Networks

Comment Type: T  Comment Status: D

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

Proposed Response: PROPOSED ACCEPT IN PRINCIPLE.

Cl 88 SC 88.9.9 P 324 L 51 # 241

Anslow, Peter Nortel Networks

Comment Type: T  Comment Status: D

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.

Proposed Response: PROPOSED ACCEPT.

[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:** E  
**Comment Status:** D  

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

**Suggested Remedy:**
Correct the subclauses so they are shown indented under the correct top clauses.

**Proposed Response:**  
PROPOSED 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

---

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

83A.2 is not shown in TOC. Also, 83A.7.2.x is shown indented under 83A7.1.

**Suggested Remedy:**
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.

**Proposed Response:**  
PROPOSED ACCEPT IN PRINCIPLE.

This is heading numbering issue in Annex 83A check and fix the issue in Annex 83A

---

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

Projects in development include a "P" in front of 802.3xx

**Suggested Remedy:**
Replace "Std. 802.3at" with "Std. P802.3at"  
Replace "Std. 802.3av" with "Std. P802.3av"  
Replace "Std. 802.3az" with "Std. P802.3az"  
Replace "Std. 802.3ba" with "Std. P802.3ba"

**Proposed Response:**  
PROPOSED REJECT.

This description is for the publication in the final version of the draft amendment. At that time these draft amendments would have been approved, if not then the unapproved entry(ies) will be removed from the front matter of this amendment

---

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

Check with 802.3 Chair and add new sections to the front matter regarding "Laws and regulations", "copyright" message and "revisions" to IEEE documents.

See 802.3av-D2.2 front matter for reference.

**Suggested Remedy:**
As per comment.

**Proposed Response:**  
PROPOSED ACCEPT IN PRINCIPLE.

Check and update the front matter as per the comment

---

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

There is a newer version of this page.

**Suggested Remedy:**
Ask P802.3av for it.

**Proposed Response:**  
PROPOSED ACCEPT IN PRINCIPLE.

Check if there is a new version of the special symbols page and update if appropriate