<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>A</td>
<td>Change &quot;IEEE Std 802.3cd-2018&quot; to &quot;IEEE Std 802.3cd-201x&quot;</td>
<td>ACCEPT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>A</td>
<td>Incorrect capitalization</td>
<td></td>
<td></td>
<td>Replace &quot;physical layer&quot; with &quot;Physical Layer&quot;</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>A</td>
<td>&quot;2019Draft Standard for Ethernet&quot; contains a spurious &quot;2019&quot;</td>
<td>ACCEPT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>A</td>
<td>Change wording of Editor's note.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>A</td>
<td>Replace all occurrences of &quot;IEEE Std 802.3cd-201x&quot; with &quot;IEEE Std 802.3cd-2018&quot;</td>
<td>ACCEPT.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
"over a single shielded balanced pair of conductors". Signal routing at PCB might not be shielded. Same on lines 23 and 29.

**Suggested Remedy**
Replace by: "over a single balanced pair of conductors using shielded cabling."

**Response**
ACCEPT IN PRINCIPLE.

**Change**
- single shielded balanced pair of conductors

**Comment Status**
A

**Response Status**
C

Throughout the document except for in 149.7 and its subsections and 149A.

---

**Comment Type**
E

**Comment Status**
A

**Nomenclature**

"Single shielded balanced pair of conductors PHY". Signal routing at PCB might not be shielded. Same on lines 18 and 23. Recommend to search for "single shielded balanced pair" as this occurs at more places in the spec.

**Suggested Remedy**
Replace by: "Single balanced pair of conductors PHY using shielded cabling."

**Response**
ACCEPT IN PRINCIPLE.

**Change**
- single shielded balanced pair of conductors

---

**Comment Type**
E

**Comment Status**
A

**Nomenclature**

Remove note on the type of paragraph to use for Abbreviations.

**Suggested Remedy**
Remove: [abbreviations use paragraph tag AcrList,ac]

**Response**
ACCEPT.
Comment Type: E  Comment Status: A  Editorial
Correct grammatical of the word "which"

Suggested Remedy
Insert a comma after the last word coming before "which" in these locations: page 27 - line 3, page 35 - line 31, page 61 - line 8, page 69 - line 37, page 70 - line 2, page 80 - line 5, and page 90 - line 51.

Response  Response Status: C  ACCEPT.

Comment Type: T  Comment Status: A  EZ
Figure 44.1 shows "WIS = WAN INTERFACE SUBLAYER" inside the lower diagram of the figure, and not in the list below. This is confusing because WIS does not occur in that lower diagram.

Suggested Remedy
Move the definition: "WIS = WAN INTERFACE SUBLAYER" to the list below the figure.

Response  Response Status: C  ACCEPT.

Comment Type: E  Comment Status: A  EZ
Item d of 44.1.3 contains five external cross-references that are not in forest green

Suggested Remedy
Apply character tag "External" to "Clause 53", "Clause 54", "Clause 55", "Clause 68", and "Clause 52"

Response  Response Status: C  ACCEPT.

Comment Type: ER  Comment Status: A  EZ
Part of the suggested remedy for Comment #27 against D1.0 was:
In the editing instruction, change: "1.2318 - 1.2320" to: "1.2318 to 1.2324"
The response was: ACCEPT but the text in the editing instruction is "1.2318 to 1.2320" where the second number is still incorrect.

Suggested Remedy
In the editing instruction, change: "1.2318 to 1.2320" to: "1.2318 to 1.2324"

Response  Response Status: C  ACCEPT.
Comment Type: T  Comment Status: EZ
Remove timing for restoration of normal operation and refer to 149.4.2.1 instead.

Suggested Remedy
Change: The control and management interface shall be restored to operation within 0.5 s from the setting of bit 1.2309.15.
To: The control and management interface shall be restored to operation within the time specified in 149.4.2.1 from the setting of bit 1.2309.15.

Proposed Response  Response Status: Z
REJECT.
This comment was WITHDRAWN by the commenter.

Comment Type: T  Comment Status: A  Reset / Startup time
"The control and management interface shall be restored to operation within 0.5 s from the setting of bit 1.2309.15"

Suggested Remedy
Replace by: "The control and management interface shall be restored to operation within max_reset_time as defined in 149.x.x, starting when bit 1.2309.15 is set."

Response  Response Status: C
ACCEPT IN PRINCIPLE.
Change: The control and management interface shall be restored to operation within 0.5 s from the setting of bit 1.2309.15.
To: The control and management interface shall be restored to operation as defined in 149.3.2.1, starting when bit 1.2309.15 is set.
Comment #16 against D1.0 was:
In the heading of 45.2.1.192.4, "(1.2309.14)" should be "(1.2309.10:9)"
The response was:
ACCEPT IN PRINCIPLE.
This is covered by Comment #85.
but comment #85 made no change to the draft.

Suggested Remedy
In the heading of 45.2.1.192.4, change "(1.2309.14)" to "(1.2309.10:9)"

Response
ACCEPT.

Comment #135

Comment Type  ER  Comment Status A  EZ
Comment #135 against D1.0 was:
verb/noun agreement
The response was:
ACCEPT.

Suggested Remedy
Change: Setting these bits force the precoder to the mode set.

Response
ACCEPT.

Comment #136

Comment Type  E  Comment Status A  EZ
We don't need to keep repeating MultiGBASE-T1.

Suggested Remedy
Change: When set as a one, this bit indicates to the link partner that the MultiGBASE-T1 PHY is advertising MultiGBASE-T1 OAM capability. When set as a zero, this bit indicates to the link partner that the MultiGBASE-T1 PHY is not advertising MultiGBASE-T1 OAM capability. This bit shall be set to zero if the MultiGBASE-T1 PHY does not support MultiGBASE-T1 OAM.

Response
ACCEPT IN PRINCIPLE.

(to correct cut/paste issue in suggested remedy "1 PHY" changed to "PHY" AND to fix "shall" on the user "this bit shall be set to zero" changed to "this bit should be set to zero...")

Change: When set as a one, this bit indicates to the link partner that the MultiGBASE-T1 PHY is advertising MultiGBASE-T1 OAM capability. When set as a zero, this bit indicates to the link partner that the MultiGBASE-T1 PHY is not advertising MultiGBASE-T1 OAM capability. This bit shall be set to zero if the MultiGBASE-T1 PHY does not support MultiGBASE-T1 OAM.

To: When set as a one, this bit indicates to the link partner that the PHY is advertising MultiGBASE-T1 OAM capability. When set as a zero, this bit indicates to the link partner that the PHY is not advertising MultiGBASE-T1 OAM capability. This bit should be set to zero if the PHY does not support MultiGBASE-T1 OAM.

Response
ACCEPT IN PRINCIPLE.
We don't need to keep repeating MultiGBASE-T1.

Suggested Remedy

Change: When set as a one, this bit indicates to the link partner that the MultiGBASE-T1 PHY is advertising EEE capability. When set as a zero, this bit indicates to the link partner that the MultiGBASE-T1 PHY is not advertising EEE capability. This bit shall be set to zero if the MultiGBASE-T1 PHY does not support EEE.

To: When set as a one, this bit indicates to the link partner that the PHY is advertising EEE capability. When set as a zero, this bit indicates to the link partner that the PHY is not advertising EEE capability. This bit should be set to zero if the PHY does not support EEE.

Response Status: ACCEPT IN PRINCIPLE.

(to fix "shall" on the user "this bit shall be set to zero" changed to "this bit should be set to zero..."

Change: When set as a one, this bit indicates to the link partner that the MultiGBASE-T1 PHY is advertising EEE capability. When set as a zero, this bit indicates to the link partner that the MultiGBASE-T1 PHY is not advertising EEE capability. This bit shall be set to zero if the MultiGBASE-T1 PHY does not support EEE.

To: When set as a one, this bit indicates to the link partner that the PHY is advertising EEE capability. When set as a zero, this bit indicates to the link partner that the PHY is not advertising EEE capability. This bit should be set to zero if the PHY does not support EEE.

Response Status: REJECT.

SNR operating margin as currently proposed in the draft is essentially an 8 bit value (255 used values), but it is defined as a 16bit register with 0x8000 as zero dB reference. This is very inefficient as all 16 bits would be toggling between values 0.0dB and -0.1dB.

Suggested Remedy

Represent the 8-bit SNR margin in bits 7:0 of register 2314, with 0x80 as zero reference for that field.

Response Status: REJECT.

It may be desirable to keep a 16-bit register to be consistent with other Clauses.

Straw poll also applies to #286

16 bits as used in other Clauses (as is) 12
8 bits, more efficient 3
Don't care most of room

How is SNR operating margin defined? We currently don't have a pre-FEC (raw) BER target in the spec. The BER < 1e-12 is post-FEC. So what does 0dB mean here?

Suggested Remedy

I see three possible solutions here:

a) Define a pre-FEC BER target, which will implicitly set a reference SNR level for the SNR margin
b) Define a fixed reference SNR pre-FEC
c) Report the actual SNR pre-FEC and don't talk about 'margin'. In the latter case the SNR register value becomes strictly positive.

Response Status: REJECT.

Commenter provides no specific remedy.
### Comment 287

**Comment Type:** T  **Comment Status:** A  **SNR**

Register 231 is called minimum margin register, but it is about an SNR valy

**Suggested Remedy:** Rename to: minimum SNR margin

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

**ACCEPT.**

### Comment 286

**Comment Type:** T  **Comment Status:** R  **SNR**

minimum SNR margin as currently proposed in the draft is essentially an 8 bit value (255 used values), but it is defined as a 16bit register with 0x8000 as zero dB reference. This is very inefficient as the upper 8 bits would be toggling between values 0.0dB and -0.1dB, but they don't contain information.

**Suggested Remedy:**

Represent the 8-bit minimum SNR margin in bits 15:8 of register 231, with 0x80 as zero reference for that field. Free-up register 2315.

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

**REJECT.**

It may be desirable to keep a 16-bit register to be consistent with other Clauses.

### Comment 285

**Comment Type:** E  **Comment Status:** A  **SNR**

In the "Description" for bit 3.2313.15, "This bit shall self clear when register 3.2317 is read." has been changed to "See 45.2.3.74.1 for self-clearing behavior". However, this is text in the base standard being changed via a "Change" editing instruction so this change has to be shown with strikethrough and underline font.

**Suggested Remedy:**

In the "Description" for bit 3.2313.15: show "This bit shall self clear when register 3.2317 is read." in strikethrough font, and show "See 45.2.3.74.1 for self-clearing behavior." in underline font. Note the addition of "." at the end of this.

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

**ACCEPT.**

### Comment 284

**Comment Type:** E  **Comment Status:** A  **SNR**

In the second line of text "8 octet" has been changed to "8-octet". However, the text in the base standard is "8 octet".

**Suggested Remedy:**

If it is intended that this amendment changes "8 octet" to "8-octet" then this has to be shown with strikethrough and underline font, preferably with "8 octet" in strikethrough and "8-octet" in underline for clarity.

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

**ACCEPT.**

### Comment 283

**Comment Type:** T  **Comment Status:** R  **OAM**

"This register shall be cleared when register 3.2317 is read." However, the last OAM byte is in register 2319. So it looks like only the first 8 bytes of the message are handshaked. Furthermore the addition of these extra 4 bytes is a bit messy as they are not directly concatenated to the existing 8 bytes in the register map.

**Suggested Remedy:**

Refer to register 3.2319 in the quoted sentence

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

**REJECT.**

3.2318 and 2319 are the new MultiGBASE-T1 OAM Status registers. We agreed that these are always current. It is only up to 2317 (the BASE-T1 OAM, common with 1000BASE-T1) which are handshaked. Making this change would break the 1000BASE-T1 handshake.

### Comment 282

**Comment Type:** E  **Comment Status:** A  **SNR**

associate: missing d

**Suggested Remedy:**

associate associated

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

**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 Z/withdrawn

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

**Page 7 of 63**

3/14/2019 1:49:44 PM
While the addition of the hyphen in "8-octet" is shown with underline, the removal of the space is not shown with strikethrough.

**Suggested Remedy**

Show "8 octet" in strikethrough and "8-octet" in underline for clarity.

**Comment Status** A

**Response Status** C

**Accept.**

---

The details on the OAM Status bytes are defined in 149.3.8.2.12. Refer to that section for these bytes.

**Suggested Remedy**

Replace: The message data is user defined and its definition is outside the scope of this standard.

With: See 149.3.8.2.12 for details on the OAM status message definition.

**Comment Status** A

**Response Status** C

**Accept.**

---

OAM status message.

It is not clear whether registers 3.2319 and 3.2319 should be R/W or RO.

Referring to page 117 (159.3.8.2.12)

I think 3.2318.7:2.0 and 3.2319 should be RO since the status is from somewhere else.

3.2318.1 should be R/W since the user will go in to make a request to clear.

Is the intent that these registers are automatic, or is the expectation that the user has to manually write in all these statuses?

**Suggested Remedy**

If the intent is these registers are automatic then 3.2318 and 3.2319 should all be changed to RO with the exception of 3.2318.1.

Also the footnote should be changed to include RO.

**Comment Status** A

**Response Status** C

**Accept in Principle.**

Implement option 2 with editorial license to implement.

Straw poll - Chicago rules

1. Change the appropriate bits to RO and add the specific usage definitions in Clause 45: 1

2. Keep the bits R/W and move the content of 149.3.8.2.11 into an informative annex with appropriate linking language: 13

3. Add a note in 45.2.3.7.6 that these bits can be set by the PHY. If this is the case, the bits that are set by the PHY should not be written to.: 2

---

Lo, William Axonne Inc.

**Comment Type** TR/technical required

**Comment Status** A

3.2320 and 2.2321 should be RO since these are statuses from the link partner.

**Suggested Remedy**

Change R/W to RO for 3.2320 and 2.2321

Change the footnote from R/W to RO

**Response Status** C

**Accept.**
Cl 45 SC 45.2.3.78.1 P46 L1  # 11
Anslow, Pete Ciena

Comment Type E  Comment Status A  EZ
Extra ")" at the end of "45.2.3.78.1 PCS reset (3.2322.15)"

SuggestedRemedy
Delete the extra ")"

Response  Response Status C
ACCEPT.

Cl 45 SC 45.2.3.80.2 P48 L38  # 218
Zimmerman, George CME:ADI,Aquantia,AP

Comment Type T  Comment Status A  Registers
When read as a one, bit 3.2324.9 indicates that the MultiGBASE-T1 PCS receiver is detecting a BER of \(> 4 \times 10^{-4}\). When read as a zero, bit 3.2324.9 indicates that the MultiGBASE-T1 PCS is not detecting a BER of \(> 4 \times 10^{-4}\)." 

hi_rfer doesn't really correspond well to a BER and this isn't the place to specify it. What BER hi_rfer corresponds to will depend on the interleaving. Better to rewrite this in terms of the definition of hi_rfer.

SuggestedRemedy
Change "is detecting a BER of \(> 4 \times 10^{-4}\)" to "is detecting more than 16 or more RS-FEC errored blocks in 312 500 bit times (one rfer_timer interval)"
Change "is not detecting a BER of \(> 4 \times 10^{-4}\)." to "is detecting fewer than 16 RS-FEC errored blocks in 312 500 bit times."
Delete editor's note at line 42

Response  Response Status C
ACCEPT.

Cl 45 SC 45.2.3.80.2 P48 L14  # 500
den Besten, Gerrit NXP Semiconductors

Comment Type T  Comment Status A  Reset / Startup time
"The control and management interface shall be restored to operation within 0.5 s from the setting of bit 3.2322.15."

SuggestedRemedy
Replace by: ""The control and management interface shall be restored to operation within max_reset_time as defined in 149.x.x, starting when bit 3.2322.15 is set."

Response  Response Status C
ACCEPT IN PRINCIPLE.

Change: The control and management interface shall be restored to operation within 0.5 s from the setting of bit 3.2322.15.
To: The control and management interface shall be restored to operation as defined in 149.3.2.1 starting when bit 3.2322.15 is set.

Cl 45 SC 45.2.3.80.2 P48 L36  # 501
den Besten, Gerrit NXP Semiconductors

Comment Type T  Comment Status A  Nomenclature
"PCS high BER": The way it is currently defined is not a BER but a RFER (reed-solomon frame-error-rate) as only frames which cannot be corrected are counted.

SuggestedRemedy
Rename to Frame Error Rate (FER)

Response  Response Status C
ACCEPT IN PRINCIPLE.

Rename "PCS High RFER". (Frame error ratios can be confused with Ethernet frames, and this is calculated based on the RS-FEC Frames.)

Cl 45 SC 45.2.3.80.2 P48 L39  # 502
den Besten, Gerrit NXP Semiconductors

Comment Type T  Comment Status D  Registers
The spec text "detecting a BER of \(> 4e-4\)" is ambiguous, because actually the frame errors are counted here, not bit errors. Furthermore this number seems way too high. Bit errors at PMA level will mostly be successfully corrected by the RS-FEC, or corrupt a whole RS frame. Counting the number of erroneous RS frames seems the correct approach, but why would we express this as BER instead of RFER? Note that the RFER counter is only 6 bits so apparently this not supposed to happen very often. For a RFER<1e-9 the packet level performance is similar to a transmission scheme without RS-FEC and a PMA BER of about 3e-11.

SuggestedRemedy
Propose to change into: "detecting a RFER \(> 1e-9\)"

Proposed Response  Response Status Z
REJECT.

This comment was WITHDRAWN by the commenter.
There is a carriage return that shouldn't be there. This section should be a single paragraph.

SuggestedRemedy
Remove the carriage return after "behavior." to bring the following line into the same paragraph.

Response  Response Status  C
REJECT.

In the BASE-T1 bits which are copies, the statement that the bit is a copy is set off by being its own paragraph for readability. See 45.2.3.69.1 and 45.2.3.69.2

Comment Type  E  Comment Status  R  Editorial

Comment Type  E  Comment Status  A  EZ
As noted in Comment #38 against D1.0, space missing before "(" in the editing instruction.

SuggestedRemedy
Add the space.

Response  Response Status  C
ACCEPT.

Comment Type  E  Comment Status  A  EZ
As noted in Comment #39 against D1.0, space missing before "(" in the editing instruction.

SuggestedRemedy
Add the space.

Response  Response Status  C
ACCEPT.

Comment Type  E  Comment Status  A  EZ
Tq is 95 frames.

SuggestedRemedy
Change Tq from [126.72, 63.36, 31.68] us to [121.6, 60.8, 30.4] us for 2.5G/5G/10G respectively in Table 78-2.

Response  Response Status  C
ACCEPT.
<table>
<thead>
<tr>
<th>Comment ID</th>
<th>Type</th>
<th>Comment Status</th>
<th>Commenter</th>
<th>Response Status</th>
<th>Comment</th>
<th>Suggested Remedy</th>
<th>Response Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>98 SC 98.5.1</td>
<td>ER</td>
<td>A</td>
<td>Tu, Mike Broadcom</td>
<td></td>
<td></td>
<td>The editor note should refer to 98.5.1, not 98.1.5.</td>
<td></td>
</tr>
<tr>
<td>104 SC 104.5.6.4</td>
<td>T</td>
<td>A</td>
<td>den Besten, Gerrit NXP Semiconductors</td>
<td></td>
<td></td>
<td>Type F has been added to the sub-clause, but there is no reference to clause 149 in there. Especially in this sentence that was apparently there for 1000BASE-T1 with reference to the MDI return loss, it seems that just adding Type F in there is not sufficient.</td>
<td></td>
</tr>
<tr>
<td>104 SC 104.7.2.4</td>
<td>E</td>
<td>A</td>
<td>Anslow, Pete Ciena</td>
<td></td>
<td></td>
<td>The heading for Table 104-9 has a grey background.</td>
<td></td>
</tr>
</tbody>
</table>
Comment Type: E  Comment Status: A  EZ

Incorrect wording for MDI

Suggested Remedy
Change: Media Dependent Interface (MDI)
To: Medium Dependent Interface (MDI)

ACCEPT.

Comment Type: E  Comment Status: A

Change the name of the PCS layer to be consistent with the other 5G/2.5G standards.

Suggested Remedy
For 2.5GBASE-T1, change "64B/65B RS-FEC PCS" to "2.5GBASE-T1 PCS".
For 5GBASE-T1, change "64B/65B RS-FEC PCS" to "5GBASE-T1 PCS".

Proposed Response
This comment was WITHDRAWN by the commenter.

This was changed by comment 151 on D1.0 for Figure 149-1. This same text was then used for Figure 125-1 and 44-1. These names should remain consistent between the three figures.

D1.1 comment 151 rationale.
If we name the PCS (say, e.g., "RS-FEC PCS") we can collapse all of the 3 stacks into 1 and make the figure much simpler, with a single stack showing the commonality of all 3 PHYs.

Comment Type: E  Comment Status: A  EZ

missing comma

Suggested Remedy
Change: (PMA) sublayer and
To: (PMA) sublayer, and

Proposed Response
This comment was WITHDRAWN by the commenter.

This was changed by comment 151 on D1.0 for Figure 149-1. This same text was then used for Figure 125-1 and 44-1. These names should remain consistent between the three figures.

D1.1 comment 151 rationale.
If we name the PCS (say, e.g., "RS-FEC PCS") we can collapse all of the 3 stacks into 1 and make the figure much simpler, with a single stack showing the commonality of all 3 PHYs.
We agreed to call the OAM "MultiGBASE-T1 OAM".

**SuggestedRemedy**

Change: 2.5G/5G/10GBASE-T1 OAM
To: MultiGBASE-T1 OAM throughout this section and the document.

**Response**

Response Status **C**

ACCEPT IN PRINCIPLE.

Change 2.5G/5G/10GBASE-T1 to "MultiGBASE-T1" everywhere in the draft (not just for OAM). Most references refer to "MultiGBASE-T1 PCS or PMA/PMD", whereas Clause 149 refers to 2.5G/5G/10GBASE-T1 links, PCS, operation, link segment, and OAM.

**Comment**

**Comment Type** **E**

Use common abbreviation for the combined PHY types.

**SuggestedRemedy**

Change: The 2.5GBASE-T1, 5GBASE-T1, or 10GBASE-T1 PMA
To: 2.5G/5G/10GBASE-T1 PMA

**Proposed Response**

Response Status **Z**

**REJECT.**

This comment was WITHDRAWN by the commenter.

When "2.5GBASE-T1, 5GBASE-T1, or 10GBASE-T1 PMA" (or PCS or PHY) is used, we are talking about behavior of a single-speed, single-instance of a PMA (or PCS or PHY). When we use "MultiGBASE-T1" PMA we are talking about the specification, or the name of a functionality associated with all 3 (such as OAM).

**Comment**

**Comment Type** **TR**

The transmit transition to the LPI transmit mode is based on the TXD[31:0] of the XGMII, not in the last 64B/65B block of a RS frame.

**SuggestedRemedy**

Change "… an LPI control character in the last 64B/65B block of a Reed-Solomon frame." to "… an LPI control character in all four lanes of two consecutive transfers of TXD[31:0] that will be mapped into a single 64B/65B block."

**Proposed Response**

Response Status **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

**Comment**

**Comment Type** **E**

missing comma

**SuggestedRemedy**

Change: Periodically the transmit
To: Periodically, the transmit

**Proposed Response**

Response Status **C**

ACCEPT IN PRINCIPLE.

(rewrite, removing need for the comma and improving clarity)

Change: Periodically the transmit function of the local PHY transmits refresh frames that are used by the link partner to update adaptive filters and timing circuits in order to maintain link integrity.

To: The transmit function of the local PHY periodically transmits refresh frames. These are used by the link partner to update adaptive filters and timing circuits in order to maintain link integrity.
Duplicate sentence.

SuggestedRemedy

Remove one instance of: The PMA Transmit function in the PHY then sends an alert message to the link partner.

Response

Response Status C

ACCEPT.

Repeat statement

SuggestedRemedy

Delete the sentence: "The PMA Transmit function in the PHY then sends an alert message to the link partner" in line 25–26

Response

Response Status C

ACCEPT.

The entire phrase is "2.5G/5G/10GBASE-T1 OAM SNR settings" - there are no other references to this - it is called the "PHY Health Indicator" in 149.3.8.2.5 and 149.3.8.2.15 (why it is repeated, with different information is for discussion, and probably another comment - this is what was in Clause 97. First there was a description of the bits, then later the functions. These are all in the same subsection due to the 5 level heading limit. The MultiG-BASET1 specific definitions are all in 149.3.8.2.12 instead of putting each item in a separate section.).

Change: 2.5G/5G/10GBASE-T1 OAM SNR settings indicate

To: PHY Health status received from the link partner indicates

Response

Response Status C

ACCEPT IN PRINCIPLE.

Implement suggested solution with editorial licence to correct references as needed.

SuggestedRemedy

Replace "126-14" with the cross-reference to the figure captioned "PCS 64B/65B Transmit state diagram, part a" currently labelled "149-13".

Replace "126-15" with the cross-reference to the figure captioned "PCS 64B/65B Transmit state diagram, part b" currently labelled "149-14".

Replace "126-16" with the cross-reference to the figure captioned "PCS 64B/65B Receive state diagram, part a" currently labelled "149-15".

Replace "126-17" with the cross-reference to the figure captioned "PCS 64B/65B Receive state diagram, part a" currently labelled "149-16".

Replace "126-18" with the cross-reference to the figure captioned "EEE transmit state diagram".

Response

Response Status C

ACCEPT IN PRINCIPLE.

Implement suggested solution with editorial licence to correct references as needed.
149.1.3.4

Comment Type: E
Comment Status: A

missing comma

Suggested Remedy

Change: The Link Synchronization function is used when Auto-Negotiation is disabled to synchronize between the …

To: The Link Synchronization function is used when Auto-Negotiation is disabled, to synchronize between the …

Response
Response Status: C

ACCEPT IN PRINCIPLE.

Repeating that "link synchronization" is to "synchronize" has no value, and actually isn't what this function does. It doesn't control the link_status timer (that's maxwait_timer in the phy control diagram) - also the case where autoneg is not implemented is left out. Combine the first and second sentences of 149.1.3.4 as follows:

Replace: The Link Synchronization function is used when Auto-Negotiation is disabled to synchronize between the MASTER PHY and SLAVE PHY before training starts. Link Synchronization provides a fast and reliable mechanism for link partners to detect the presence of each other and start the timers used by the link monitor which determines link_status.

With: The Link Synchronization function is used when Auto-Negotiation is disabled or not implemented to detect the presence of the link partner, time and control link failure, and act as the data source for the PHY control state diagram.

Revised: The Link Synchronization function is used when Auto-Negotiation is disabled or not implemented to detect the presence of the link partner, time and control link failure, and act as the data source for the PHY control state diagram.

149.1.4

Comment Type: TR
Comment Status: A

missing comma before and

Suggested Remedy

Add the following paragraph:

When EEE is active, the same link synchronization pattern is used as an alert sequence.

When rx_lpi_active is true, the send_s_sigdet variable which detects the SEND_S pattern is used as alert detect.

Proposed Response
Response Status: Z

REJECT.

This comment was WITHDRAWN by the commenter.
### Comment Type: E

#### Comment Status: A

**Desc:** subject/verb agreement

#### Suggested Remedy

- **Change:** which enable the receiver
- **To:** which enables the receiver

**Response**

**Response Status:** C

**ACCEPT IN PRINCIPLE.**

**Suggested Remedy**

PAM2 doesn't "enable" the receiver, it might aide it, but best to leave implementation detail out. Also, figure 149-4 isn't really relevant to this statement. 149-31 is.

**Response**

**Response Status:** C

**ACCEPT IN PRINCIPLE.**

In training mode, the PCS is directed to generate only PAM2 symbols for transmission by the PMA, which enable the receiver at the other end to train until it is ready to operate in normal mode. (See Figure 149–4.)

**To:** In training mode, the PCS is directed to generate only PAM2 symbols for transmission by the PMA. (See Figure 149–31.)

### Comment Type: TR

#### Comment Status: A

**Desc:** variable loc_phy_ready is not used.

#### Suggested Remedy

1. Remove "PMA_PHYREADY.request(loc_phy_ready)".
2. In page 71 line 26, remove "loc_phy_ready" in Figure 149-2.
3. In page 79, remove lines from 1 to 22.
4. In page 82 line 26, remove "loc_phy_ready" in Figure 149-4.
5. In page 134 line 8, remove "loc_phy_ready" in Figure 149-24.
6. In page 147, remove lines from 19 to 26.

**Response**

**Response Status:** C

**ACCEPT IN PRINCIPLE.**

Editor to remove all text and references associated with loc_phy_ready and rem_phy_ready.

Comments 130, 94, 274, 276, 273 all discuss removing loc_phy_ready and/or rem_phy_ready. Need to determine a coherent solution for these comments.

### Comment Type: TR

#### Comment Status: A

**Desc:** State diagrams variable "rem_phy_ready" is no longer used.

#### Suggested Remedy

1. Delete line 28 "PMA_REMPHYREADY.request(rem_phy_ready)"
2. Delete references to "rem_phy_ready" at the following location:
   - 2.1 Page 71, line 34, Figure 149-2, change from "rem_rcvr_status / rem_phy_ready" to "rem_rcvr_status".
   - 2.2 Page 80, delete 149.2.2.10, 149.2.2.10.1, 149.2.2.10.2, and 149.2.2.10.3.
   - 2.3 Page 82, line 24, Figure 149-4, change from "rem_rcvr_status / rem_phy_ready" to "rem_rcvr_status".
   - 2.4 Page 134, line 11, Figure 149-24, change from "rem_rcvr_status / rem_phy_ready" to "rem_rcvr_status".
   - 2.5 Page 148, delete line 14 to line 20.
   - 2.6 Page 75, line 26, delete "PMA_REMPHYREADY.request" and the associated ARROW.

**Response**

**Response Status:** C

**ACCEPT IN PRINCIPLE.**

Editor to remove all text and references associated with loc_phy_ready and rem_phy_ready.

Comments 130, 94, 274, 276, 273 all discuss removing loc_phy_ready and/or rem_phy_ready. Need to determine a coherent solution for these comments.
I believe this editor's note refers to a special GMII codeword defined and used in Clause 97 only for the purpose of signaling PMA_PHYREADY.indication (loc_phy_ready) to the link partner. For Clause 97, Idle was split into two different codewords, one for loc_phy_ready = NOT_OK and one for loc_phy_ready = OK. This points out a problem in the current CH draft.

149.2.2.8 PMA_PHYREADY.indication definition states that "loc_phy_ready is conveyed to the link partner by the PCS as defined in 149.4.4.1."

149.4.4.4 then points back to Table 149-1, "This variable is conveyed to the link partner by the PCS as defined in Table 149-1."

However, Table 149-1 has no codeword to convey loc_phy_ready. loc_phy_ready was created in BP to prevent either side from transmitting frames until both sides are ready. loc_phy_ready is unnecessary for XGMII based PHYs and currently it isn't used in the PMA PHY control state machine. Normal ordered sets of Local Fault and Remote Fault from the Reconciliation Sublayer perform the function of holding off frames until both PHYs are ready.

SuggestedRemedy

Remove the editor's note.
Remove the primitive PMA_PHYREADY.indication and any text and figure references related to loc_phy_ready.
Remove the primitive PMA_REMPHYREADY.request and any text and figure references related to rem_phy_ready.
Remove loc_phy_ready definition from 149.4.4.1 State diagram variables.
Remove rem_phy_ready definition from 149.4.4.1 State diagram variables.

Response

ACCEPT IN PRINCIPLE.

Editor to remove all text and references associated with loc_phy_ready and rem_phy_ready.

Comments 130, 94, 274, 276, 273 all discuss removing loc_phy_ready and/or rem_phy_ready. Need to determine a coherent solution for these comments.

---

We removed SEND_I, but didn't change the number of values to "three" from "four" in the text.

SuggestedRemedy

Change: four
To: three

Response

ACCEPT IN PRINCIPLE.

Change: can take one of the following four values of the form:
To: can take on one of the following values:

---

Using XGMII instead.

SuggestedRemedy

Change "to represent GMII data and ..." to "to represent XGMII data and ..."
Suggest to search and replace it globally.

Response

ACCEPT IN PRINCIPLE.

Make the suggested change and also make this change on P148 L34.

---

Formatting of text under SYMB and ALERT does not match the rest of the document.

SuggestedRemedy

Fix the paragraph formatting.

Response

ACCEPT.
Delete references to unused loc_phy_ready and rem_phy_ready in the primitives section, in Figures 149-2, 149-4, and 149-24, and in the variables of PHY Control 149.4.4.1. PHY control uses loc_rcvr_status instead of loc_phy_ready and rem_phy_ready.

**Suggested Remedy**

In Figure 149-2 (P71): Delete loc_phy_ready from PMA RECEIVE to PCS TRANSMIT, and rem_phy_ready (just the label, not the arc) from PCS RECEIVE to PHY CONTROL (this arc also has the label rem_rcvr_status, which should remain)

149.2.2 P74 L26, Delete primitives PMA_PHYREADY.indication(loc_phy_ready) and on P74 L28 delete PMA_REMPHYREADY.request (rem_phy_ready)

149.2.2.8 Delete 149.2.2.8 and subclauses 149.2.2.8.1 and 149.2.2.8.2 (P79 L1-22)

In Figure 149-4 (PCS reference diagram, P82 L23), Delete loc_phy_ready input to PCS TRANSMIT from PMA SERVICE INTERFACE. Change label on output from PCS RECEIVE to PHY CONTROL from "rem_rcvr_status/rem_phy_ready" to "rem_rcvr_status".

In Figure 149-24 (PMA reference diagram, P134 L7) delete the first solid line output from PMA RECEIVE to PMA SERVICE INTERFACE and change able on rightmost input (2nd from right line) to PHY CONTROL from PMA SERVICE INTERFACE from "rem_rcvr_status/rem_phy_ready" to "rem_rcvr_status".

**Response**

ACCEPT IN PRINCIPLE.

Editor to remove all text and references associated with loc_phy_ready and rem_phy_ready.

Comments 130, 94, 274, 276, 273 all discuss removing loc_phy_ready and/or rem_phy_ready. Need to determine a coherent solution for these comments.

Timing specs for PCS reset are missing.

**Suggested Remedy**

Insert the following paragraph:

The reset shall take less than 10ms (=max_reset_time), and register access shall be available again after that. The link shall resume operation and achieve the required BER within 100ms (=max_training_time)

**Response**

ACCEPT IN PRINCIPLE.

Insert the following paragraph:

The control and management interface shall be restored to operation within 10 ms from the setting of bit 1.2309.15.

These bits are then mapped two at a time, into a PAM4 symbol.

**Response**

ACCEPT.

Add commas for readability.

**Suggested Remedy**

Change: These bits are then mapped two at a time into a PAM4 symbol.

To: These bits are then mapped, two at a time, into a PAM4 symbol.

**Response**

ACCEPT.
Comment Type: E  Comment Status: A  EZ
Comment: Change signal value to +1 for consistency.
Suggested Remedy: Change: {-1, 1} To: {-1, +1}
Response: ACCEPT IN PRINCIPLE.

Comment Status: A  Response Status: C

Comment Type: T  Comment Status: A  Editorial
Comment: Aggregation into a superframe is not an option - it is written as if it were.
Suggested Remedy: Change "In order to improve error correction capability, the PHY may aggregate L RS-FEC input frames into an interleaved RS-FEC input superframe." to "The PHY aggregates L RS-FEC input frames into an L-interleaved (L=1, 2, or 4) RS-FEC input superframe."
Response: ACCEPT.

Comment Status: A  Response Status: C

Comment Type: E  Comment Status: A  EZ
Comment: Typo: 65B-RS_FEC
Suggested Remedy: Change: 65B-RS_FEC To: 65B RS-FEC
Response: ACCEPT.
Comment Type: E  Comment Status: A  EZ
Equation (149-1) is truncated
Is this a "Medium" equation?

Suggested Remedy
If it is not already, make this a "Medium" equation.
"Shrink-wrap" the equation.

Response  Response Status: C
ACCEPT.

Comment Type: ER  Comment Status: A  EZ
Just shows half g of g(x), and half 0 of g0 in Equation (149-1)

Suggested Remedy
Zoom out a little bit for the equation (149-1) to show the full equation.

Response  Response Status: C
ACCEPT.

Comment Type: E  Comment Status: A  Editorial
"This may be computed".  "may" is a special word for "is permitted to". In this case, it is
describing an implementation.

Suggested Remedy
Change "may" to "can"

Response  Response Status: C
ACCEPT.

Comment Type: E  Comment Status: A  EZ
i,r should be subscripts

Suggested Remedy
For pi,r, change i,r to a subscript of p.

Response  Response Status: C
ACCEPT.
Comment Type: TR
Comment Status: A
Editorial

The last message symbol of the input message symbols should be m0, not mL.

Suggested Remedy
In the input message symbols, change "mL" to "m0".

ACCEPT.

Response: Response Status: C

Comment Type: ER
Comment Status: A
Editorial

Type

Change "mL" to "m0"; Figure 149-10, at the RS Encoder #L, the input and output mL should be m0.

ACCEPT.

Response: Response Status: C

Comment Type: TR
Comment Status: A
Editorial

Wrong indices. "m_L" should be "m_0" at both the input and the output of the Lth encoder.

Suggested Remedy
Change "m_L" to "m_0" at both the input and the output of the Lth RS Encoder.

ACCEPT.
Refresh is PAM2 so we can delete highlighted paragraph.

Data are processed in units of superframes. It makes no sense if the 8 RS-FEC partially fill the final superframe. A related issue is once the LP_IDLE is sent, the transmitter is committed to sending the complete sleep signal (8 RS-FEC frames worth) and not abort early.

Add the sentences below to clarify how the 8 RS-FEC frames of LP_IDLE are packed at the end of line 23.

The 8 RS-FEC frames of LP_IDLE completely fill two superframes in L=4 interleaves or four superframes in L=2 interleaves. Once initiated, the complete sleep signal consisting of 8 RS-FEC frames of LP_IDLE shall be transmitted.

Add comma for readability.

Change: After the sleep signal is transmitted, LPI control characters shall be
To: After the sleep signal is transmitted, LPI control characters shall be

Remove highlighting on "Figure 149-TBD".

Change: Figure 149-TBD
To: The correct Figure reference for the figure added by comment #78.
Alert description is yellowed out, and needs to mention that we use link synchronization.

Current paragraph:
When the lpi_tx_mode variable takes the value <TBD: ALERT and the PMA asserts SEND_N, the PCS passes the ALERT vector to the PMA.>

SuggestedRemedy
When the lpi_tx_mode variable takes the value ALERT, the PMA transmits the link synchronization sequence onto the MDI as provided by the link synchronization block via sync_tx_symb.

Response
Remove highlighting and
Change: When the lpi_tx_mode variable takes the value <TBD: ALERT and the PMA asserts SEND_N, the PCS passes the ALERT vector to the PMA.>
To: When the lpi_tx_mode variable takes the value ALERT, the PMA transmits the link synchronization sequence onto the MDI as provided by the link synchronization block via sync_tx_symb.

Alert has a yellow tag around it <TBD Alert>

SuggestedRemedy
Please add the following:
After the alert signal, the PCS completes the transition from LPI mode to normal mode by sending a wake signal containing lpi_wake_time RS-FEC frames composed of IDLE 64B/65B blocks.

Lpi_wake_time is a fixed parameter that is defined in Table 149-1000. Please see attached word doc

Response
Delete: <TBD Alert>
Replace with: After the alert signal, the PCS completes the transition from LPI mode to normal mode by sending a wake signal containing lpi_wake_time RS-FEC frames composed of IDLE 64B/65B blocks.

Lpi_wake_time is a fixed parameter that is defined in Table 149-1000.

Add the table on page 3 of Benyamin_3ch_1_0319.pdf after the text being added by this comment.

Editorial license to use the appropriate table number.

Change "65B-RS-FEC" to "65B RS-FEC", same as the convention used in 149.3.2.2.2

SuggestedRemedy
Change "65B-RS-FEC" on line 14 and line 15 to "65B RS-FEC".
Comment Type: T  Comment Status: A

Suggested Remedy

There are 450 PAM2 symbols per partial frame.

Response

Response Status: C

ACCEPT IN PRINCIPLE.

There are 450 PAM2 symbols per partial frame.

Suggested Remedy

Within the highlighted text, change "180" to "450". Then remove the highlights.

Response

Response Status: C

ACCEPT.

Comment Type: E  Comment Status: A

Add comma for readability.

Suggested Remedy

Change: After these frames the link partner
To: After these frames, the link partner

Response

Response Status: C

ACCEPT.

Comment Type: E  Comment Status: A

Add comma for readability.

Suggested Remedy

Change: After these frames the link partner
To: After these frames, the link partner

Response

Response Status: C

ACCEPT.
There is a yellow TBD as follows:
The quiet-refresh cycle continues until the PMA asserts <TBD Alert>.

Suggested Remedy:
The quiet-refresh cycle continues until the link synchronization detect asserts send_s_sigdet to indicate that the alert (link synchronization) sequence has been reliably detected. After the alert sequence the link partner transmits repeated /I/ characters, representing a wake signal. The PHY receive function sends /I/ to the XGMII for 8 RS-Frame periods (wake duration) and then resumes normal operation.

Response: Remove yellow highlighting.

Change: PMA asserts <TBD Alert>.

To: link synchronization detect asserts send_s_sigdet to indicate that the alert (link synchronization) sequence has been reliably detected. After the alert sequence the link partner transmits repeated /I/ characters, representing a wake signal. The PHY receive function sends /I/ to the XGMII for 8 RS-Frame periods (wake duration) and then resumes normal operation.

The equation references are swapped. The Master receive function should use the Slave transmit scrambler to descramble and the Slave receiver should use the Master transmit scrambler to descramble.

Suggested Remedy:
Swap the references to Equation (149-5) and Equation (149-6) in the following text: For side-stream descrambling, the MASTER PHY shall employ the receiver descrambler generator polynomial per Equation (149–5) and the SLAVE PHY shall employ the receiver descrambler generator polynomial per Equation (149–6).

Response: ACCEPT.

The equation references are swapped. The Master receive function should use the Slave transmit scrambler to descramble and the Slave receiver should use the Master transmit scrambler to descramble.

Suggested Remedy:
Swap the references to Equation (149-5) and Equation (149-6) in the following text: For side-stream descrambling, the MASTER PHY shall employ the receiver descrambler generator polynomial per Equation (149–5) and the SLAVE PHY shall employ the receiver descrambler generator polynomial per Equation (149–6).

Response: ACCEPT.

"however there is the possibility that the RS-FEC decoder may have corrected some errors." *may* is a special word for "is permitted to" in this case a fact is being described.

Suggested Remedy:
"however there is the possibility that the RS-FEC decoder may have corrected some errors." to "however there is the possibility that the RS-FEC decoder corrected some errors."

Response: ACCEPT.

"PMA training side-stream scrambler polynomials" - these are also used in data mode. They're not just for breakfast anymore.

Suggested Remedy:
Delete "PMA Training" so that the header for 149.3.4 reads "Side-stream scrambler polynomials"

Response: ACCEPT.
den Besten, Gerrit  
NXP Semiconductors

Comment Type: T  
Comment Status: A  
Editorial

"alignment to the RS-FEC block and the 16 partial PHY frames that comprise the block"  
"block" is confusing here as block is used in the context of 64B/65B block encoding. What is meant here is a PAM2 training sequence with the length of 4 RS frames. I think this is called super-frame.

Suggested Remedy
Replace by: "alignment to the RS-FEC super-frame comprising 16 partial PHY frames"

Response: Response Status C

ACCEPT IN PRINCIPLE.

Change: alignment to the RS-FEC block and the 16 partial PHY frames that comprise the block

To: alignment to the RS-FEC super-frame comprising 16 partial PHY frames

Wienckowski, Natalie  
General Motors

Comment Type: E  
Comment Status: A  
EZ

This is a duplicate of 149.3.4.3.

Suggested Remedy
Delete 149.3.4.4.

Response: Response Status C

ACCEPT.

Wienckowski, Natalie  
General Motors

Comment Type: E  
Comment Status: A  
EZ

grammar - the letter L is "el" which requires an in front of it

Suggested Remedy
Change: a LPI

To: an LPI

Response: Response Status C

ACCEPT.

Lo, William  
Axonne Inc.

Comment Type: ER  
Comment Status: A  
EZ

Section duplicated

Suggested Remedy
Delete section.

Response: Response Status C

ACCEPT.
We space alerts so they do not overlap by forcing their start times. It is more clear to refer to alert start time as opposed to alert signal. Also in the same sentence we refer to the link partner. See following text and changes in bold on the right

lpi_offset is a fixed value equal to lpi_qr_time / 2 + 4 (52 RS-FEC frame periods) that is used to ensure refresh signals and alert signals are appropriately offset by the link partner's.

**Suggested Remedy**

lpi_offset is a fixed value equal to lpi_qr_time / 2 + 4 (52 RS-FEC frame periods) that is used to ensure refresh signals and alert start times are appropriately offset from the link partner's.

**Response**

ACCEPT IN PRINCIPLE.

Change "alert signals" to "alert start times" on P100 L34.

---

The method to synchronize the master as slave as described in this section defeats the entire purpose of partial frame count during training as shown in Figure 149-12 and introduces uncertainty in the timing.

**Suggested Remedy**

Delete:

The transition to PCS_Test is used as a fixed timing reference for the link partners. Refresh signaling is derived by counting RS-FEC frames from the transition to PCS_Test. At the Master RS-FEC frame count of zero and all multiples of 96 RS-FEC frames thereafter denote the start of the cycle.

Replace with:

Refresh signaling is derived by tracking the partial frame count as shown in Figure 149-12.

Delete (lines 16, 17):

Following the transition to PAM4, the PCS continues to count transmitted RS-FEC frames (tx_rsfc), and uses the counter to generate refresh, ALERT, and wake control signals for the transmit functions.

Replace with:

Following the transition to PAM4, the PCS continues to count partial frames and uses the count to generate refresh, ALERT, and wake control signals for the transmit functions.

**Response**

ACCEPT IN PRINCIPLE.

Delete all text in Clause 149.3.5.1.

Editorial license to format correctly.

Replace with: To maximize power savings, maintain link integrity, and ensure interoperability, EEE-capable PHYs must synchronize refresh intervals during the LPI mode. An EEE-capable PHY in SLAVE mode is responsible for synchronizing its Partial PHY frame Count (PFC24) to the MASTER's PFC24 during PAM2 training. For 10GBASE-T1, 5GBASE-T1, and 2.5GBASE-T1 the SLAVE's PFC24 should be +0/-4, +0/-2, and +0/-1 partial frames respectively with respect to the MASTER's PFC24.

Refresh signaling is derived by tracking the RS-FEC frame count as shown in Figure 149-12, where:

\[
\text{RS-FEC frame count} = \left( \frac{\text{PFC24}}{4} \right) \mod 96.
\]

The start of the SLAVE quiet-refresh cycle is delayed from the MASTER by 52 RS-FEC frames. This offset ensures that the MASTER and SLAVE ALERT windows are offset from each other and that the refresh periods are close to half cycle offset.
Following the transition to PAM4, the PCS continues with the RS-FEC frame count and uses the count to generate refresh, ALERT, and wake control signals for the transmit functions.

Also resolves Comment #33.

---

**Comment:**

Add commas for readability.

**Suggested Remedy:**

Change:  At the Master RS-FEC frame count of zero and all multiples of 96 RS-FEC frames thereafter denote the start of the cycle.

To:  At the Master, a RS-FEC frame count of zero, and all multiples of 96 RS-FEC frames thereafter, denote the start of the cycle.

---

**Comment Status:**

REJECT.

This comment was WITHDRAWN by the commenter.

---

**Comment:**

Frame counts are based on RS-Frames, not partial frames

**Suggested Remedy:**

Remove the word partial in three places on line 10 and line 11

**Response**

REJECT.

Not needed as comment #65 implemented as proposed.
We need to establish limitation for alert starts so that it does not overlap with the link partner's alert.

**Suggested Remedy**

Add the following paragraph:

The four RS-Frame long Alert may start at the beginning of every eighth PHY frame boundary starting at the beginning of the frame following the refresh PHY frame. This sets alert_period to 4 PHY frames and provides the following two benefits: The MASTER and SLAVE allowable alert transmissions do not overlap and Alert does not overlap device's own refresh. The MASTER and SLAVE shall derive the tx_refresh_active and tx_alert_start signals from the transmitted PHY frames (tx_rsfc) as shown in Table 149-5 and Table 149-6.

**Proposed Response**

This comment was WITHDRAWN by the commenter.
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  Z/withdrawn
SORT ORDER: Clause, Subclause, page, line

Cl 149 SC 149.3.5.1 P101 L28 # 70
Graba, Jim Broadcom
Comment Type: TR  Comment Status: A  EEE
Need tx_lpi_full_refresh condition in Table 149-3
Suggested Remedy:
Add row to Table 149-3. First column: tx_lpi_full_refresh=true. Second column: mod(u, lpi qr time) = lpi_offset - lpi refresh time
Response  Response Status: C
ACCEPT.

Cl 149 SC 149.3.5.1 P101 L36 # 57
Benyamin, Saied Aquantia
Comment Type: TR  Comment Status: A  EEE
The table is erroneously referring to wake_period for alert calculation
Suggested Remedy:
Change wake_period to alert_period
Response  Response Status: C
ACCEPT.

Cl 149 SC 149.3.5.1 P101 L38 # 71
Graba, Jim Broadcom
Comment Type: TR  Comment Status: A  EEE
Need tx_lpi_full_refresh condition in Table 149-4
Suggested Remedy:
Add row to Table 149-4. First column: tx_lpi_full_refresh=true. Second column: mod(v,lpi qr time) = lpi_quiet_time
Response  Response Status: C
ACCEPT.

Cl 149 SC 149.3.5.3 P101 L47 # 58
Benyamin, Saied Aquantia
Comment Type: TR  Comment Status: A  EEE
During LPI, we still need to send the OAM, the following text does not include this, it only mentions that we do not send any infofield data during refresh with the exception that the infofield consists of a sequence of 128 zeros.
Suggested Remedy:
with the exception that the infofield consists of a sequence of 128 zeros and, in addition, the 10-bit OAM symbol to be transmitted is XORed with the last 10 bits of the PAM2 refresh transmission
Response  Response Status: C
ACCEPT.

Cl 149 SC 149.3.6.2.2 P102 L49 # 74
Maguire, Valere The Siemon Company
Comment Type: E  Comment Status: A  Editorial
Consistency with other text in clause
Suggested Remedy:
Replace "which" with "that"
Response  Response Status: C
ACCEPT.

Cl 149 SC 149.3.6.2.2 P103 L29 # 70
Graba, Jim Broadcom
Comment Type: ER  Comment Status: A  EEE
Yellow highlighting is no longer needed
Suggested Remedy:
Remove highlighting
Response  Response Status: C
ACCEPT IN PRINCIPLE.

The 10-bit OAM symbol to be transmitted is XORed with the last 10 bits of the PAM2 refresh transmission.

Add the following sentence after …128 zeros.

The 10-bit OAM symbol to be transmitted is XORed with the last 10 bits of the PAM2 refresh transmission.
Comment Type       Comment Status
E                   EZ

Suggested Remedy

Proposed Response  Response Status  Z
REJECT.

This comment was WITHDRAWN by the commenter.

Comment Type       Comment Status
T                   A

State diagrams

Comment Type       Comment Status
ER                  A

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

Yellow highlighting is no longer needed

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.

Comment Type       Comment Status
ER                  A

There's no definition for rx_symb_vector. The rx_symb is defined instead.

Suggested Remedy

Proposed Response  Response Status  C
ACCEPT.
Ez Wienckowski, Natalie General Motors

Comment Type: E
Comment Status: A
Hex alphabetic characters should be capitalized.

Suggested Remedy:
- Change: 0x1e
- To: 0x1E
- Also on page 105, line 45

Response: Response Status: C
ACCEPT.

Ez Wienckowski, Natalie General Motors

Comment Type: E
Comment Status: A
duplicate sentence.

Suggested Remedy:
- Delete on instance of: A valid O code is one containing an O code specified in Table 149-1.

Response: Response Status: C
ACCEPT.

Tu, Mike Broadcom

Comment Type: TR
Comment Status: A
The RFER monitor state diagram is missing.

Suggested Remedy:
1. Copy Figure 97-13 as RFER monitor state diagram
2. On line 17, change Figure 149-TBD to the figure number of this inserted figure.
3. Before 149.3.6.3, add "149.3.6.2.6 Messages", with content:
   RX_FRAME
   A signal sent to PCS Receive indicating that a full Reed-Solomon frame has been decoded and the variable rf_valid is updated.

Response: Response Status: C
ACCEPT.

Need to reconcile comments 101, 221, 222, 103, and 78.
Comment Type: T  Comment Status: A  State diagrams

Need RFER monitor state diagram

SuggestedRemedy

Accept text in yellow on P 107 lines 17 & 18. Add figure 97-13 into the draft as the referenced "Figure 149-TBD" in line 17. Editorial license to accept and add any necessary variables, counters, functions or constants for Figure 97-13 from clause 97 into 149.3.6.2, or accept them if missed by other comments (they should all be there in yellow and in other comments)

Response  Response Status: C

ACCEPT IN PRINCIPLE.

Remove highlighting from all text in 149.3.6.2.5 and make other changes in suggested remedy with editorial license to make additional changes, if needed, as described in the suggested remedy.

Need to reconcile comments 101, 221, 222, 103, and 78.

Comment Type: E  Comment Status: A  State diagrams

Accept description of state diagrams

SuggestedRemedy

Accept text in yellow on page 107 lines 19 through 36 for PCS state diagrams.

Response  Response Status: C

ACCEPT.

Need to reconcile comments 101, 221, 222, 103, and 78.

Comment Type: TR  Comment Status: A  State diagrams

Remove editorial highlights from line 17 to line 35.

Response  Response Status: C

ACCEPT.

Need to reconcile comments 101, 221, 222, 103, and 78.

SuggestedRemedy

Change "PCS_status" to the defined pcs_status for naming consistency.

Response  Response Status: C

ACCEPT IN PRINCIPLE.

Make suggested change.

Also make change on P150 L46 x2, P151 L12, P151 L18, P48 L35.

Comment Type: TR  Comment Status: A  State diagrams

Add EEE transmit state diagram

SuggestedRemedy

Insert EEE transmit state diagram with changes as shown in EeeTransmitStateDiagramMarkUp_Graba_20190222.pdf

Response  Response Status: C

ACCEPT IN PRINCIPLE.

In addition to adding the Figure in Graba_3ch_1_0319.pdf, on P148 L 37 insert the following text, with editorial license:

The following variable is required only for PHYs that support the EEE capability:

| ppi_refresh_detect |

Set TRUE when the receiver has reliably detected refresh signaling and FALSE otherwise.

The exact criteria left to the implementer.

| pcs_data_mode |

Generated by the PMA PHY Control function and indicates whether or not the local PHY may transition its PCS state diagrams out of their initialization states. The current value of the pcs_data_mode is passed to the PCS via the PMA_PCSDATAMODE.indicate primitive.

In the absence of the optional EEE and fast retrain capabilities, the PHY operates as if the value of this variable is TRUE.

Response  Response Status: C

ACCEPT IN PRINCIPLE.

Make suggested change.

Also make change on P150 L46 x2, P151 L12, P151 L18, P48 L35.
There are only 6 bits in MDIO register bits 3.2324.5:0.

Suggested Remedy
Change from "X-bit counter that ..." to "6-bit counter that ...".

Response
ACCEPT.

The "fr_active" and "fr_sigtype" is not defined and should be removed.

Suggested Remedy
Change
if !fr_active
rx_raw <= LBLOCK_R
else
rx_raw <= fr_sigtype
end

to
"rx_raw <= LBLOCK_R"

Response
ACCEPT IN PRINCIPLE.

“a continuous stream of TBD encoded PAM 4 symbols” - the missing word is "RS-FEC"

Suggested Remedy
Replace "TBD with "RS-FEC"

Response
ACCEPT IN PRINCIPLE.

Change "TBD to "65B RS-FEC"
Comment Type: TR  Comment Status: A  Editorial
Change "TBD" to "65B RS-FEC"

Suggested Remedy
Change "TBD" to "65B RS-FEC"

Response  Response Status: C  ACCEPT.

---

Comment Type: E  Comment Status: A  Editorial
The OAM10 is not defined.

Suggested Remedy
Change "the OAM10 field" to "the OAM 10-bit field"
Also replace the same issue in page 113 line 30.

Response  Response Status: C  ACCEPT.

---

Comment Type: T  Comment Status: A  OAM
It is not required that a user defined OAM message require multiple OAM messages to transmit. It is possible that the user defined OAM message fits within the 8 bytes available.

Suggested Remedy
Change: the OAM message exchange operates on a per OAM message basis that will occur over many OAM frames.
To: the OAM message exchange operates on a per OAM message basis that may occur over many OAM frames.

Response  Response Status: C  ACCEPT.
"it may be possible". "may" means "it is permitted to" - "it is permitted to be possible"
doesn't really make sense. If it is, indeed possible, "it is possible", if we are unsure, let's
figure it out! (in 2 places, also on line 44)

Suggested Remedy
Change "it may be possible" to "it is possible" on lines 41 and 44

Response Response Status C
ACCEPT.

Clarification on the dummy symbol

Suggested Remedy
Add new paragraph at line 3 as follows:
The dummy OAM symbol is all 0s and its value is ignored at the receiver.

Response Response Status C
ACCEPT.

awkward wording

Suggested Remedy
Change: This bit is set by the PHY to for the link partner to echo on Ping RX.
To: This bit is set by the PHY for the link partner to echo on Ping RX.

Response Response Status C
ACCEPT.
This standard requires single pair cable. There's no pair swap.

**Suggested Remedy**
- Remove L42 to L47.

While it is true that pairs cannot be swapped as there is only one pair, the conductors in the pair can be swapped. That is what this says.

**Change:** Pair swapped

**To:** Polarity inversion

Also on P117 L46 Change: Pair is not swapped

**To:** No polarity inversion detected.

Also on P117 L47 Change: Pair is swapped

**To:** Polarity inversion detected.

Unclear which RS-FEC block errors since we have different RS-FEC for both RS-FEC frame and OAM message, respectively.

**Suggested Remedy**
- Change "... RS-FEC block errors" to "... RS-FEC frame block errors"

**Response**

**Accept.**

The RS(16, 14) parity symbols is indicated

**Suggested Remedy**
- Change: The RS(16, 14) parity symbols are indicated

**Response**

**Accept.**

Make the changes as defined in Lo_3ch_01_0319.pdf with editorial license to correct grammar.

This also resolves comment #288.
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
<th>#</th>
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<td>149</td>
<td>149.3.8.2.13</td>
<td>118</td>
<td>35</td>
<td>507</td>
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<td>149</td>
<td>149.3.8.2.14</td>
<td>119</td>
<td>39</td>
<td>37</td>
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<tr>
<td>149</td>
<td>149.3.8.2.15</td>
<td>119</td>
<td>48</td>
<td>246</td>
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<td>149</td>
<td>149.3.8.2.17</td>
<td>120</td>
<td>22</td>
<td>207</td>
</tr>
</tbody>
</table>

**Comment by den Besten, Gerrit**
NXP Semiconductors

Comment Type: E  Comment Status: A  EZ

**Comment Type**

Period missing after "Figure 149–19"

**Suggested Remedy**

Add period

**Response**

Implementation by comment 204.

**Response Status**: C

---

**Comment by Lo, William**
Axonne Inc.

Comment Type: ER  Comment Status: A  Editorial

**Comment Type**

Title heading incorrect

**Suggested Remedy**

Delete 1000BASE-T1

**Response**

Accept in Principle.

**Response Status**: C

---

**Comment by Wienckowski, Natalie**
General Motors

Comment Type: E  Comment Status: A  EZ

**Comment Type**

missing periods

**Suggested Remedy**

Change: Figure 149–19 Before calculation

To: Figure 149–19. Before calculation

**Response**

Accept.

**Response Status**: C

---

**Comment by Wienckowski, Natalie**
General Motors

Comment Type: E  Comment Status: A  Editorial

**Comment Type**

missing periods

**Suggested Remedy**

Add periods at the end of the a) and b) statements.

**Response**

Accept in Principle.

**Response Status**: C

---

**Comment by Zimmerman, George**
CME;ADI,Aquantia,AP

Comment Type: E  Comment Status: A  Editorial

**Comment Type**

"that may cause the PHY" - it appears "can cause the PHY" would be more appropriate.

This is neither permission nor option. Occurs 2 times, also on line 51.

**Suggested Remedy**

Change "may" to "can" on lines 48 & 51

**Response**

Accept.

**Response Status**: C

---

**Comment by Lo, William**
Axonne Inc.

Comment Type: ER  Comment Status: A  Editorial

**Comment Type**

Delete 1000BASE-T1

**Suggested Remedy**

Accept in Principle.

**Response**

Change: 1000BASE-T1

To: BASE-T1

---

**Comment by Wienckowski, Natalie**
General Motors

Comment Type: E  Comment Status: A  EZ

**Comment Type**

missing comma

**Suggested Remedy**

Change: After the link partner receives the OAM message it transfers it

To: After the link partner receives the OAM message, it transfers it

**Response**

Accept.

**Response Status**: C

---

**Comment by Lo, William**
Axonne Inc.

Comment Type: ER  Comment Status: A  Editorial
Comment Type: E  Comment Status: A  EZ

Suggested Remedy:

Change: One OAM message can be loaded into the OAM transmit registers while another OAM message is being transmitted by the PHY to the link partner while yet another OAM message is being read out at the link partner's OAM receive registers.

To: One OAM message can be loaded into the OAM transmit registers while another OAM message is being transmitted by the PHY to the link partner, while yet another OAM message is being read out at the link partner's OAM receive registers.

Response  Response Status: C
ACCEPT.

Comment Type: E  Comment Status: A  EZ

Suggested Remedy:

Change: The exchange of OAM messages are occurring concurrently and bi-directionally.

To: The exchange of OAM messages is occurring concurrently and bi-directionally.

Response  Response Status: C
ACCEPT.

Comment Type: E  Comment Status: A  EZ

Suggested Remedy:

Change: On the transmit side mr_tx_valid = 0 indicates that the next OAM message can be written into the OAM transmit registers.

To: On the transmit side, mr_tx_valid = 0 indicates that the next OAM message can be written into the OAM transmit registers.

Response  Response Status: C
ACCEPT.

Comment Type: E  Comment Status: A  EZ

Suggested Remedy:

Change: If mr_rx_lp_valid is not cleared then the OAM

To: If mr_rx_lp_valid is not cleared, then the OAM

Response  Response Status: C
ACCEPT.
Comment Type: E  Comment Status: A
Highlighted sentence is accurate

Suggested Remedy
Remove highlight

Response  Response Status: C
ACCEPT.

Comment Type: E  Comment Status: A
Highlighted sentence is accurate

Suggested Remedy
Remove highlight

Response  Response Status: C
ACCEPT.

Comment Type: ER  Comment Status: A
The mr_rx_lp_message[95:0] has 12 Octets.

Suggested Remedy
Change "Eight octet BASE-T1 OAM from ..." to "Twelve octet BASE-T1 OAM from ..."

Response  Response Status: C
ACCEPT IN PRINCIPLE.

Change: Eight octet BASE-T1 OAM
To: Twelve octet OAM
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response</th>
<th>Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>A</td>
<td>Improve wording to match other statements</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>A</td>
<td>Add periods at the end of both &quot;Values&quot; sentences.</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>A</td>
<td>Add periods at the end of all 4 &quot;Values&quot; sentences.</td>
<td>ACCEPT.</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>A</td>
<td>Add period at end of &quot;Good&quot; sentence.</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>A</td>
<td>Remove the yellow as the text is correct</td>
<td>ACCEPT.</td>
<td></td>
</tr>
</tbody>
</table>
Comment Type: E  Comment Status: A  Editorial
Comment: missing periods
Suggested Remedy: Add periods at the end of both "Values" sentences.
Response: Response Status: C  ACCEPT IN PRINCIPLE.
Change: false: transmit stream not at a boundary end
to: true: transmit stream at a boundary end
To: false: transmit stream is not at a boundary end.
to: true: transmit stream is at a boundary end.

Comment Type: E  Comment Status: A  Editorial
Comment: missing periods
Suggested Remedy: Add periods at the end of all 4 "Values" sentences.
Response: Response Status: C  ACCEPT.

Comment Type: T  Comment Status: A  EZ
Comment: tx_boundary description has yellow highlighted
Suggested Remedy: Remove the yellow as the text is correct.
Response: Response Status: C  ACCEPT.

Comment Type: E  Comment Status: A  Editorial
Comment: rx_cnt incorrectly defined
Suggested Remedy: Change:
A count of received OAM frames
To:
A count of received OAM frame symbols
Response: Response Status: C  ACCEPT IN PRINCIPLE.
Change:
A count of received OAM frames.
To:
A count of received OAM frame symbols.
The downward arrow from RECEIVE INIT state to CHECK READ state is missing the transition condition.

**Suggested Remedy**
Add conditional label "UCT" for the arrow in the middle.

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

If comment #66 is accepted as the response is written, a condition is added to this transition.

**Comment Status** A

---

State machine issues:
Typo from modifying from 1000BASE-T1 and missing transitions and not quite correct exit condition

**Suggested Remedy**
Change: Parity_Check(rx_oam_field<8:0>) = Even
To: frame_boundary = True * (rx_cnt ! = 16)

Change: RECEIVE INIT to CHECK READ transition should be rx_boundary (currently it is blank)

Change:
In the LOAD SYMBOL state change rx_boundary To:
rx_boundary | (rx_cnt = 16)

Add:
rx_cnt <= 0 at the bottom of the LOAD RECEIVE PAYLOAD state
Delete in 2 places
* (frame_boundary = False)

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

P131 L 26 Change: Parity_Check(rx_oam_field<8:0>) = Even
To: (frame_boundary = True) * (rx_cnt != 16)

P131 L 17 Add transition condition to middle arrow out of RECEIVE INIT: rx_boundary (condition to be added)

P131 L 37 Change transition out of LOAD SYMBOL state
From: rx_boundary
To: rx_boundary + (rx_cnt = 16)

P 131 L 30 Add:

---

---

---
rx_cnt <= 0 as the first line in the LOAD RECEIVE PAYLOAD state

Delete in 2 places (P 131 L 27 (on left) & P 131 L 38 (on right):
* (frame_boundary = False)

PMA reference diagram shows alert detect, this is replaced by link synchronization

Suggested Remedy
See attached word document for Figure 149-24 erroneously numbered as 149-34 because I was looking at the wrong pdf

Response
ACCEPT IN PRINCIPLE.

Accept changes as shown on page 3 of Benyamin_3ch_1_0319.pdf, removing the line for loc_phy_ready and the label, with editorial license while modifying the figure.

Suggested Remedy
Change: Figure 149-12
To: Figure 149-24
Make the same change on line 49.

Response
ACCEPT.

Suggested Remedy
Add requirement for time allowed to perform a reset at the end of this section.

Response
REJECT.

This comment was WITHDRAWN by the commenter.

Add a new paragraph at the end of this section: The time for the PMA to resume normal transmit and receive functions after pma_reset transitions to OFF shall not exceed 20 ms.

Proposed Response
REJECT.

This comment was WITHDRAWN by the commenter.
Timing specs for PMA reset are missing.

**Suggested Remedy**

Insert the following paragraph:

The reset shall take less than 10 ms (=max_reset_time), and register access shall be available again after that. The link shall resume operation and achieve the required BER within 100 ms (=max_training_time).

**Response**

**Response Status**: C

**ACCEPT IN PRINCIPLE.**

Insert the following paragraph on page 135 after line 7:

The MultiGBASE-T1 PMA shall take no longer than 100 ms to enter the SEND_DATA state after exiting from reset or lowpower mode.

---

**Comment**

**Comment Type**: TR

**Comment Status**: A

**Comment**: State diagrams

**Comment**: missing comma

**Suggested Remedy**

Change: onto the MDI pulses modulated
To: onto the MDI, pulses modulated

**Response**

**Response Status**: C

**ACCEPT IN PRINCIPLE.**

Sentence is punctuated, correctly, but is confusing - and is incorrect by not covering the autoneg case.

Change: PMA Transmit shall continuously transmit onto the MDI pulses modulated by the symbols given by tx_symb when sync_link_control = ENABLE, or the sync_tx_symb output by the PHY Link Synchronization function when sync_link_control = DISABLE, after processing with optional transmit filtering, digital-to-analog conversion (DAC) and subsequent analog filtering.

To: When the PHY control state diagram (Figure 149-31) is not in the DISABLE_TRANSMITTER state, PMA Transmit shall continuously transmit pulses modulated by the symbols given by tx_symb onto the MDI. During Link Synchronization, when sync_link_control = DISABLE and Auto-Negotiation is either not enabled or is not implemented, the sync_tx_symb output by the PHY Link Synchronization function shall be used in place of tx_symb as the data source for PMA Transmit.

**Proposed Response**

**Response Status**: Z

**REJECT.**

This comment was WITHDRAWN by the commenter.
When the PMA_transmit_disable variable is set to true, this function shall turn off the transmitter so that the Average Launch Power of the Transmitter is less than –53 dBm.

Change: When the PMA_transmit_disable variable is set to true, this function shall turn off the transmitter so that the Average Launch Power of the Transmitter is less than –53 dBm.

Tu, Mike Broadcom

SuggestedRemedy
Change "TBD" to "3.2 x 10^-9".

Response
ACCEPT IN PRINCIPLE.

Error rate specification "The quality of these symbols shall allow RFER of less than TBD after RS-FEC decoding"... 10^-12 BER with an RS-FEC frame of 3260 message bits (with the errored frame replaced by error symbols) means an RFER same as the BER, or 10^-12.

SuggestedRemedy
Replace "TBD" with "10^-12" (where ^ indicates superscript)

Proposed Response
REJECT.

This comment was WITHDRAWN by the commenter.
Comment Type: E  Comment Status: A  
subject/verb agreement

Suggested Remedy
- Change: from any other values
- To: from any other value

Response  Response Status: C
ACCEPT.

Comment Type: E  Comment Status: A  
extra "F"

Suggested Remedy
- Change: Figure 149-27
- To: Figure 149-27

Response  Response Status: C
ACCEPT IN PRINCIPLE.

Comment Type: E  Comment Status: A  
Should be the letter "O", not the number "0".

Suggested Remedy
- Change: [0ct8<7:0>, 0ct9<7:0>, 0ct10<7:0>]
- To: [Oct8<7:0>, Oct9<7:0>, Oct10<7:0>]

Response  Response Status: C
ACCEPT.
The requirements for EEEen and OAM should go here in the description of the fields. These are currently in yellow in the PHY control description.

SuggestedRemedy
Insert new first 2 sentences of paragraph beginning with "Interleaver Depth..." to read "The optional EEE capability shall be enabled only if both PHYs set the capability bit EEEen = 1. The optional BASE-T1 OAM capability shall be enabled only if both PHYs set the capability bit OAMen = 1."

Response
ACCEPT IN PRINCIPLE.

Change: InterleaverDepth indicates the requested data mode interleaving depth and PrecodeSel indicates the requested data mode precoder.

To: The optional EEE capability shall be enabled only if both PHYs set the capability bit EEEen = 1. The optional BASE-T1 OAM capability shall be enabled only if both PHYs set the capability bit OAMen = 1. InterleaverDepth indicates the requested data mode interleaving depth. PrecodeSel indicates the requested data mode precoder.

Response
ACCEPT IN PRINCIPLE.

"data mode precoder" - it's used in training as well. It is not just for data mode.

SuggestedRemedy
Change "data mode precoder" to "requested precoder"

Response
ACCEPT.

Remove the editorial highlights

This comment was WITHDRAWN by the commenter.

Requested changes are accomplished with the proposal in comment 231.
Comment Type: TR
Comment Status: D

There is no need to exchange the Seed values. There are no user configurable register bits either. However the PHY shall indicate the precoder and the interleaver selections.

Suggested Remedy
Change the last sentence to "The PHY Control also sets PMA_state = 00 and sends the PHY capability bits, and select the precoder and the interleaver depth".

Proposed Response
REJECT.

This comment was WITHDRAWN by the commenter.

Requested changes are accomplished with the proposal in comment 231.

Comment Type: E
Comment Status: D

Add commas for readability.

Suggested Remedy
Change: In SLAVE mode PHY Control transitions to the TRAINING state only after the SLAVE PHY acquires timing, converges its equalizers, acquires its descrambler state and sets loc_SNR_margin = OK.
To: In SLAVE mode, PHY Control transitions to the TRAINING state only after the SLAVE PHY acquires timing, converges its equalizers, acquires its descrambler state, and sets loc_SNR_margin = OK.

Proposed Response
REJECT.

This comment was WITHDRAWN by the commenter.

Requested changes are accomplished with the proposal in comment 231.
Comment Type TR Comment Status A Startup
Text modification to conform to state machine.
Rest of highlighted text is correct

Suggested Remedy
Un highlight lines 16 to 26
Change rem_phy_ready to PCS_status in line 17

Response Response Status C
ACCEPT IN PRINCIPLE.

Requested changes are accomplished with the proposal in comment 231.

Comment Type TR Comment Status D Startup
This paragraph needs to be revised to match the PHY Control state diagram.

Suggested Remedy
Change the paragraph to "Upon entering the SEND_DATA state, PHY Control starts the
minwait_timer and stops the maxwait_timer."

Proposed Response Response Status Z
REJECT.

This comment was WITHDRAWN by the commenter.

Requested changes are accomplished with the proposal in comment 231.

Comment Type E Comment Status EZ
subject/verb agreement

Suggested Remedy
Change: the Auto-Negotiation function set link_control
To: the Auto-Negotiation function sets link_control

Response Response Status C
ACCEPT.
Lo, William
Axonne Inc.

Comment Type TR Comment Status A State diagrams
No state diagram so no reference
Update to correct time

Suggested Remedy
Delete:
The Refresh monitor shall comply with the state diagram of Figure TBD.

Change:
16.384/S ms to 1.536/S ms

Response Response Status C
ACCEPT IN PRINCIPLE.
Do not delete the Figure reference, Comment 77 adds the missing figure.
Remove highlighting on page 146, lines 5 to 7.
Change: 16.384/S ms
To: 1.536/S ms

Graba, Jim
Broadcom

Comment Type TR Comment Status D EZ
Update the moving time window length to be equivalent to 2.5G/5G/10GBASE-T

Suggested Remedy
Change 50 to 256. Change 16.384/S ms to 7.864/S ms

Proposed Response Response Status Z
REJECT.
This comment was WITHDRAWN by the commenter.

Graba, Jim
Broadcom

Comment Type TR Comment Status A EZ
Update to correct time

Suggested Remedy
Point to figure containing EEE Refresh monitor state diagram

Response Response Status C
ACCEPT IN PRINCIPLE.
Point to Figure added by comment 76 as shown in Graba_3ch_1_0319.pdf.

Tu, Mike
Broadcom

Comment Type ER Comment Status A EZ
Remove editorial highlight.

Suggested Remedy
Remove editorial highlight.

Response Response Status C
ACCEPT.

Wienckowski, Natalie
General Motors

Comment Type T Comment Status A MDI
there is only 1 pair

Suggested Remedy
Change: The modulation scheme used over each pair is PAM4.
To: The modulation scheme used is PAM4.

Response Response Status C
ACCEPT IN PRINCIPLE.

P146 L21 Delete the sentence: The modulation scheme used over each pair is PAM4.
P146 L33 Change: Signals received at the MDI can be expressed for each pair as pulse-amplitude modulated
To: Signals received at the MDI can be expressed as pulse-amplitude modulated
In \([-1, -1/3, 1/3, 1]\) the hyphen should be an en dash

Suggested Remedy

In \([-1, -1/3, 1/3, 1]\) change the hyphen to an en dash

Response

ACCEPT IN PRINCIPLE.

See comment 181

Comment Type E Comment Status A

Wienckowski, Natalie General Motors

Comment Type E Comment Status A

fix "-" and add "+" to be consistent with the rest of the document.

Suggested Remedy

Change: \([-1, -1/3, 1/3, 1]\)
To: \([-1, -1/3, +1/3, +1]\)

Response

ACCEPT.

Comment Type ER Comment Status A

WU, Peter Marvell

PAM3 still used

Suggested Remedy

change "PAM3" to "PAM4"

Response

ACCEPT.
Tu, Mike  
Broadcom

Comment Type: TR  
Comment Status: A  
State diagrams

Remove editorial highlight.

Suggested Remedy
Remove editorial highlight from line 3 to line 12.

Response  
Response Status: C  
ACCEPT.

Zimmerman, George  
CME:ADI,Aquantia,AP

Comment Type: T  
Comment Status: D  
EZ

Accept variables for en_slave_tx, infofield_complete, loc_phy_ready, loc_countdown_done, PMA_state, rem_countdown_done, rem_phy_ready, and sync_link_control.
Do not accept PMA_watchdog_status, as this is not used.

Suggested Remedy
Remove highlighting from en_slave_tx, infofield_complete, loc_phy_ready, loc_countdown_done, PMA_state, rem_countdown_done, rem_phy_ready, and sync_link_control.

Delete PMA_watchdog_status at P147 L51- P148 L9

Proposed Response  
Response Status: Z  
REJECT.

This comment was WITHDRAWN by the commenter.

Lo, William  
Axonne Inc.

Comment Type: ER  
Comment Status: A  
State diagrams

The following variables are correct and should be un-indented and un highlighted. See list below

Suggested Remedy
Fix indentation and un-highlighted the text associated with the following variables:
en_slave_tx  
infofield_complete  
loc_phy_ready  
loc_countdown_done  
PMA_state  
rem_phy_ready  
sync_link_control

Response  
Response Status: C  
ACCEPT IN PRINCIPLE.
Accept Suggested Remedy except delete loc_phy_ready and rem_phy_ready as they are not used.

Zimmerman, George  
CME:ADI,Aquantia,AP

Comment Type: T  
Comment Status: A  
State diagrams

Accept variables for en_slave_tx, infofield_complete, loc_countdown_done, PMA_state, rem_countdown_done, and sync_link_control.
Do not accept PMA_watchdog_status, loc_phy_ready, and rem_phy_ready as these are not used.

Suggested Remedy
Remove highlighting from en_slave_tx, infofield_complete, loc_countdown_done, PMA_state, rem_countdown_done, and sync_link_control.

Delete PMA_watchdog_status at P147 L51- P148 L9
Delete loc_phy_ready at P147 L18-26
Delete rem_phy_ready at P148 L14-21

Response  
Response Status: C  
ACCEPT IN PRINCIPLE.

Remove highlighting from en_slave_tx, infofield_complete, loc_countdown_done, PMA_state, rem_countdown_done, and sync_link_control.

Delete loc_phy_ready at P147 L18-26
Delete rem_phy_ready at P148 L14-21
Comment Type TR  Comment Status A
Remove editorial highlight.

SuggestedRemedy
Remove editorial highlight from line 19 to line 30

Response  Response Status C
ACCEPT IN PRINCIPLE.
Remove highlight from line 27 to 30.
Delete lines 19 to 26 as loc_phy_ready is not used.

Comment Type ER  Comment Status A
Incorrect reference

SuggestedRemedy
Change 149.4.3 to 149.4.2.7

Response  Response Status C
ACCEPT.

Comment Type TR  Comment Status A
Remove editorial highlight.

SuggestedRemedy
Remove editorial highlight from line 47 to line 54

Response  Response Status C
ACCEPT IN PRINCIPLE.
Remove highlight on page 147 from line 47 to 51.
Comment Type: ER
Comment Status: A

rem_countdown_done variable

SuggestedRemedy
- Change PAM3 to PAM4

Response: Response Status: C
- ACCEPT.

Comment Type: TR
Comment Status: A

The variable pcs_data_mode is not defined.

SuggestedRemedy
- Copy from Clause 55.4.5.1 and insert here.

Response: Response Status: C
- ACCEPT IN PRINCIPLE.

Add the following, with the proper formatting, after the tx_mode definition:

The following variables are required only for PHYs that support the EEE capability:

pcs_data_mode

Generated by the PMA PHY Control function and indicates whether or not the local PHY may transition its PCS state diagrams out of their initialization states. The current value of the pcs_data_mode is passed to the PCS via the PMA_PCDATAMODE.indicate primitive. In the absence of the optional EEE capability, the PHY operates as if the value of this variable is TRUE.

Comment Type: TR
Comment Status: A

State diagrams

Time way too long for acceptable startup in automotive applications. Change to match 1000BASE-T1.

SuggestedRemedy
- Change:
  2000 ms +/- 10ms
  To:
  97.5 ms +/- 0.5 ms

Response: Response Status: C
- ACCEPT.

Comment Type: TR
Comment Status: A

State diagrams

Maxwait_timer expiration period should be much shorter than 2000ms with 100ms link up requirement

SuggestedRemedy
- Change "2000ms +/- 10ms" to "97.5ms +/- 0.5ms"

Response: Response Status: C
- ACCEPT.

Comment Type: T
Comment Status: A

State diagrams

minwait_timer expiration period changed to the same value used at 802.3bp

SuggestedRemedy
- change "1ms +/- 0.1s" to "975us +/- 50us"

Response: Response Status: C
- ACCEPT IN PRINCIPLE.

Make proposed change and remove highlighting.
Comment Type: ER  Comment Status: A  State diagrams

Name of states incorrect for minwait_timer
Timer is ok

Suggested Remedy:
Change:
PMA_Training_Init_S, PCS_Test and PCS_Data
To:
SILENT, TRAINING, PCS TEST, and SEND DATA
Timer value is ok ans should be un-highlighted

Response  Response Status: C
ACCEPT IN PRINCIPLE.

Make proposed change and remove highlighting.

Comment Type: T  Comment Status: A  State diagrams

States where minwait_timer is used need to be entered and aligned with state diagram.
Delete highlighted "PMA_Training_Init_S," state (this does not exist, and accept
"PCS_TEST, and PCS_DATA" currently in yellow, correcting the capitalization

Suggested Remedy:
Delete highlighted "PMA_Training_Init_S," state (this does not exist, and accept
"PCS_TEST, and PCS_DATA" currently in yellow, correcting the capitalization

Response  Response Status: C
ACCEPT IN PRINCIPLE.

This change is included in comment #55.

Comment Type: TR  Comment Status: A  State diagrams

The minwait_timer is started again in TX SWITCH, but to no purpose, because it is not
checked on exit and is started again in both possible subsequent states

Suggested Remedy:
delete "start minwait_timer" in TX_SWITCH state

Response  Response Status: C
ACCEPT.

Comment Type: TR  Comment Status: A  State diagrams

The "start minwait_timer" does not seem needed in the TX_SWITCH state.

Suggested Remedy:
Remove "start minwait_timer".

Response  Response Status: C
ACCEPT.

1. In the "PCS_TEST" block, remove "tx_mode <= SEND_N"
2. In the "SEND_DATA" block, remove "tx_mode <= SEND_N"

Response  Response Status: C
ACCEPT IN PRINCIPLE.

Implement the suggested remedy.
In addition, tx_mode does not need to be set to SEND_T in COUNTDOWN as it was set
that way in TRAINING.
3. In the "COUNTDOWN" block, remove "tx_mode <= SEND_T"

Comment Type: TR  Comment Status: A  State diagrams

Missing watchdog conditions and refresh status link down conditions

Suggested Remedy:
See Lo_3ch_01_0319.pdf slide 2 for correct state machine.

Response  Response Status: C
ACCEPT.
Add EEE Refresh monitor state diagram

Suggested Remedy
Use same EEE Refresh monitor state diagram from 802.3bz (Figure 126-30)

Response
Response Status: C
ACCEPT IN PRINCIPLE.

In addition to adding the Figure, on P148 L 55 insert the following text, with editorial license:

The following timer is required only for PHYs that support the EEE capability:

\[ lpi\_refresh\_rx\_timer \]

This timer is used to monitor link quality during the LPI receive mode. If the PHY does not reliably detect reliable refresh signaling before this timer expires then a full retrain is performed.

Values: The condition \( lpi\_refresh\_rx\_timer\_done \) becomes true upon timer expiration.

Duration: This timer shall have a period equal to 50 complete quiet-refresh signal periods, equivalent to 1.536/\( S \) ms.

Remove highlighting on Test mode descriptions for modes 1, 5 and 7 in Table 149-12

Response
Response Status: C
ACCEPT.

Remove “Link Partner” box in Figure 149-36 over the Figure title.

Response
Response Status: C
ACCEPT.

Remove highlighting on Test mode descriptions for modes 1, 5 and 7 in Table 149-12

Response
Response Status: C
ACCEPT.

Dividing a clock down does not change the clock jitter. Recommend dividing by 32 or 64 so \( TX\_TCLK\_DIV \) is 175.8 or 87.9 MHz.

Note that I am ok with either 32 or 64 depending on what people like.

See Lo_3ch_01_0319.pdf slide 5 for an intuitive diagram.

Response
Response Status: C
ACCEPT IN PRINCIPLE.

Implement the proposal in souvignier_3ch_01a_0319.pdf; however, instead of scaling the jitter by \( 1/\sqrt{S} \) scale all values by \( 1/S \).
Figure 149-36 with wrong piece copied.  
SuggestedRemedy: remove the block of "link partner" in the figure.

Change "less than 3 dBm" to "in the range of 1 dBm to 3 dBm".

SuggestedRemedy: Change "TBD" with "0.2"

Max transmitter peak differential output of 1.2V, 20% over nominal to allow for process and design variation.

SuggestedRemedy: Replace "TBD" with "0.2"

Proposal to make this 1.3Vppd, like 1000BASE-T1

No consensus to change at this time.

See DenBesten_3ch_02a_0319.pdf for details on the proposal.
The clock is still defined for 2.5G-T1,

SuggestedRemedy
change "1406.25 MHz ± 50 ppm"
to "5625*S MHz± 50 ppm"

Response  Response Status  C
ACCEPT.

The transmission rate should scale by the factor "S".

SuggestedRemedy

Response  Response Status  C
ACCEPT IN PRINCIPLE.

No suggested remedy provided. Comment 272 is related to this and provides a suggested remedy so implement that.

"frame loss ratio is less than TBD for TBD-octet packets" should be scalable directly from 1000BASE-T1 since the RS-FEC frame lengths are comparable. Since 10^-10 is the BER for 1000BASE-T1 and 10^-12 is for multigig, two orders of magnitude are needed.

SuggestedRemedy
Change "TBD for TBD-octet" to "10^-9 for 125-octet"
Remaining parameters will be communicated via infofields. List is complete at this time.

Suggested Remedy
- Delete editor's note at line 38

Response: Response Status C

ACCEPT.

This matches the formatting of existing 802.3 clauses.

Suggested Remedy
- Change "f is the" to "f is the"

Response: Response Status C

REJECT.

This matches the formatting of existing 802.3 clauses.

Suggested Remedy
- Delete the unit of "MHz", Fmax is just the number.

Response: Response Status C

ACCEPT.
This matches the formatting of existing 802.3 clauses.

This matches the formatting of existing 802.3 clauses.

This matches the formatting of existing 802.3 clauses.

Change "f is the" to "f is the"

ACCEPT.

Change "N = 1" to "N = 1 curve which is equivalent to equation (149-19)."

ACCEPT IN PRINCIPLE.

Keep reference to Annex 97B.
This matches the formatting of existing 802.3 clauses.

We reached consensus on coupling and shielding attenuation, but the paragraph on the first topic is empty and the paragraph about the second doesn’t exist yet.

Need to add the limit formulas and graph on coupling attenuation to this paragraph. Need to add an paragraph in shielding attenuation. I would be happy to provide editorial assist on the wording.

This comment was WITHDRAWN by the commenter.

Hi Natalie,

I’d like to withdraw comment #292. The underlying concern of this comment is addressed by the proposal from Thomas. Furthermore my comment refers due to a misunderstanding to the wrong section. This was not about the ‘MDI coupling attenuation’, which therefore seems to be a remaining open issue for the next draft version.

Best regards,

Gerrit W. den Besten
This now says "shall conform to IEC 62368–1 (former IEC 60950–1)". This would be ok if IEC 60950–1 had simply been re-numbered to become IEC 62368–1, but I do not believe that this is the case. I believe that these are different standards with different contents, in which case this text is inappropriate.

Suggested Remedy
Delete "(former IEC 60950–1)"

Response
ACCEPT IN PRINCIPLE.

TFTD
Change: "IEC 62368-1 (former IEC 60950-1)".
To: "IEC 62368-1 (or IEC 60950-1)".

Add editors note from P802.3cg D2.4 146.9.1 related to P802.3cr.

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"for operation at 2.5Gbps, 5Gbps, and 10Gbps over single shielded balanced pair of conductors."

Suggested Remedy
Replace by: "for operation at 2.5Gbps, 5Gbps, and 10Gbps over single shielded balanced pair of conductors."

Response
ACCEPT.

---

Change "23°C ± 5°C" to "23 ± 5°C"

Suggested Remedy
Change "Testfixture" to "Test Fixture"

Response
ACCEPT.

---

There are a zillion places where 1000Base-T1 is mentioned; on some, we have crossed out the "1000"

Suggested Remedy
They all need to change to MGBase-T1

Response
ACCEPT IN PRINCIPLE.

OAM registers used for both 1000BASE-T1 and MultiGBASE-T1 are named BASE-T1.
The following are the places where "1000" does not have strikethrough but it should.

P119 L38, P127 L35