I think the name of the amendment could be improved from "Physical Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet".

This is an amendment for 2.5 Gb/s, 5 Gb/s, and 10 Gb/s PHYs and the title should state that.

Also there is likely to be a project for a 25G automotive PHY in the future and this would also be greater than 1G.

Suggested Remedy

Change the title of the amendment to:
"Physical Layer Specifications and Management Parameters for 2.5 Gb/s, 5 Gb/s, and 10 Gb/s Automotive Electrical Ethernet"

Response

ACCEPT IN PRINCIPLE.

Comment Type: E  Comment Status: A  EZ

"operation on automotive cabling in an automotive application". Other definitions in the spec refer to "single balanced pair". It seems useful to make the abstract consistent with that.

**Suggested Remedy**
Change: "operation over single balanced pair cabling and suitable for automotive applications."

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

Change: on automotive cabling in an automotive application.
To: on a single balanced pair of conductors suitable for automotive applications.

Comment Type: E  Comment Status: A  EZ2

Now that there is another effort that will likely become a project for greater than 10 Gb/s operation, the title may not be sufficiently unique.

**Suggested Remedy**
Consider a title listing 2.5 Gb/s, 5 Gb/s, 10 Gb/s operation to make it clear that the >10 Gb/s interfaces are not included

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

Perform instructions provided by Pete: Take a fresh copy of the latest 802.3 template and with your latest P802.3ch book open, open the TOC file from the template. In the left hand pane, highlight the TOC file from your book. File, Import, Formats, Deselect all, check Paragraph Formats, Import, OK.

**Comment Type:** E  **Comment Status:** A  **EZ**

Extraneous comma.

**Suggested Remedy**
Replace, "amendments, and adds" with "amendments and adds".

**Response**
Response Status: C
ACCEPT.
Hajduczenia, Marek
Charter Communications

Comment Type: E  Comment Status: A  EZ

Suggested Remedy:
Please remove, no content

Response: ACCEPT.

Marris, Arthur
Cadence Design Systems

Comment Type: E  Comment Status: A  EZ

Suggested Remedy:
Delete 1.5 if no new abbreviations are being added

Response: ACCEPT.

Anslow, Pete
Ciena

Comment Type: E  Comment Status: A  EZ

Suggested Remedy:
Remove 1.5 from the draft

Response: ACCEPT.

Zimmerman, George
ADI, APL Gp, Aquantia, BMW, Cisco, Commscope, S

Comment Type: E  Comment Status: A  EZ

Suggested Remedy:
It appears that the entry "Single balanced pair of conductors..." is a smaller font size (9pt) than the "2.5GBASE-T1"(10pt) - it should be the same. Same comment for 5GBASE-T1 and 10GBASE-T1 entries

Response: ACCEPT.

Lo, William
Axonne Inc.

Comment Type: TR  Comment Status: R  Auto-Negotiation

Autonegotiation column is not in table 44-1.
In Table 125-2 (page 67) there is a column 98 showing Auto-Negotiation is optional for both 2.5GBASE-T1 and 5GBASE-T1. However there isn't one for 10GBASE-T1.

Also note that autonegotiation is missing for 10GBASE-T as well.

Suggested Remedy:
Add column for clause 98 Auto-Negotiation to table 44-1 and put O in the 10GBASE-T1 row.
Add to the footnote
O = Optional

As a service to humanity we can optionally fix this for 10GBASE-T by putting a column for clause 28 Auto-Negotiation and put M in the 10GBASE-T row.

Response: REJECT.

Clause 125 also has 125.2.4 which summarizes Auto-Negotiation for 2.5G and 5G PHYs. Clause 44 does not have this. If we add the Auto-Negotiation Clauses to the table we'll also need to add a subclause in Clause 44 for this.

The commenter is encouraged to submit a comment to Maintenance to add this to Clause 44. If this is approved, a new comment can be submitted to ch to add this.
Dawe, Piers  
Mellanox

Comment Type: **T**  Comment Status: **R**  
Auto-Negotiation

**Suggested Remedy:**

Add 10GBASE-T1 and Clause 98 Auto-Negotiation to Table 44-1, Nomenclature and clause correlation.

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

REJECT.

Clause 125 also has 125.2.4 which summarizes Auto-Negotiation for 2.5G and 5G PHYs. Clause 44 does not have this. If we add the Auto-Negotiation Clauses to the table we'll also need to add a subclause in Clause 44 for this.

The commenter is encouraged to submit a comment to Maintenance to add this to Clause 44. If this is approved, a new comment can be submitted to ch to add this.

Zimmerman, George  
ADI, APL Gp, Aquantia, BMW, Cisco, Commscope, S

Comment Type: **E**  Comment Status: **A**  
Registers

Transmit fault descriptions are in 45.2.1.7.4, Table 45-9, and Receive fault descriptions are in 45.2.1.7.5, Table 45-10. These need to be brought into the draft and updated to include the clause 149 references for 2.5GBASE-T1, 5GBASE-T1, and 10GBASE-T1.

Additionally, I cannot find the reference to Transmit and Receive Faults in clause 149, although the abilities are referenced in 1.2310.

**Suggested Remedy:**

Bring 45.2.1.7.4 and Table 45-9, adding rows for 2.5GBASE-T1, 5GBASE-T1, and 10GBASE-T1 referencing the appropriate section of clause 149 for transmit faults.

Bring 45.2.1.7.5 and Table 45-10, adding rows for 2.5GBASE-T1, 5GBASE-T1, and 10GBASE-T1 referencing the appropriate section of clause 149.

Add text, if necessary, for transmit and receive faults to clause 149.

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

ACCEPT IN PRINCIPLE.

Make the changes and additions as defined in zimmerman_3ch_03a_0719.pdf.

Remen, Duane  
Futurewei Technologies, Inc.

Comment Type: **ER**  Comment Status: **A**  
Formatting

Given this is a change to Table 45-19 the new rows should be underlined and the Editing Instruction should not be "Change ... and insert ... ."

Same issue Table 45-21.

I note that other tables (ex 45-176) are marked properly.

**Suggested Remedy:**

per comment

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

ACCEPT IN PRINCIPLE.

Do the following for Table 45-19 and Table 45-21.

Keep the Editing instruction as is, this is the same as the example given. Underline the text in the added rows.
The 2 bits 1.21.5 and 1.21.4 are redundant since they are already defined in 1.18.5 and 1.18.4. Note that register 1.11 states register 1.18 is for BASE-T1 ability.

Note that register 1.21 causes some issues in that it is for 2.5G/5G abilities and 2.5/5GBASE-T1 fits the criteria for both 1.18 and 1.21.

Nevertheless I don’t think any other PHY capabilities are advertised twice and I think it is best if we advertise only in one location instead of 2.

Suggested Remedy
Delete content in page 33 lines 11 to 48

Response
Accept in Principle.

Remove the duplicate BASE-T1 abilities from register 1.21. In addition, add a note below Register 1.21 that the BASE-T1 abilities can be found in register 1.18.

In addition, move 45.2.1.18.ab & 45.2.1.18.ab to 45.2.1.16.xy and 45.2.1.16.xz changing 1.21.x to 1.18.x and add 45.2.1.16.xx

When read as a one, bit 1.18.6 indicates that the PMA/PMD is able to operate as a 10GBASE-T1 PMA type.

When read as a zero, bit 1.18.6 indicates that the PMA/PMD is not able to operate as a 10GBASE-T1 PMA type.

What's the purpose to duplicate BASE-T1 abilities to register 21, as these are already covered by the BASE-T1 extended ability register 18. Register 11 indicates whether there are BASE-T1 extended abilities or 2.5G/5G extended abilities. Why would a 2.5G/5GBASE-T1 need to indicate 2.5G/5G extended abilities next to BASE-T1 extended abilities?

Suggested Remedy
Propose to remove BASE-T1 abilities from register 21.

Response
Accept in Principle.

Remove the duplicate BASE-T1 abilities from register 1.21. In addition, add a note below Register 1.21 that the BASE-T1 abilities can be found in register 1.18.

In addition, move 45.2.1.18.ab & 45.2.1.18.ab to 45.2.1.16.xy and 45.2.1.16.xz changing 1.21.x to 1.18.x and add 45.2.1.16.xx

When read as a one, bit 1.18.6 indicates that the PMA/PMD is able to operate as a 10GBASE-T1 PMA type.

When read as a zero, bit 1.18.6 indicates that the PMA/PMD is not able to operate as a 10GBASE-T1 PMA type.

ability misspelled as "abilitiy" in 4 places: titles of clause 45.2.1.18.aa and 45.2.1.18.ab as well as the two related entries in the Table of Contents

Suggested Remedy
change all occurrences of "abilitiy" to "ability"

Response
Accept.
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>Type</th>
<th>Line</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>45.2.1.18.aa</td>
<td>typo</td>
<td>37</td>
<td>Kolesar, Paul CommScope Comment Type: typo SuggestedRemedy: change abilitiy to ability Response: ACCEPT.</td>
</tr>
<tr>
<td>45</td>
<td>45.2.1.18.ab</td>
<td>typo</td>
<td>43</td>
<td>Kolesar, Paul CommScope Comment Type: typo SuggestedRemedy: change abilitiy to ability Response: ACCEPT.</td>
</tr>
<tr>
<td>45</td>
<td>45.2.1.192.1</td>
<td>typo</td>
<td>36</td>
<td>Brandt, David Rockwell Automation Comment Type: typo SuggestedRemedy: Change: “abilitiy”, To: “ability” Response: ACCEPT.</td>
</tr>
<tr>
<td>45</td>
<td>45.2.1.192.4</td>
<td>typo</td>
<td>9</td>
<td>Brandt, David Rockwell Automation Comment Type: typo SuggestedRemedy: Change: “abilitiy”, To: “ability” Response: ACCEPT.</td>
</tr>
</tbody>
</table>

It might be wise to keep some reserved registers after 2308 for future extension instead of directly abutting the multi-gig register addresses to 1Gbps addresses. Note that for other IEEE 802.3 PHYs there is also some reserved address between PHY types.

SuggestedRemedy: The 1000BASE-T1 starts at address 2304 which equals 0x0900. Propose to start multi-gig register addresses at 0x0910, which would be 2320 decimal.

Response: REJECT. This change would require significant changes throughout Clauses 45 and 149. Address spaces are broken up all the time without incidence.

It isn't clear what all MultiGBASE-T1 PMA/PMD registers means. Be more specific as to which registers this applies to.

Response: ACCEPT IN PRINCIPLE.

"Bits 1.2309.10:9 control the current precoder setting of the transmitter," - because "current" can have meaning both as time and as an electrical parameter, this isn't a great way to say this. The rest of the paragraph, particularly the sentence "Setting these bits forces the precoder to the mode set." is clarity enough, and the word "current" is unneeded.

SuggestedRemedy: Delete "current" on P36 L9

Response: ACCEPT.
Comment Type: E  Comment Status: A  EZ

SuggestedRemedy

Missing article.

Response  Response Status: C  ACCEPT.

---

Comment Type: TR  Comment Status: A  Precoder

Wienckowski, Natalie  General Motors

In D2.0, the "Precoder requested" bit values are configured by user. The PHY simply reads in these register bit values and sends to the link partner via InfoField. It may be more robust to optionally allow the PHY to choose the precoder on-the-fly based on channel and noise conditions.

SuggestedRemedy

See page 3 of "tu_3ch_01_0719.pdf".

Response  Response Status: C  ACCEPT IN PRINCIPLE.

Implement the new registers and text, with editorial license, as defined in tu_3ch_01a_0719.pdf.

Remove the shall on slide 4 in the register definitions.

---

Comment Type: TR  Comment Status: A  Precoder

Souvignier, Tom  Broadcom

In D2.0, the "Precoder requested" bit values are configured by user. The PHY simply reads in these register bit values and sends to the link partner via InfoField. It may be more robust to optionally allow the PHY to choose the precoder on-the-fly based on channel and noise conditions.

SuggestedRemedy

See page 4 of "tu_3ch_01_0719.pdf".

Response  Response Status: C  ACCEPT IN PRINCIPLE.

Implement the new registers and text, with editorial license, as defined in tu_3ch_01a_0719.pdf.

Remove the shall on slide 4 in the register definitions.

---

Comment Type: TR  Comment Status: A  Precoder

den Besten, Gerrit  NXP Semiconductors

Slow wake request is an indication in one direction, which leaves the option open that it would still require to support regular wake-up in the other direction. I think it would be better to specify that if one of the transceivers on a link request slow-wake, that the slow-wake is applied in both directions.

SuggestedRemedy

Add the sentence to the paragraph:
If either this PHY or its link partner request slow wake, the PHY may only transmit alert immediately following refresh.

Response  Response Status: U  REJECT.

There was no consensus to make the change. The desire of the TF was to allow these to be different in each direction.
In D2.0, the "Precoder requested" bit values are configured by user. The PHY simply reads in these register bit values and sends to the link partner via InfoField. It may be more robust to optionally allow the PHY to choose the precoder on-the-fly based on channel and noise conditions.

**SuggestedRemedy**

See page 4 of "tu_3ch_01_0719.pdf".

**Response**

Accept in principle.

Implement the new registers and text, with editorial license, as defined in tu_3ch_01a_0719.pdf.

Remove the shall on slide 4 in the register definitions.

---

Does the following statement imply that once the device has seen an link up the bits in register 1.2112 are then valid forever? "The values in this register are not valid until link is up."

**SuggestedRemedy**

Change: "The values in this register are not valid until link is up."

**Response**

Accept.

---

The jitter test in 149.5.2.3.1 is designed for the low-frequency square wave signal used in BASE-T PHYs and the test in 149.5.2.3.2 is designed for the at-speed test patterns (JP03A & JP03B) used in backplane phys. A control bit is needed to allow test mode 2 to support both tests, and additional language is needed specifying which signals to use in which tests.

Comments tagged JITTER TEST MODE should be treated as a group.

**SuggestedRemedy**

Table 45-155e: Add new rows after Reserved row, and adjust reserved row to allocate bits 0,1 of register 1.2313 (Test mode control) register based: 1.2313.1:0= 00 (Normal Square Wave), 1.2313.1:0= 01 (JP03A pattern), 1.2313.1:0= 10 (JP03B pattern), 1.2313.1:0= 11 (Reserved), 1.2313.1:0= 12 (Reserved), 1.2313.1:0= 13 (Reserved).

Insert new subclause 45.2.1.196.2 as follows:

45.2.1.196.2 Jitter test control (1.2313.1:0)

When the transmitter is in test mode 2, bits 1.2313.1:0 control the pattern of the jitter test signal. A value of 0 transmits a square wave from the transmitter, a value of 1 transmits the JP03A pattern, and a value of 10 transmits the JP03B pattern. See 149.5.1 for more information.

**Response**

Accept in principle.

Implement as proposed but refer to 149.5.2.3 which is where the jitter tests are defined.
This register should contain "the current SNR operating margin measured at the slicer input ... to an accuracy of 0.5 dB", yet there is no indication of what "SNR operating margin" means (is the PHY supposed to measure the noise of the signal? or infer it from FEC errors? or ...) nor is "the slicer input" defined. Trying to set an accuracy on something so vague is not appropriate. Anyway, providing that accuracy at the extremes of the range is probably difficult and unnecessary.

Suggested Remedy
Delete "to an accuracy of 0.5 dB"

Response Response Status W REJECT.
This was discussed during a previous meeting and the decision of the group was to keep the accuracy, which matches MultiGBASE-T PHY's.

The intent of registers 1.2314 and 1.2315 is to represent -12.7 dB to +12.7 dB as an 8 bit number. However the description is a little confusing for the uninitiated in that these registers are described as 16 bits registers.

Suggested Remedy
2 ways to fix this. Pick one. My preference is method 1.
1) Define the registers to be 8 bits only. Hence these 2 registers are 1.2314.15:8 and 1.2315.15:8 respectively.
   Set 1.2314.7:0 and 1.2315.7:0 to reserved.
2) There is an example stating 0.0dB is 0x8000. Add 2 more examples where 12.7dB is 0xFF00 and -12.7dB is 0x0100. Note that this solution is not as clean as in theory bits 7:0 can show more resolution and we are now mixing decimal and binary representations with fractional 0.1 dB.

Editor has editorial license to word and format either of the options above.

Response Response Status C ACCEPT IN PRINCIPLE.
Editor to add 2 more examples where 12.7dB is 0xFF00 and -12.7dB is 0x0100.
Table 45-244a is split across two pages with only one body row on the first page.

**Suggested Remedy**

Increase the Orphan rows setting in Table Designer to 4

**Response**

Response Status: C

**ACCEPT.**

"The Link partner MultiGBASE-T1" should be "The link partner MultiGBASE-T1" (lower case p in partner) in the title of Table 45-244b and also in the Name column (4 instances)

**Suggested Remedy**

Change "Partner" to "partner" in the title of Table 45-244b and also in the Name column (4 instances)

**Response**

Response Status: C

**ACCEPT.**

"Link Partner" should be "Link partner" (lower case p in partner) in the title of Table 45-244b and also in the Name column (4 instances)

**Suggested Remedy**

Secure "Partner" to "partner" in the title of Table 45-244b and also in the Name column (4 instances)

**Response**

Response Status: C

**ACCEPT.**

Type 45-244b contains message data received from the link partner, but the description says "transmitted first". Seems misleading / inconsistent.

**Suggested Remedy**

Replace "transmitted first" with "received first" for all occurrences in the table.

**Response**

Response Status: C

**ACCEPT.**

Add "See 149.3.9.2.12 for details on the OAM status message definition." before "See Table 45–244b."

**Response**

Response Status: C

**ACCEPT IN PRINCIPLE.**
IEEE P802.3ch D2.0 Physical Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet Initial W

Hajduczenia, Marek Charter Communications

Comment Type: TR, Comment Status: A, Registers

Is this really intended to be an optional requirement? “The default value for each bit of the MultiGBASE-T1 PCS control register should be chosen so that the initial state of the device upon power up or reset is a normal operational state without management intervention.”

SuggestedRemedy
Suggest to rewrite as an informative text, which I believe it is.

There are at least 28 instances of the keyword "should" in the draft (excluding front page), none of which strikes me as intended optional requirement. Each and every instance of the keyword "should" ought to be reviewed and if the given statement is not intended as an optional requirement, text ought to be rewritten as informative instead.

Response: ACCEPT IN PRINCIPLE.

Should is not another way to state an optional requirement. Should statements do not need PICS.

Change: The default value for each bit of the MultiGBASE-T1 PCS control register should be chosen so that the initial state of the device upon power up or reset is a normal operational state without management intervention.

Response: ACCEPT.

To: The default value for each bit of the MultiGBASE-T1 PCS control register is chosen so that the initial state of the device upon power up or reset is a normal operational state without management intervention.

In addition:
P40 L25 and P46 L 39 change "should be" to "is"
P105 L48 change "should be" to "are"
P99 L17-19 there are two "should’s" regarding initialization of the precoder. These need to remain "should" as they are not testable. The Editor will add a statement to the effect that "If the precoder is not initialized to zero there may be a short period of errors."
P134 L12 change "should be" to "is". – this is automatic in the state diagram Figure 149-25 p137 L25

The other "shoulds" are in the template, e.g. at the bottom of the PICS tables.

Brandt, David Rockwell Automation

Comment Type: E, Comment Status: A, EZ

SuggestedRemedy
Change: "is detecting is detecting", To: "is detecting"

Response: ACCEPT.

Wienckowski, Natalie General Motors

Comment Type: E, Comment Status: A, EZ

SuggestedRemedy
Change: Description of non-latched source is wrong.

Response: ACCEPT.

Anslow, Pete Ciena

Comment Type: E, Comment Status: A, EZ

IEEE P802.3cg D3.0 is inserting PICS items MM152 through MM204 so the items being inserted by this draft should start at MM205

Response: ACCEPT.

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

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

SORT ORDER: Clause, Subclause, page, line
Comment Type E Comment Status A
Suggested Remedy
When tables split across pages, the bottom ruling of the table on the first page should be “very thin”

Response

Comment Type T Comment Status A
Suggested Remedy
Do one of the following:
- On P38L4 Change "should be set to zero" to "shall be set to zero" and on P53L25 Change Subclause from 45.2.1.194.4 to 45.2.1.194.5.
- OR
- Delete PICS MM223

Response

Comment Type E Comment Status A
Suggested Remedy
Changes "advertisingg" to "advertising"
Comment Type: T Comment Status: A
Incorrect reference
SuggestedRemedy: Change Subclause from 45.2.1.194.5 to 45.2.1.195.5.

Response: Response Status: C
ACCEPT.

Comment Type: E Comment Status: A
"the" is repeated as "the the" in 2 places in the draft
SuggestedRemedy: change all occurrences of "the the" to "the"

Response: Response Status: C
ACCEPT.

Comment Type: E Comment Status: A
"the the"
SuggestedRemedy: Change to single "the"

Response: Response Status: C
ACCEPT.

Comment Type: E Comment Status: A
"the the"
SuggestedRemedy: Change to single "the"

Response: Response Status: C
ACCEPT.

Comment Type: E Comment Status: A
"the the"
SuggestedRemedy: Change to single "the"

Response: Response Status: C
ACCEPT.
Comment #65 against P802.3cj D2.0 defined the order of items in Table 78-1. See http://www.ieee802.org/3/cj/comments/P8023-D2p0-Comments-Final-byID.pdf#page=14
Sort the result in "speed/reach" order using the following set of rules.
1. Increasing speed.
2. Increasing reach (maximum supported distance over the medium).
3. Decreasing number of lanes

The following supplemental rules address are included to address special cases.
4. PHY "family designations, by convention, are assigned a reach of 0.
5. "Copper" PHYs precede "Fiber" PHYs (all else being equal).
6. Alphanumeric sort (all else being equal).

Applying these rules puts 2.5GBASE-T1 before 2.5GBASE-T, 5GBASE-T1 before 5GBASE-T, and 10GBASE-T1 before 10GBASE-T.

SuggestedRemedy
Change the editing instruction to:
"Insert a row for 2.5GBASE-T1 after 2.5GBASE-KX (as inserted by IEEE Std 802.3cb-2018), insert a row for 5GBASE-T1 after 5GBASE-KR (as inserted by IEEE Std 802.3cb-2018), and insert a row for 10GBASE-T1 after 10GBASE-KR in Table 78-1 as follows (unchanged rows not shown):"

Response
ACCEPT.

Comment #66 against P802.3cj D2.0 defined the order of items in Table 78-2. See http://www.ieee802.org/3/cj/comments/P8023-D2p0-Comments-Final-byID.pdf#page=14
This defined the sort order to be the same as for Table 78-1
Applying these rules puts 2.5GBASE-T1 before 2.5GBASE-T, 5GBASE-T1 before 5GBASE-T, and 10GBASE-T1 before 10GBASE-T.

SuggestedRemedy
Change the editing instruction to:
"Insert a row for 2.5GBASE-T1 after 2.5GBASE-KX (as inserted by IEEE Std 802.3cb-2018), insert a row for 5GBASE-T1 after 5GBASE-KR (as inserted by IEEE Std 802.3cb-2018), and insert a row for 10GBASE-T1 after 10GBASE-KR in Table 78-2 as follows (unchanged rows not shown):"

Response
ACCEPT.

Comment #67 against P802.3cj D2.0 defined the order of items in Table 78-3. See http://www.ieee802.org/3/cj/comments/P8023-D2p0-Comments-Final-byID.pdf#page=14
This defined the sort order to be the same as for Table 78-1
Applying these rules puts 2.5GBASE-T1 before 2.5GBASE-T, 5GBASE-T1 before 5GBASE-T, and 10GBASE-T1 before 10GBASE-T.

SuggestedRemedy
Change the editing instruction to:
"Insert a row for 2.5GBASE-T1 after 2.5GBASE-KX (as inserted by IEEE Std 802.3cb-2018), insert a row for 5GBASE-T1 after 5GBASE-KR (as inserted by IEEE Std 802.3cb-2018), and insert a row for 10GBASE-T1 after 10GBASE-KR in Table 78-3 as follows (unchanged rows not shown):"

Response
ACCEPT.
## IEEE P802.3ch D2.0 Physical Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet Initial Working Group ballot comments

### Comment #20

**Comment Type:** E  
**Comment Status:** A  
**Response Status:** C  
**Response:** Anslow, Pete

There are nine paragraphs in 78.5 of the base standard, so the additional paragraph is number 10.  
Case-1 and Case 2 start with "Case-x of the PHY in the MultiGBASE-T set applies when ..." but cases 3 and 4 start with "Case-x in MultiGBASE-T1 is the same as ..."  

**Suggested Remedy:**  
Change the editing instruction to:  
"Insert a 10th paragraph in 78.5 as follows:"  
For Case-3 and Case-4, change:  
"Case-x in MultiGBASE-T1 is the same as ..." to:  
"Case-x of the PHY in the MultiGBASE-T set is the same as ...."

### Comment #21

**Comment Type:** E  
**Comment Status:** A  
**Response Status:** C  
**Response:** Anslow, Pete

Comment #66 against P802.3cj D2.0 defined the order of items in Table 78-4.  
See [http://www.ieee802.org/3/cj/comments/P8023-D2p0-Comments-Final-byID.pdf#page=14](http://www.ieee802.org/3/cj/comments/P8023-D2p0-Comments-Final-byID.pdf#page=14)  
This defined the sort order to be the same as for Table 78-1  
Applying these rules puts 2.5GBASE-T1 before 2.5GBASE-KX, 5GBASE-T1 before 5GBASE-T, and 10GBASE-T1 before 10GBASE-T.  

**Suggested Remedy:**  
Change the editing instruction to:  
"Insert a row for 2.5GBASE-T1 after 2.5GBASE-KX (as inserted by IEEE Std 802.3cb-2018), insert a row for 5GBASE-T1 after 5GBASE-KT (as inserted by IEEE Std 802.3cb-2018), and insert a row for 10GBASE-T1 after 10GBASE-KT in Table 78-4 as follows (unchanged rows not shown):"

### Comment #22

**Comment Type:** E  
**Comment Status:** A  
**Response Status:** C  
**Response:** Anslow, Pete

The cells for Tphy_shrink_tx (max) and Tphy_shrink_rx (max) in Table 78-4 should not be blank.  
If the values for these parameters are 0, then these cells should all contain 0  

**Suggested Remedy:**  
Populate the cells for Tphy_shrink_tx (max) and Tphy_shrink_rx (max) in Table 78-4 for the new rows with "0"  
**Response**  
Response Status C  
ACCEPT IN PRINCIPLE.  
Implement changes requested by Graba_3ch_01a_0719.pdf.

### Comment #224

**Comment Type:** T  
**Comment Status:** A  
**Response Status:** C  
**Response:** McClellan, Brett

Figure 149-34 references 'mGigT1'.  
10GigT1, 5GigT1, and 2.5GigT1 are never referenced.  

**Suggested Remedy:**  
"— 2.5GigT1;represents that the 2.5GBASE-T1 PMA is the signal source.  
— 5GigT1; represents that the 5GBASE-T1 PMA is the signal source.  
— 10GigT1; represents that the 10GBASE-T1 PMA is the signal source. "  
Change:  
"— mGigT1;represents that the 10/5/2.5GBASE-T1 PMA is the signal source."

### Comment #240

**Comment Type:** E  
**Comment Status:** A  
**Response Status:** C  
**Response:** Zimmerman, George

Capitalization of "type F PSE" is missing

**Suggested Remedy:**  
Change "type F PSE" to "Type F PSE"

### Table: Clause, Subclause, page, line

<table>
<thead>
<tr>
<th>CI</th>
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<th>78.5</th>
<th>P57</th>
<th>L18</th>
<th># 20</th>
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<td>EZ</td>
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</table>
| There are nine paragraphs in 78.5 of the base standard, so the additional paragraph is number 10.  
Case-1 and Case 2 start with "Case-x of the PHY in the MultiGBASE-T set applies when ..." but cases 3 and 4 start with "Case-x in MultiGBASE-T1 is the same as ..." |
| **Suggested Remedy:**  
Change the editing instruction to:  
"Insert a 10th paragraph in 78.5 as follows:"  
For Case-3 and Case-4, change:  
"Case-x in MultiGBASE-T1 is the same as ..." to:  
"Case-x of the PHY in the MultiGBASE-T set is the same as ...."
| **Response**  
Response Status C  
ACCEPT. |

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<thead>
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<th>78.5</th>
<th>P57</th>
<th>L38</th>
<th># 22</th>
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<td>EEE</td>
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</table>
| The cells for Tphy_shrink_tx (max) and Tphy_shrink_rx (max) in Table 78-4 should not be blank.  
If the values for these parameters are 0, then these cells should all contain 0 |
| **Suggested Remedy:**  
Populate the cells for Tphy_shrink_tx (max) and Tphy_shrink_rx (max) in Table 78-4 for the new rows with "0" |
| **Response**  
Response Status C  
ACCEPT IN PRINCIPLE.  
Implement changes requested by Graba_3ch_01a_0719.pdf. |

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<th>P61</th>
<th>L11</th>
<th># 224</th>
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</tr>
</tbody>
</table>
| Figure 149-34 references 'mGigT1'.  
10GigT1, 5GigT1, and 2.5GigT1 are never referenced. |
| **Suggested Remedy:**  
"— 2.5GigT1;represents that the 2.5GBASE-T1 PMA is the signal source.  
— 5GigT1; represents that the 5GBASE-T1 PMA is the signal source.  
— 10GigT1; represents that the 10GBASE-T1 PMA is the signal source. "  
Change:  
"— mGigT1;represents that the 10/5/2.5GBASE-T1 PMA is the signal source."
| **Response**  
Response Status C  
ACCEPT. |

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<th>104.1.3</th>
<th>P62</th>
<th>L10</th>
<th># 240</th>
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</tr>
<tr>
<td>Capitalization of &quot;type F PSE&quot; is missing</td>
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</tr>
</tbody>
</table>
| **Suggested Remedy:**  
Change "type F PSE" to "Type F PSE" |
| **Response**  
Response Status C  
ACCEPT. |
Type F systems include a NGAUTO PHY. The PD ripple currently in the standard was reused from 1000BASE-T1 (Type B) systems. This needs to be changed for the higher data transmission speed.

**Suggested Remedy**

See "stewart_3ch_01_0719" Slides 5, 6, and 7

**Response**  
Response Status: C

Make changes defined in stewart_3ch_01a_0719 slides 5 & 6.

---

All the "VPD", "PPD" references should have the "PD" in subscript.

**Suggested Remedy**

Editor to check and make "PD" and "PSE" subscript where appropriate. (I think it's just PD)

**Response**  
Response Status: C

ACCEPT.

---

Type F systems include a NGAUTO PHY. The PD ripple currently in the standard was reused from 1000BASE-T1 (Type B) systems. This needs to be changed for the higher data transmission speed.

**Suggested Remedy**

See "stewart_3ch_01_0719" Slides 8 and 9

**Response**  
Response Status: C

ACCEPT.

---

The right hand ruling for the second heading row in Table 125-2 should be set to the default.

**Suggested Remedy**

Change the right side border on last cell in 2nd ro to be the wider outside border.

**Response**  
Response Status: C

ACCEPT.
<table>
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<td><strong>PICS</strong></td>
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<td>L28</td>
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<tr>
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</table>

**Comment Type**: ER (Editorial Required)  **Comment Status**: A (Accepted)  **PICS**: Editor's Pick

**Comment**: New shall statements were added, PICS were not updated

**Suggested Remedy**: Per comment

**Response**: ACCEPT IN PRINCIPLE.

<table>
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<td><strong>PICS</strong></td>
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<tr>
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</table>

**Comment Type**: ER (Editorial Required)  **Comment Status**: A (Accepted)

**Comment**: Per comment.

**Response**: ACCEPT IN PRINCIPLE.

**Suggested Remedy**: Use consistent alignment in the columns of Table 125-3

**Response**: ACCEPT IN PRINCIPLE.

**Suggested Remedy**: Create an annex to provide information on channel transmission characteristics defined between the Tx function to Rx function inclusive of the host PCB, MDI and link segment that might not be testable in an implemented system. ide

**Response**: ACCEPT IN PRINCIPLE.

**Suggested Remedy**: Add Informative Annex 149C with the contents of dominico_3ch_02_0719.pdf with editorial license to format correctly.

---

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

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

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

---

**Page 17 of 62**  **7/17/2019 7:44:15 AM**
IEEE P802.3ch D2.0 Physical Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet Initial Working Group ballot comments

Cl  149 SC 149.11.4.2.1 P173 L5 # 139
Donahue, Curtis UNH-IOL

Comment Type E Comment Status A
Shall statement missing associated PICS item

Suggested Remedy
Insert new PICS entry before PCT1 of Draft 2.0, with the following content:
Feature: PCS Reset
Subclause: 149.3.2.1
Value/Comment: Described in 149.3.2.1
Status: M
Support: Yes[] N/A[]

Response Response Status C
ACCEPT.

Cl  149 SC 149.11.4.2.2 P175 L10 # 140
Donahue, Curtis UNH-IOL

Comment Type E Comment Status A
Shall statement missing associated PICS item

Suggested Remedy
Insert new PICS entry after PCR2 of Draft 2.0, with the following content:
Feature: Frame and block synchronization
Subclause: 149.3.2.3.1
Value/Comment: Described in 149.3.2.3.1
Status: M
Support: Yes[] N/A[]

Response Response Status C
ACCEPT.

Cl  149 SC 149.11.4.2.2 P175 L17 # 141
Donahue, Curtis UNH-IOL

Comment Type E Comment Status A
Incorrect subclause reference.

Suggested Remedy
Change '149.3.2.3.2' to '149.3.2.3.3'.

Response Response Status C
ACCEPT.

Cl  149 SC 149.11.4.2.7 P177 L16 # 142
Donahue, Curtis UNH-IOL

Comment Type E Comment Status A
Shall statement missing associated PICS item

Suggested Remedy
Insert new PICS entry before OAM2 of Draft 2.0, with the following content:
Feature: Partially transmitted OAM frame
Subclause: 149.3.9.2.1
Value/Comment: Described in 149.3.9.2.1
Status: M
Support: Yes[] N/A[]

Response Response Status C
ACCEPT.

Cl  149 SC 149.11.4.2.8 P177 L33 # 143
Donahue, Curtis UNH-IOL

Comment Type E Comment Status A
Shall statement missing associated PICS item

Suggested Remedy
Insert new PICS entry after PCR2 of Draft 2.0, with the following content:
Feature: Partially transmitted OAM frame
Subclause: 149.3.9.2.1
Value/Comment: Described in 149.3.9.2.1
Status: M
Support: Yes[] N/A[]

Response Response Status C
ACCEPT.

Cl  149 SC 149.11.4.3.2 P178 L15 # 144
Donahue, Curtis UNH-IOL

Comment Type E Comment Status A
Duplicate PICS entry.

Suggested Remedy
Remove PMAT1.

Response Response Status C
ACCEPT.
Comment Type: E  Comment Status: A  EZ

SuggestedRemedy

- Change ‘Expire s97.5’ to ‘Expires 97.5’

Response  Response Status: C

ACCEPT.

---

Comment Type: E  Comment Status: A  EZ

SuggestedRemedy

- Change the subclause reference in the Subclause column from ‘149.5.2.3’ to ‘149.5.2.3.1’ for TES12, TES13, TES14, and TES15.

Response  Response Status: C

ACCEPT.

---

Comment Type: E  Comment Status: A  EZ

SuggestedRemedy

- Insert new PICS entry after TSE15 of Draft 2.0, with the following content:
  Feature: EOJpk-pk Jitter
  Subclause: 149.5.2.3.2
  Value/Comment: Less than 4/S ps
  Status: M
  Support: Yes[] N/A[]

Response  Response Status: C

ACCEPT.

---

Comment Type: E  Comment Status: D

SuggestedRemedy

- Incorrect dBm values in TSE16.

Response  Response Status: C

REJECT.

This comment was WITHDRAWN by the commenter.

---

Comment Type: E  Comment Status: A

SuggestedRemedy

- Insert new PICS entry after TSE15 of Draft 2.0, with the following content:
  Feature: DJpk-pk Jitter
  Subclause: 149.5.2.3.2
  Value/Comment: Less than 9/S ps
  Status: M
  Support: Yes[] N/A[]

Response  Response Status: C

ACCEPT.

---

Comment Type: E  Comment Status: A

SuggestedRemedy

- Change ‘2.5G return loss’ to ‘2.5GBASE-T1 return loss’

Response  Response Status: C

ACCEPT.
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TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched  A/accepted  R/rejected  RESPONSE STATUS: O/open  W/written  C/closed  U/unsatisfied  Z/withdrawn
SORT ORDER: Clause, Subclause, page, line
The word 'type' seems strange and unnecessary in this sentence.

Suggested Remedy: Remove the word 'type'.

The use of "S" to represent scaling parameter is not advisable. Trying to see where this comes into play throughout the document on a search of "S" reveals so many instances that it is useless.

Suggested Remedy: Change "S" to "Scale".

In other diagrams the PCS is referred to as 64B/65B RS-FEC PCS. Here it is just RS-FEC PCS. We should be consistent.

Suggested Remedy: Change "RS-FEC PCS" to "64B/65B RS-FEC PCS" in Figure 149-1.

The use of S to represent the scaling parameter is consistent with the use in 802.3bq-2016 and 802.3bz-2016. This is where we got it. It’s used in all Multi-Gig BASE-T PHYs.

113.1.1 Nomenclature
The 25GBASE-T and 40GBASE-T PHYs described in Clause 113 represent two distinct PHY types that share the same PCS, PMA, and MDI specifications subject to frequency scaling, and differences between the 25GMII and the XLGMII specifications. In order to efficiently describe the two PHYs, the nomenclature 25G/40GBASE-T is used to describe specifications that apply to both the 25GBASE-T and 40GBASE-T PHYs. Additionally, for parameters that scale with the PHYs data rate, the parameter S is used for scaling.

For 25GBASE-T, S = 0.625 and for 40GBASE-T, S = 1.

126.1.1 Nomenclature
The 2.5GBASE-T and 5GBASE-T PHYs described in this clause represent two distinct PHY types that share the same PCS, PMA, and MDI specifications subject to frequency scaling. In order to efficiently describe the two PHYs, the nomenclature 2.5G/5GBASE-T is used to describe specifications that apply to both the 2.5GBASE-T and 5GBASE-T PHYs. Additionally, for parameters that scale with the PHYs data rate, the parameter S is used for scaling.

For 2.5GBASE-T, S = 0.5 and for 5GBASE-T, S = 1.

In other diagrams the PCS is referred to as 64B/65B RS-FEC PCS. Here it is just RS-FEC PCS. We should be consistent.

Suggested Remedy: Change "RS-FEC PCS" to "64B/65B RS-FEC PCS" in Figure 149-1.
Cl 149 SC 149.1.3 P71 L27 # 193
Brandt, David Rockwell Automation
Comment Type E Comment Status A EZ
PCS layer label is inconsistent with Figure 44-1 and Figure 125-1.
SuggestedRemedy
Change: "RS-FEC PCS"
To: "64B/65B RS-FEC PCS"
Response Response Status C
ACCEPT.

Cl 149 SC 149.1.3 P72 L3 # 243
Zimmerman, George ADI, APL Gp, Aquantia, BMW, Cisco, Commscope, S
Comment Type T Comment Status A EZ
"The MASTER and SLAVE are synchronized by the PHY Link Synchronization function in the PHY (see 149.4.2.6)." - this sentence stands alone from the previous sentence, and needs to be qualified or linked - else it is incorrect (149.4.2.6 only applies in FORCE mode). It is only true when Auto-Negotiation is not used.
SuggestedRemedy
Change "PHYS. The MASTER and SLAVE are..." to "PHYS, and the MASTER and SLAVE are..."
Response Response Status C
ACCEPT.

Cl 149 SC 149.1.3 P72 L14 # 105
Lo, William Axonne Inc.
Comment Type TR Comment Status A OAM
Contradicting statement whether OAM in-band or out-of-band:
page 72 line 14 says "out-of-band", page 120 line 12 says "in-band"
SuggestedRemedy
Change page 72 line 14 from out-of-band to in-band.
Response Response Status C
ACCEPT IN PRINCIPLE.
OAM is "out-of-band"
P120 L120 change "in-band" to "out-of-band".

The Editor will enter a Maintenance request for Clause 97 as 97.3.8 states " The 1000BASE-T1 OAM information is exchanged in-band between two PHYs", this should be "out-of-band".

Cl 149 SC 149.1.3 P149 L27 # 82
D'Ambrosia, John Futurewei, U.S. Subsidiary of Huawei
Comment Type E Comment Status A EZ
The naming of the PCS block in Fig 149-1 is inconsistent with the naming of the PCS block in Fig 44-1 (PDF Page 28, Line 37), which includes "64B/65B", and PCS Blocks in Fig 125-1 (PDF Pge 66 ,Line 14) which also includes the "64B/65B" text
SuggestedRemedy
Change the naming of the PCS block in Fig 149--1 to read "64B/65B RS-FEC PCS"
Response Response Status C
ACCEPT.

Cl 149 SC 149.1.3.1 P72 L30 # 225
McClellan, Brett Marvell
Comment Type E Comment Status R EZ
text in this section appears to be a different font size than other text.
SuggestedRemedy
adjust font
Response Response Status C
REJECT.
I checked the text in FrameMaker and it is the same as the rest of the text. This must be due to the pdf creation or your viewer.

Cl 149 SC 149.1.3.1 P72 L38 # 194
Brandt, David Rockwell Automation
Comment Type E Comment Status A EZ
Missing dashes.
SuggestedRemedy
Change: "3260 bit block"
To: "3260-bit block", in 2 locations
Response Response Status C
ACCEPT.
The scale factor "S" looks like units (Siemens)

Suggested Remedy
Change "L x 320 S ns" to "L x 320 x S ns" (add the multiply operator 'x') as done in other areas of the draft (including line 54 of the same page)

Response
ACCEPT IN PRINCIPLE.

"L x 320 S ns" should be corrected as "L x 320 / S ns"

"L x 320 S ns" should be corrected as "L x 320 / S ns"

Response
ACCEPT.

The PMA interface is defined in 149.2, not 149.4.

Suggested Remedy
change '149.4' to '149.2'

Response
ACCEPT.
"The quiet-refresh cycle continues until the PCS function detects IDLE characters on the XGMII."
This statement is in conflict with normative text in 149.3.2.2.21 which states that any non-LPI symbol will trigger an exit from LPI.
This section has too much detail for a non-normative summary sections and is prone to have conflicts with the normative sections.

**Suggested Remedy**
delete the two paragraphs starting with:
"In the transmit direction the transition to the LPI transmit mode begins..."
and
"In the receive direction the transition to the LPI mode is triggered when ...

**Response**
ACCEPT.

---

This section has too much detail for a non-normative summary sections and is prone to have conflicts with the normative sections. The section sounds normative but has no 'shall' statements. It should provide only a summary and refer to section 149.4.2.6 for normative details.

**Suggested Remedy**
change text to:
"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. Link Synchronization operates in a half-duplex fashion. The MASTER PHY sends a synchronization sequence. If there is no response from the SLAVE, the MASTER repeats sending a synchronization sequence. If the slave detects the sequence, it responds with a synchronization sequence. If no other detection happens after the SLAVE response then Link Synchronization is successfully complete, link monitor timers are started, and the PHY Control state machine starts Training. Link synchronization is defined in 149.4.2.6."

**Response**
ACCEPT IN PRINCIPLE.

To accomodate comment 85 change text to:
"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. Link Synchronization operates in a half-duplex fashion. The MASTER PHY sends a synchronization sequence. If there is no response from the SLAVE, the MASTER repeats sending a synchronization sequence. If the slave detects the sequence, it responds with a synchronization sequence. If no other detection happens after the SLAVE response then Link Synchronization is successfully complete, link monitor timers are started, and the PHY Control state diagram starts Training. Link synchronization is defined in 149.4.2.6."

---

Use preferred terminology for state diagrams.

**Suggested Remedy**

**Response**
ACCEPT.
Comment Type: E
Suggested Remedy:
- Make the horizontal line under "tx_mode" straight.

Response: ACCEPT.

Wienkowski, Natalie
Comment Type: E
Suggested Remedy:
- Fix crooked line

Response: ACCEPT.

McClellan, Brett
Comment Type: E
Suggested Remedy:
- Replace arrows with lines at line 23 and line 29

Response: ACCEPT.

Dawe, Piers
Comment Type: TR
Suggested Remedy:
- Delete this sentence from here. If any substitute is needed, put it within 149.5 PMA electrical specifications, and use the language of a parameter definition, not a test requirement.

Response: ACCEPT IN PRINCIPLE.

Terminology

Implementers (or testers) take responsibility for the accuracy of their test equipment. If someone wants to use 2%-accurate equipment and apply appropriate guard bands, that's OK.

In "The values of all components in test circuits shall be accurate to within ± 1% unless otherwise stated", the "shall" is inappropriate.

Remarks about % tolerance muddy the water: Does 1 V mean 1 V any more? If asked for e.g. <1 V, and measured with 0.1%-accurate equipment, is 1.008 V acceptable?

Anyway, this topic does not fit with "conventions in this clause", and does not relate to the PCS.

Response: ACCEPT IN PRINCIPLE.

Delete "The values of all components in test circuits shall be accurate to within ± 1% unless otherwise stated"

A Maintenance request is required to remove this through 802.3. It is in Clause 97 and may be in others.
According to Table 125-2, Nomenclature and clause correlation, Clause 98 Auto-Negotiation is optional. The Technology Dependent Interface is used to communicate with Auto-Negotiation - I don't think it has any other purpose.

**Suggested Remedy**
Say that the Technology Dependent Interface is required if Auto-Negotiation is implemented (so, not if it's not)

**Response**
ACCEPT IN PRINCIPLE.

Change: MultiGBASE-T1 uses the following service primitives to exchange status indications and control signals across the Technology Dependent Interface as specified in 98.4:

To: MultiGBASE-T1 uses the following service primitives to exchange status indications and control signals across the Technology Dependent Interface, required in PHYs that implement Auto-Negotiation, as specified in 98.4:

The following statement is incorrect:
MultiGBASE-T1 transfers data and control information across the following four service interfaces:

a) 10 Gigabit Media Independent Interface (XGMII)
b) Technology Dependent Interface
c) PMA service interface
d) Medium dependent interface (MDI)

MDI is not a service interface. See definition 1.4.324.

**Suggested Remedy**
Reword
MultiGBASE-T1 transfers data and control information across the following three service interfaces:

a) 10 Gigabit Media Independent Interface (XGMII)
b) Technology Dependent Interface
c) PMA service interface

This is not consistent throughout 802.3.

MDI is included in Service Primitives and Interfaces in Clauses 55, 97, 113, 126, etc. Commenter may want to consider creating a Maintenance request to remove this throughout 802.3.
"send_s_sigdet" appears in Figure 149–2 as a service interface (apparently for EEE alert detection), but does not appear in 149.2.2.
PMA_ALERTDETECT.indication(alert_detect) is a defined service interface for EEE alert detection, but does not appear in 149.2.2.

SuggestedRemedy
- delete "send_s_sigdet" from Figure 149–2.
- add "alert_detect" as a dotted line service interface from the PMA receiver in Figure 149–2 and Figure 149–3
- add "PMA_ALERTDETECT.indication(alert_detect)" to the list in 149.2.2.
- change * to "alert_detect" in 149.3.2.3 on page 101 line 45.

Response:
Make the following set of changes (same as comment 101)
1. Figure 149-2 (P75 L30) remove "send_s_sigdet" and associated line
2. Figure 149-2 (P75 L33) add dotted arrow line from PMA RECEIVE to PCS RECEIVE labeled "alert_detect"
3. Figure 149-3 (P79 L28) add dotted arrow line from PMA to PCS labeled "PMA_ALERTDETECT.indication"
4. P78 L32 add "PMA_ALERTDETECT.indication(alert_detect)" to the list in 149.2.2.
5. Figure 149-4 (P86) add dotted up arrow from PMA SERVICE INTERFACE dotted line to PCA RECEIVE box labeled "alert_detect"
6. P101 L 45 change: "send_s_sigdet" to "alert_detect"

Lo, William

Comment Type: TR
Clause Status: A

"149.3.2.3" and "Figure 149-17" should be cross-references.

SuggestedRemedy
Make "149.3.2.3" and "Figure 149-17" cross-references.

Response:
ACCEPT.
Comment Type E  Comment Status A  EZ

"RS_FEC" is inconsistent with other text using "RS-FEC"

SuggestedRemedy
change "RS_FEC" to "RS-FEC"

Response Response Status C  ACCEPT.

Comment Type E  Comment Status A  EZ
Mispelling "frame"

SuggestedRemedy
Change "FEC fame" to "FEC frame"

Response Response Status C  ACCEPT.

Comment Type E  Comment Status A  EZ
I think it would be useful to indicate that the block of 3600 bits are encoded into a block of 1800 PAM4 symbols.

SuggestedRemedy
Change:
"The 3600 bits in this frame are then encoded into PAM4 symbols and transferred to the PMA."
to:
"The 3600 bits in this frame are then encoded into 1800 PAM4 symbols and transferred sequentially to the PMA."

Response Response Status C  ACCEPT.
"In addition, the code enables the receiver to achieve PCS synchronization alignment on the incoming PHY bit stream." This text is not correct. Alignment is found during training.

**Suggested Remedy**
- delete this sentence.

**Response**
- ACCEPT.

---

Figure 149–7 does not show how the receive path works with de-interleaving.

**Suggested Remedy**
- Either change the figure to include de-interleaving or add a note indicating that this figure only applies to L=1.
- Change the text in 149.3.2.2 as shown in zimmerman_3ch_02_0719.pdf.
- Change fig 149-6:
  - change the block name “RS-FEC (360,326) encoder” to “Interleaver and RS-FEC (360,326) encoder”
  - Editor to add note to Figure that the case shown is L=1.
  - change the encoded block after the encoder to show the L interleaved encoded blocks
  - change the RS-FEC frame at the end to an RS-FEC superframe showing L x 1800 symbols and change fig 149-7:
  - change the output of frame sync from an RS-FEC frame to an RS-FEC superframe showing L x 1800 symbols
  - Editor to add note to Figure that the case shown is L=1.
  - change the block name “RS-FEC decoder to “De-interleaver and RS-FEC decoder”
  - change the RS-FEC Decoded frame to show the L interleaved encoded blocks
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<th>SC</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Suggested Remedy</th>
<th>Response</th>
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<td>149.3.2.2.3</td>
<td>E</td>
<td>A</td>
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<td>149.3.2.2.4</td>
<td>E</td>
<td>A</td>
<td>Change: Contents of block type fields, data octets and control characters are shown as hexadecimal values.</td>
<td>ACCEP.</td>
</tr>
<tr>
<td>149</td>
<td>149.3.2.2.4</td>
<td>E</td>
<td>A</td>
<td>Add arrow ends on TXD&lt;32&gt; and TXD&lt;63&gt;.</td>
<td>ACCEP.</td>
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<tr>
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<td>149.3.2.2.4</td>
<td>E</td>
<td>A</td>
<td>Some arrows in the diagram are too long.</td>
<td>ACCEP.</td>
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Trowbridge, Steve, Nokia
Comment Type E
Comment Status A
Many elements of Figure 149-7 don't quite line up
Suggested Remedy
Use the recommended Pete Anslow tricks of exact pixel position and size to get everything to align
Response Response Status C
ACCEPT.

McClellan, Brett, Marvell
Comment Type E
Comment Status A
"For both x and c the encoder shall follow the notation described in 149.3.2.2.2 where the LSB (leftmost element of the vectors x and c) is the first bit into the RS-FEC encoder and the first transmitted bit."
x and c are not yet defined and need a reference. Notation is defined in 149.3.2.2.3, not 149.3.2.2.2.
Suggested Remedy
change "transcoder/scrambler" to "transcoder and scrambler"
change "For both x and c (in 149.3.2.2.15)" to "For both x and c (in 149.3.2.2.15)"
Response Response Status C
ACCEPT.
IEEE P802.3ch D2.0 Physical Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet Initial Working Group ballot comments

Cl 149 SC 149.3.2.2.15 P94 L41 # 214
McClellan, Brett Marvell

Comment Type: E  Comment Status: A  EZ
page 94 line 41
alpha does not appear in equation 149-3.

Suggested Remedy
change "In Equation (149–3)," to "In Equation (149–1),"

Response  Response Status: C
ACCEPT.

Cl 149 SC 149.3.2.2.15 P94 L41 # 179
Baggett, Tim Microchip

Comment Type: E  Comment Status: A  EZ
Reference to equation 149-3 is incorrect. The referenced equation does not have an alpha term.

Suggested Remedy
reference "Equation (149-1)"

Response  Response Status: C
ACCEPT.

Cl 149 SC 149.3.2.2.15 P94 L41 # 53
Wienckowski, Natalie General Motors

Comment Type: T  Comment Status: A  EZ
Incorrect reference

Suggested Remedy
Change: In Equation (149-3)
To: In Equation (149-1)

Response  Response Status: C
ACCEPT.

Cl 149 SC 149.3.2.2.15 P94 L51 # 37
Wu, Peter Marvell

Comment Type: T  Comment Status: A  EZ
The equation is wrong
\[ m_{i,j} = tx_{RSmessage} < (359 - i) \times 10 + j >, \quad i = 0 \text{ to } 325, \quad j = 0 \text{ to } 9. \]
index out of range

Suggested Remedy
It should be changed to:
\[ m_{i,j} = tx_{RSmessage} < (325 - i) \times 10 + j >, \quad i = 0 \text{ to } 325, \quad j = 0 \text{ to } 9. \]

Response  Response Status: C
ACCEPT.

Cl 149 SC 149.3.2.2.15 P94 L52 # 180
Baggett, Tim Microchip

Comment Type: E  Comment Status: A  EZ
Equation \( m_{i,j} \) could be written a bit more clear.

Suggested Remedy
Reference: "tx_{RSmessage} < (359 - i) \times 10 + j >, for \( i = 0 \) to 325, \( j = 0 \) to 9."

Response  Response Status: C
ACCEPT IN PRINCIPLE.

Make the suggested editorial changes, but don't overwrite the technical change made by Comment #137 changing the first "359" to "325".

Cl 149 SC 149.3.2.2.15 P95 L6 # 125
Nicholl, Shawn Xilinx

Comment Type: E  Comment Status: A  EZ
There is an orphan statement containing that mentions \( tx_{scrambled} \), but makes no other mention to \( tx_{scrambled} \) in the sub-clause. Also, the cross-reference is wrong since
149.3.2.2.14 says nothing about \( tx_{scrambled} \).

Suggested Remedy
Remove the statement "\( tx_{scrambled} < 3599:0 > \) is defined in 149.3.2.2.14."

Response  Response Status: C
ACCEPT.
Figure 149-9 shows a multiplier associated with coefficient $g_{34}$. This is mathematically incorrect (although $g_{34}=1$ based on Equation 149-1). It can only cause confusions and mis-interpretations in the future when people look at this figure.

Suggested Remedy
In figure 149-9, remove the multiplier next to $g_{34}$, and replace the arrowed line into that multiplier with a straight line connecting to the output of that multiplier. Also replace the text "$g_{34}$" with "$g_{34}=1$".

Response
ACCEPT.

Table 149-3 spans over two pages. It'd be useful to have all information on a single page.

Suggested Remedy
Make Table 149-3 have 4 columns so the table can fit on a single page.

Response
ACCEPT IN PRINCIPLE.

The phrase "Compared to the non-interleaving case," is not very straightforward.

Suggested Remedy
Change "Compared to the non-interleaving case, each RS-FEC encoder receives one out of every L message symbols. Otherwise the RS FEC encoder operates exactly the same as specified in 149.3.2.2.15." to "When $L > 1$ each RS-FEC encoder receives one out of every L message symbols from the superframe, otherwise the RS FEC encoder operates exactly the same as specified in 149.3.2.2.15."

Response
ACCEPT.
The sentence "The L encoded RS-FEC frames are recombined into an interleaved RS-FEC superframe" and onward talk about functions that happen after RS encoder. I think this text should be in its own section located after RS encoder.

**Suggested Remedy**

Propose to add a new sub-clause "RS-FEC Recombine" before "149.3.2.2.17 PCS Scrambler". In the new sub-clause put the text "The L encoded RS-FEC frames are recombined ... " and all that follows it, currently found in 149.3.2.2.16

**Response**

**Response Status C**

The current index values are correct as it would be M326xL-L = M325xL.
IEEE P802.3ch D2.0 Physical Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet Initial Working Group ballot comments

P802.3ch D2.0

Cl 149 SC 149.3.2.2.21 P99 L33 # 218

McClellan, Brett Marvell

Comment Type E
Comment Status A

"After the alert signal," is unclear

Suggested Remedy

change "After the alert signal," to "After transmitting the alert signal,"

Response Response Status C
ACCEPT.

Cl 149 SC 149.3.2.2.21 P99 L36 # 219

McClellan, Brett Marvell

Comment Type E
Comment Status A

"Lpi_wake_time" is a variable and should not be capitalized

Suggested Remedy

change "Lpi_wake_time" to "lpi_wake_time"

Response Response Status C
ACCEPT.

Cl 149 SC 149.3.2.2.21 P99 L41 # 220

McClellan, Brett Marvell

Comment Type TR
Comment Status A

"lpi_wake_timer" is not a defined variable. Is this supposed to be lpi_tx_wake_timer?

Suggested Remedy

change lpi_wake_timer to lpi_tx_wake_timer

Response Response Status C
ACCEPT.

Cl 149 SC 149.3.2.2.21 P99 L49 # 216

McClellan, Brett Marvell

Comment Type TR
Comment Status A

"When the last 64B/65B block of LPI characters is generated by the PCS transmit function," This statement is unclear and likely incorrect about when the sleep signal is triggered.

Suggested Remedy

change this paragraph to:
"In the transmit direction the transition to the LPI transmit mode begins when the PCS transmit function detects an LPI control character in the last 64B/65B block of a Reed-Solomon frame. Following this event the PMA transmits the sleep signal starting at the beginning of the next superframe to indicate to the link partner that it is transitioning to the LPI transmit mode. The sleep signal is composed of eight Reed-Solomon frames that contain only LP_IDLE 64B/65B blocks. Once initiated, the complete sleep signal consisting of 8 RS-FEC frames of LP_IDLE shall be transmitted."

Response Response Status C
ACCEPT IN PRINCIPLE.

Change to: In the transmit direction, the transition to the LPI transmit mode begins when the PCS transmit function detects an LPI control character in the last 64B/65B block of a Reed-Solomon frame. Following this event, the PMA transmits the sleep signal starting at the beginning of the next superframe to indicate to the link partner that it is transitioning to the LPI transmit mode. The sleep signal is composed of eight Reed-Solomon frames that contain only LP_IDLE 64B/65B blocks. Once initiated, the complete sleep signal consisting of 8 RS-FEC frames of LP_IDLE shall be transmitted.
"When the last 64B/65B block of LPI characters is generated by the PCS transmit function, the PHY ..." seems inconsistent with 149.1.3.3

**Suggested Remedy**

Replace by:

When the PCS transmit function detects an LPI character in the last 64B/65B block of an RS frame, the PHY ...

**Response**

Response Status **C**

ACCEPT IN PRINCIPLE.

Same resolution as comment 216

Change to: In the transmit direction, the transition to the LPI transmit mode begins when the PCS transmit function detects an LPI control character in the last 64B/65B block of a Reed-Solomon frame. Following this event, the PMA transmits the sleep signal starting at the beginning of the next superframe to indicate to the link partner that it is transitioning to the LPI transmit mode. The sleep signal is composed of eight Reed-Solomon frames that contain only LP_IDLE 64B/65B blocks. Once initiated, the complete sleep signal consisting of 8 RS-FEC frames of LP_IDLE shall be transmitted.

**Comment Type** **E**

"The PMA training frame includes 1 bit pattern every 450 PAM2 symbols, which is aligned with the PCS partial PHY frame boundary" is unclear

**Suggested Remedy**

change to "The PMA training frame includes an alignment bit every 450 PAM2 symbols, which is aligned with the PCS partial PHY frame boundary"

**Response**

Response Status **C**

ACCEPT.

"PHYs with the EEE capability support transition to the LPI mode when the PHY has successfully completed training and pcs_data_mode is TRUE." 46.1.7 states that LPI will not be asserted until one second after link is up.

**Suggested Remedy**

change text to "PHYs with the EEE capability support transition to the LPI mode when the PHY has successfully completed training and pcs_data_mode is TRUE and subject to the timing requirement of 46.1.7."

**Response**

Response Status **C**

ACCEPT.

In figure 149-19, the counter lpi_rxw_err_cnt is used which was not previously defined.

**Suggested Remedy**

In section 149.3.7.2.5 (Counters) add the following definition for lpi_rxw_err_cnt:

"lpi_rxw_err_cnt
An integer value that counts the number of receive wake time faults. lpi_rxw_err_cnt is reset to zero during PCS_TEST. The counter is reflected in register 3.22 (see 45.2.3.12)."

**Response**

Response Status **W**

ACCEPT IN PRINCIPLE.

In section 149.3.7.2.5 (Counters) add the following definition for lpi_rxw_err_cnt:

"lpi_rxw_err_cnt
An integer value that counts the number of receive wake time faults. lpi_rxw_err_cnt is reset to zero during PCS_TEST. The counter is reflected in register 3.22 (see 45.2.3.12)."

**Comment Type** **TR**

"The block_lock flag de-assertion is described for data mode, but re-assertion is not described."

**Suggested Remedy**

insert "The block_lock flag is re-asserted upon detection of a valid RS-FEC frame."

**Response**

Response Status **C**

ACCEPT.

"The PMA training frame includes 1 bit pattern every 450 PAM2 symbols, which is aligned with the PCS partial PHY frame boundary" is unclear

**Suggested Remedy**

change to "The PMA training frame includes an alignment bit every 450 PAM2 symbols, which is aligned with the PCS partial PHY frame boundary"

**Response**

Response Status **C**

ACCEPT.
Cl 149  SC 149.3.5  P102  L31  # 54

Wienckowski, Natalie  General Motors

Comment Type  E  Comment Status  A  Interleaver

Sub-clause 149.3.2.3 PCS Receive function is missing section that describe the following:
- de-construction of the unscrambled Rx stream into pieces for each RS-FEC decoder
- RS-FEC decoder
- round robin de-interleaving

SuggestedRemedy
Propose to add sub-clauses before "149.3.2.3.3 Invalid blocks" that are akin to sub-clauses in the Tx direction, but in the opposite order.
- Rx De-construction (akin to Tx Recombine)
- Rx RS-FEC decoder (akin to Tx FEC encoder)
- Rx De-interleaving (akin to Tx Superframe and round robin interleaving)

Response  Response Status  C
ACCEPT IN PRINCIPLE.

Change the text in 149.3.2.3 as shown in zimmerman_3ch_02_0719.pdf.

Change fig 149-6:
change the block name “RS-FEC (360,326) encoder” to “Interleaver and RS-FEC (360,326) encoder”

change the encoded block after the encoder to show the L interleaved encoded blocks

change the RS-FEC frame at the end to an RS-FEC superframe showing L x 1800 symbols

Editor to add note to Figure that the case shown is L=1.

and change fig 149-7:
change the output of frame sync from an RS-FEC frame to an RS-FEC superframe showing L x 1800 symbols

change the block name “RS-FEC decoder to “De-interleaver and RS-FEC decoder”

change the RS-FEC Decoded frame to show the L interleaved encoded blocks

Editor to add note to Figure that the case shown is L=1.

Cl 149  SC 149.3.5  P102  L31  # 15

Dudek, Mike  Marvell

Comment Type  E  Comment Status  A  typo

SuggestedRemedy
change: among raining frame
To: among training frame

Response  Response Status  C
ACCEPT.

Cl 149  SC 149.3.5  P102  L31  # 233

McClellan, Brett  Marvell

Comment Type  E  Comment Status  A  typo

SuggestedRemedy
change "raining" into "training"

Response  Response Status  C
ACCEPT.

Cl 149  SC 149.3.5  P102  L31  # 254

den Besten, Gerrit  NXP Semiconductors

Comment Type  E  Comment Status  A  typo: raining

SuggestedRemedy
Replace by: training

Response  Response Status  C
ACCEPT.
IEEE P802.3ch D2.0 Physical Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet Initial Working Group ballot comments

Comment Type: E  Comment Status: A
"are shown in 149–12" should be "are shown in Figure 149–12"

SuggestedRemedy
Change the cross-reference format to "FigureNumber"

Response: Response Status: C
ACCEPT.

Comment Type: E  Comment Status: A
Subject verb agreement

SuggestedRemedy
Change: The first 96 bits of the 16th partial PHY frame is
To: The first 96 bits of the 16th partial PHY frame are

Response: Response Status: C
ACCEPT.

Comment Type: E  Comment Status: A
typo: (bits of) PHY frame is

SuggestedRemedy
Replace by: (bits of) PHY frame are

Response: Response Status: C
ACCEPT.

Comment Type: TR  Comment Status: A
RFER_CNT_LIMIT and RFRX_CNT_LIMIT are not defined

SuggestedRemedy
See page 2 of "tu_3ch_03_0719.pdf".

Response: Response Status: C
ACCEPT IN PRINCIPLE.

Grant editorial license to format the definitions correctly.
IEEE P802.3ch D2.0 Physical Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet Initial Working Group ballot comments

P802.3ch D2.0

Cl 149 SC 149.3.7.2.2 P109 L22 # 174
Regev, Alon Keysight Technologies

Comment Type TR Comment Status A EZ
"rs-fec_frame_done" should be "rs_fec_frame_done"

SuggestedRemedy
change "rs-fec_frame_done" to "rs_fec_frame_done"

Response Response Status W
ACCEPT.

Cl 149 SC 149.3.8.2 P113 L42 # 162
Law, David Hewlett Packard Enterprise

Comment Type E Comment Status A EZ

SuggestedRemedy
Change the text ‘... time RFER_BAD_RF of the ...’ to read ‘... time the RFER_BAD_RF state of the ...’.

Response Response Status C
ACCEPT.

Cl 149 SC 149.3.8.2 P113 L46 # 163
Law, David Hewlett Packard Enterprise

Comment Type T Comment Status A RS-FEC
I'm struggling to find the definition of the RFER_CNT_LIMIT and RFRX_CNT_LIMIT.

SuggestedRemedy
Please add a cross-reference to where RFER_CNT_LIMIT and RFRX_CNT_LIMIT are defined.

Response Response Status C
ACCEPT IN PRINCIPLE.

Comment 282 adds these definitions. A cross reference should not be needed as these definitions will be a few pages before the state diagram with the other variables.

Cl 149 SC 149.3.8.2 P114 L3 # 164
Law, David Hewlett Packard Enterprise

Comment Type T Comment Status A EZ
Subclause 149.3.7.2.2 'Variables' defines pcs_reset as a Boolean variable with no further definition of the values, which I understand to mean that the two possible values default to true and false. This seems to be confirmed in subclause 149.3.2.1 'PCS Reset function' which states that ‘PCS Reset sets pcs_reset = TRUE while any of the above ...’ and its use in the PCS 64B/65B Transmit and receive State diagrams where the open arrow entry is based on ‘pcs_reset + ...’. Based on its use in the open arrow entry to the RFER_MT_INIT state in Figure 149–15 'RFER monitor state diagram' needs to be changed from 'pcs_reset = ON + ...' to 'pcs_reset + ...'.

SuggestedRemedy
Change 'pcs_reset = ON + ...'. to read 'pcs_reset + ...'.

Response Response Status C
ACCEPT.

Cl 149 SC 149.3.8.2 P114 L48 # 165
Law, David Hewlett Packard Enterprise

Comment Type T Comment Status A RS-FEC
There is no transition condition on the transition from the INC_CNT2 state to the HI_RFER state in Figure 149–15 'RFER monitor state diagram'.

SuggestedRemedy
Add a transition condition on the transition from the INC_CNT2 state to the HI_RFER state.

Response Response Status C
ACCEPT IN PRINCIPLE.

Add "UCT" transition condition.

Cl 149 SC 149.3.8.2 P115 L5 # 166
Law, David Hewlett Packard Enterprise

Comment Type E Comment Status A EZ
Please vertically and horizontally centre align all state names.

SuggestedRemedy
See comment.

Response Response Status C
ACCEPT.
IEEE P802.3ch D2.0 Physical Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet Initial Working Group ballot comments

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

Lo, William Axonne Inc.

Comment Type: TR  Comment Status: D  EEE

Technically this is really clause 149.3.7.3 but for some reason the state diagrams appears after clause 149.3.8.2.

Figure 149-16 (page 115) has 3 L transitions into Figure 149-17 (Page 116). There is a corner case that makes things behave a little ugly that people may implement slight differently depending on interpretation. This change avoids the corner case.

Scenario:
T_TYPE(tx_raw) initially = LI at exactly a time lp_low_snr = true.
When this happens the state machine transitions into TX_L but does absolutely nothing and then immediately transitions into TX_WM state.
The intent here is to exit LPI when SNR is low.
But why enter LPI in the first place when the PHY already knows SNR is low.
Suggest remedy is to prevent entering Figure 149-17 when the PHY already knows that SNR is low.

SuggestedRemedy
Page 115 Figure 149-16.
Change the 3 T_TYPE(tx_raw) = LI to
(T_TYPE(tx_raw) = LI) * lp_low_snr

Proposed Response  Response Status: C
REJECT.

This comment was WITHDRAWN by the commenter.

Lo, William Axonne Inc.

Comment Type: TR  Comment Status: A  PCS

Technically this is really clause 149.3.7.3 but for some reason the state diagrams appears after clause 149.3.8.2.
The tx_lpi_req variable gets stuck true if LPI is presented on XGMII for less than a full RS frame time and then goes to something that is not LPI. This will cause Figures 149-16 and 149-20 to get out of sync.

Scenario:
XGMII indicates LPI which causes
T_TYPE(tx_raw) = LI, enter TX_L state (page 116)
XGMII stops sending LPI before end of RS frame which causes
T_TYPE(tx_raw) = (C+D+E+S+T), enter TX_WM state but tx_lpi_req never gets set to false because tx_alert_start_next is never set true.
Since RS frame is not complete (rs_fec_frame_done is not asserted page 119) tx_lpi_active remains false hence state machine moves from TX_WM to TX_C state. Meanwhile with tx_lpi_req stuck at true, rs_fec_frame_done will trigger eventually and we move to SEND_SLEEP state and then onto SEND_QR state (page 119).
We are stuck there forever since tx_lpi_req is stuck at true.
Hence the EEE transmit state diagram (page 119) is out of sync with the PCS 64/65B transmit state diagram (page 115).
Remedy is to delay transition into TX_WM until tx_lpi_active is true to keep the 2 state diagrams in sync.

SuggestedRemedy
Page 116 Figure 149-17.
Change
lp_low_snr + T_TYPE(tx_raw) = (C + D + E + S + T )
to
(lp_low_snr + T_TYPE(tx_raw) = (C + D + E + S + T )) * tx_lpi_active

Response  Response Status: C
ACCEPT.

Page 39 of 62
7/17/2019 7:44:16 AM
Suggest that a font be used for the each symbols in the state diagram to ease any future maintenance on the state diagram.

Suggested Remedy
Suggest that the two instances of the symbol '=' in symbol font be changed to Airal font. They are used in 'R_TYPE_NEXT = ...' in the transition from RX_D to RX_E and the transition from RX_E to RX_E.

Accept.

---

Law, David  
Hewlett Packard Enterprise

**Comment Type:** E  
**Comment Status:** A  
**Suggested Remedy:**

Suggest that 'R_TYPE(rx_coded) = S' be changed to read 'R_TYPE(rx_coded) = S' (add a space between ') and '=') on the transition from the RX_T to RX_D states.

Accept.

---

Law, David  
Hewlett Packard Enterprise

**Comment Type:** T  
**Comment Status:** A  
**Suggested Remedy:**

The lpi_rxw_err_cnt counter incremented in the RX_WE state of Figure 149–19 PCS 64B/65B Receive state diagram, part b' is not defined or used anywhere.

Accept in principle.

Implement solution to comment #173.

In section 149.3.7.2.5 (Counters) add the following definition for lpi_rxw_err_cnt:

```
lpi_rxw_err_cnt
An integer value that counts the number of receive wake time faults. lpi_rxw_err_cnt is reset to zero during PCS_TEST. The counter is reflected in register 3.22 (see 45.2.3.12).```

---

Law, David  
Hewlett Packard Enterprise

**Comment Type:** E  
**Comment Status:** A  
**Suggested Remedy:**

Either change lpi_rxw_err_cnt to lpi_block_r or change lpi_block_r in subclause 149.3.7.2.1 to lpi_block_r.

Accept in principle.

---

Law, David  
Hewlett Packard Enterprise

**Comment Type:** E  
**Comment Status:** A  
**Suggested Remedy:**

Either change LP_BLOCK_R in the RX_L state to LPBLOCK_R, or change LPBLOCK_R in subclause 149.3.7.2.1 to LP_BLOCK_R.

Accept.

---

Law, David  
Hewlett Packard Enterprise

**Comment Type:** E  
**Comment Status:** A  
**Suggested Remedy:**

Either change I_BLOCK_R in the RX_R state to IBLOCK_R, or change IBLOCK_R in subclause 149.3.7.2.1 to I_BLOCK_R.

Accept in principle.

Change IBLOCK_R in subclause 149.3.7.2.1 to I_BLOCK_R.

---

Law, David  
Hewlett Packard Enterprise

**Comment Type:** T  
**Comment Status:** A  
**Suggested Remedy:**

The LP_BLOCK_R constant assigned to rx_raw in the RX_L state isn't defined in subclause 149.3.7.2.1 'Constants', there is however an LPBLOCK_R constant defined in subclause 149.3.7.2. that isn't used.

Accept in principle.

Change LPBLOCK_R in subclause 149.3.7.2.1 to LP_BLOCK_R.
Law, David  
Hewlett Packard Enterprise

**Comment Type:** E  **Comment Status:** A  **Response Status:** C  **Comment:** EZ

**Suggested Remedy:**
Delete the spurious AND symbol from the end of the equation for the transition from SEND_SLEEP to SEND_QR.

**Response:**
ACEPT.

---

Wienckowski, Natalie  
General Motors

**Comment Type:** E  **Comment Status:** A  **Response Status:** C  **Comment:** EZ

**Suggested Remedy:**
Adjust lines/boxes in figure 149-21 so they are properly aligned and there don't appear to be different line widths.

**Response:**
ACEPT.

---

Brandt, David  
Rockwell Automation

**Comment Type:** E  **Comment Status:** A  **Response Status:** C  **Comment:** EZ

**Suggested Remedy:**
Missing space

**Response:**
ACEPT.

---

Wienckowski, Natalie  
General Motors

**Comment Type:** E  **Comment Status:** A  **Response Status:** C  **Comment:** EZ

**Suggested Remedy:**
Change: "OAM10-bit"  
To: "OAM 10-bit"

**Response:**
ACEPT.

---

Lo, William  
Axonne Inc.

**Comment Type:** E  **Comment Status:** A  **Response Status:** C  **Comment:** EZ

**Suggested Remedy:**
“can packed into” to "can be packed into"
Fig. 149-23 shows a multiplier associated with coefficient $A_2$. This is mathematically incorrect (although $A_2=1$ based on Equation 149-8). It can only cause confusions and misinterpretations in the future when people look at this figure.

In Fig. 149-23, remove the multiplier next to $A_2$, and replace the arrowed line into that multiplier with a straight line connecting to the output of that multiplier. Also replace the text "A_2" with "A_2=1".
Comment Type E
Comment Status A
OAM
Should this refer to the "State Variables to OAM Register Mapping" that were edited in Clause 97 to be BASE-T1? Why do they need to appear twice?

Suggested Remedy
Refer to the modified Clause 97 Table 97-6 for the BASE-T1 mappings and then define the additional mappings for MultiGBASE-T1.

Response
Response Status C
ACCEPT IN PRINCIPLE.

P127 L38
Change: Table 149–9 describes the MDIO register to the state diagrams variable mapping.

To: Table 97-6 and Table 149–9 describe the MDIO register to the state diagrams variable mapping.

P128 L6
Delete rows from "BASE-T1 OAM Message Valid" through "Link Partner BASE-T1 OAM Message 7".

Delete rows for 3.2318.7 through 3.2318.0 and 3.2319.15 through 3.2319.0.

Add 3 rows (each cell in row is on a separate line due to width restriction of database row 1, before MultiGBASE-T1 OAM status Message 9:
MultiGBASE-T1 OAM status Message 10
MultiGBASE-T1 OAM status register
3.2318.7:0
mr_tx_message[71:64]
row 2, after MultiGBASE-T1 OAM status Message 9:
MultiGBASE-T1 OAM status Message 12
MultiGBASE-T1 OAM status register
3.2319.7:0
mr_tx_message[95:88]
row 3, after row 2 above:
MultiGBASE-T1 OAM status Message 11
MultiGBASE-T1 OAM status register
3.2318.15:8
mr_tx_message[87:80]

Comment Type T
Comment Status A
OAM
In Figure 149-24, the OAM receive state diagram, the entry condition into state "LOAD_RECEIVE_PAYLOAD" may cause an erroneous corner case.

Suggested Remedy
See page 4 of "tu_3ch_05_0719.pdf".

Response
Response Status C
ACCEPT.
IEEE P802.3ch D2.0 Physical Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet Initial Working Group ballot comments

---

**Comment Type:** E  **Comment Status:** A  **EZ**

typo: sall

**Suggested Remedy:** Replace by: shall

**Response:**  
ACCEPT.

---

**Comment Type:** ER  **Comment Status:** A  **EZ**

**Response:**  
ACCEPT.

---

**Comment Type:** T  **Comment Status:** A  **EZ**

The clock jitter requirements are in 149.5.2.3, not 149.5.2.2.

**Suggested Remedy:**

Change: while meeting the transmit jitter requirements of 149.5.2.2.

To: while meeting the transmit jitter requirements of 149.5.2.3.

Make the same change on line 36.

**Response:**  
ACCEPT.
PHY Capability Bits: PHY Vendors need to communicate vendor specific information between the two link partners. Most previous BASE-T standards provided such capability, but currently 802.3ch does not provide it.

Suggested Remedy

Replace paragraph on page 141, line 50 with the following:
The format of PHY capability bits is Oct10<0> = OAMen, Oct10<2:1> = InterleaverDepth, Oct10<4:3> = PrecoderSel, Oct10<5> = SlowWakeRequest, Oct10<6> = EEEen and Oct10<7> = VendorSpecificMessage. EEEen and OAMen indicate EEE and MultiGBASE-T1 OAM capability enable, respectively. The PHY shall indicate the support of these two optional capabilities by setting the corresponding capability bits. When the VendorSpecificMessage bit is set to 1 then the remaining 23 bits of the MSG24 field is vendor specific data. Otherwise when VendorSpecificMessage=0, the remaining bits shall be reserved and set to 0.

ACCEPT IN PRINCIPLE.

Implement the requested changes in Farjadrad_3ch_02a_0719.pdf with editorial license to format, number, correct spelling etc. as needed to fit the draft.

Straw Poll - Chicago Rules

What do you think should be done with Comment 285?

1. Reject - 4
2. Use the available remaining bits (17) for Vendor Specific communication - 13
3. Define additional Capability bits and a new state machine to define how these are implemented for the Vendor Specific communication and how these work with the currently defined bits - 1
Wienckowski, Natalie  General Motors

**Comment Type**: E  **Comment Status**: A  **EZ**

**SuggestedRemedy**
- Change: After all the 7 octets
- To: After all 7 octets

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

---

Wienckowski, Natalie  General Motors

**Comment Type**: E  **Comment Status**: A  **EZ**

**SuggestedRemedy**
- Change: PHY Control state diagram state diagram
- To: PHY Control state diagram

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

---

Farjadrad, Ramin  Aquantia

**Comment Type**: T  **Comment Status**: R  **Vendor info**

[PHY Capability Bits]: Table 149-12 to be replaced by two tables (149-12a & 149-12b) to demonstrate the change proposed, meaning to include a field to identify the VendorSpecificMessage mode. Also, group all reserved bits in Octer8 and Octer 9 for more efficient grouping.

**SuggestedRemedy**
- In Table 149-12a (when VendorSpecificMessage=0)
  - Change Octer9<6> from SlowWakeRequest to Reserved
  - Change Octer9<6> from SlowWakeRequest to Reserved
  - Change Octer10<5> from Reserved to SlowWakeRequest
  - Change Octer10<6> from Reserved to EEEen
  - Change Octer10<7> from Reserved to VendorSpecificMessage=0

- In Table 149-12b (when VendorSpecificMessage=1)
  - Change Octer8<7:0>, Octer9<7:0>, Octer10<6:0> to Vendor Specific Data
  - Change Octer10<7> VendorSpecificMessage=1

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

Based on the straw poll for comment 285, this comment is not needed as there won't be a second table.

---

**Comment Type**: E  **Comment Status**: A  **EZ**

**SuggestedRemedy**
- Change: and the Link
  - Monitor state machines begins monitoring
  - To: and the Link
  - Monitor state machine begins monitoring

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

**Comment Type**: E  
**Comment Status**: A  
**SuggestedRemedy**:  
Inconsistent Sn subscript style. 
Lines 19, 20 does not subscript the n in Sn where everywhere else the n is in subscript.  
**Response**: None

Lo, William  
Axonne Inc.

**Comment Type**: TR  
**Comment Status**: A  
**SuggestedRemedy**:  
Missing subscript  
**Response**: None

Lo, William  
Axonne Inc.

**Comment Type**: E  
**Comment Status**: A  
**SuggestedRemedy**:  
RS FER is called RFER at other places in the spec  
**Response**: None

Lo, William  
Axonne Inc.

**Comment Type**: E  
**Comment Status**: A  
**SuggestedRemedy**:  
"pcs_data_mode" should not be split across two lines  
**Response**: None

Lo, William  
Axonne Inc.

**Comment Type**: E  
**Comment Status**: A  
**SuggestedRemedy**:  
It appears that in hT(t), "h" and "(t)" are superscripts and "T" is a subscript.  
**Response**: None

Wienckowski, Natalie  
General Motors

**Comment Type**: E  
**Comment Status**: A  
**SuggestedRemedy**:  
Change "h" and "(t)" to normal with "T" as a subscript.  
**Response**: None

Wienckowski, Natalie  
General Motors

**Comment Type**: E  
**Comment Status**: A  
**SuggestedRemedy**:  
Move "OK:..." to be on the line after "Values:  
**Response**: None

Wienckowski, Natalie  
General Motors

**Comment Type**: E  
**Comment Status**: A  
**SuggestedRemedy**:  
Move "OK:..." to be on the line after "Values:  
**Response**: None

Wienckowski, Natalie  
General Motors

**Comment Type**: E  
**Comment Status**: A  
**SuggestedRemedy**:  
Move "OK:..." to be on the line after "Values:  
**Response**: None

Anslow, Pete  
Ciena

**Comment Type**: E  
**Comment Status**: A  
**SuggestedRemedy**:  
"pcs_data_mode" should not be split across two lines  
**Response**: None

Anslow, Pete  
Ciena

**Comment Type**: E  
**Comment Status**: A  
**SuggestedRemedy**:  
Prevent "pcs_data_mode" from being split across lines.  
(Click somewhere within "pcs_data_mode" and type Esc n s)  
**Response**: None
P802.3ch D2.0 Physical Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet Initial Working Group ballot comments

**Cl 149 SC 149.4.4.1 P150 L44 #160**

Law, David
Hewlett Packard Enterprise

Comment Type: E   Comment Status: A

Typo, 'PCSDATAMODE.indicate' should read 'PCSDATAMODE.indication', see IEEE Std 802.3 subclause 1.2.2.1 'Classification of service primitives'.

SuggestedRemedy
See comment.

Response
Response Status: C  ACCEPT.

**Cl 149 SC 149.4.4.1 P151 L7 #112**

Lo, William
Axonne Inc.

Comment Type: TR   Comment Status: A

The watchdog function is removed from the state diagrams. There is no longer a need for the watchdog variable.

SuggestedRemedy
Remove the entire paragraph on PMA_watchdog_status

Response
Response Status: C  ACCEPT.

**Cl 149 SC 149.4.4.1 P151 L25 #67**

Wienckowski, Natalie
General Motors

Comment Type: E   Comment Status: A

Missing return

SuggestedRemedy
Move "OK:..." to be on the line after "Values:

Response
Response Status: C  ACCEPT.

**Cl 149 SC 149.4.4.1 P151 L44 #160**

Law, David
Hewlett Packard Enterprise

Comment Type: E   Comment Status: A

Typo, 'PCSDATAMODE.indicate' should read 'PCSDATAMODE.indication', see IEEE Std 802.3 subclause 1.2.2.1 'Classification of service primitives'.

SuggestedRemedy
See comment.

Response
Response Status: C  ACCEPT.

**Cl 149 SC 149.4.4.2 P151 L41 #113**

Lo, William
Axonne Inc.

Comment Type: TR   Comment Status: A

The maxwait timer was removed in previous drafts but all reference to this was not cleanly removed.

Side note: the maxwait_timer functionality is actually in the autoneg and Link Synchronization state diagrams so it is redundant here.

SuggestedRemedy
Page 151 line 45 - Delete maxwait_timer paragraph
Page 144 line 21 - Delete "...until maxwait_timer expires"
Page 144 lines 24 to 27 - Delete paragraph
Page 153 line 13 - Delete INIT_MAXWAIT_TIMER state, delete UCT arrow and reconnect arrow from DISABLE_TRANSMITTER to SILENT
Page 153 line 51 - Delete "stop maxwait_timer" in box
Page 182 line 35 - Delete maxwait_timer row

Response
Response Status: C  ACCEPT.

**Cl 149 SC 149.4.5 P154 L12 #81**

Souvignier, Tom
Broadcom

Comment Type: TR   Comment Status: A

State Diagrams

There is a corner case in the Link Monitor state diagram (Figure 149-34) that may cause unnecessary delays in the startup process. This can be fixed by a simple change in the branch condition from the LINK_DOWN state into the LINK_UP state.

SuggestedRemedy
See page 4 of "tu_3ch_02_0719.pdf".

Response
Response Status: W

ACCEPT IN PRINCIPLE.

In Figure 149-34, change the transition condition from LINK_DOWN to LINK_UP to be pcs_data_mode = true.

Also, change the transition condition from LINK_UP to LINK_DOWN to be loc_rcvr_status = NOT_OK + PMA_refresh_status = FAIL

In Figure 149-33, in State PCS_DATA, remove start minwait_timer.
Add non-breaking space in the number per the IEEE-SA Style Manual.

**Suggested Remedy**
- Change: 175.78125 MHz.
- To: 175.78125 MHz.

**Response**
- **Response Status**: C
- **REJECT.**

The current format is correct per 802.3 style for numbers.

---

**JITTER TEST MODE** The description of test mode 2 needs to be expanded to allow the multiple test patterns.

**Suggested Remedy**
- Change the fourth paragraph of 149.5.1. to read:

  Test mode 2 is for transmitter jitter testing on MDI when transmitter is in MASTER timing mode. When test mode 2 is enabled, the PHY shall transmit the pattern controlled by bits 1.231.1:0, as shown in Table 149-15a, with the transmitted symbols timed from its local clock source.

  Insert Table 149-15a Jitter test modes after (new) fourth paragraph of 149.5.1 as follows:

<table>
<thead>
<tr>
<th>Bit 1.231.1</th>
<th>Bit 1.231.0</th>
<th>Test Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Square wave: a continuous pattern of 16<em>S {+1} symbols followed by 16</em>S {-1} symbols</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>JP03A: a continuous pattern of JP03A (as specified in 94.2.9.1)</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>JP03B: a continuous pattern of JP03B (as specified in 94.2.9.2)</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

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

Comments tagged JITTER TEST MODE should be treated as a group.

Comments 39, 40, 41, 117, 119, 120, 121, and 200 all change the text related to the transmitter linearity and jitter test modes.

Modify the text as defined in wienckowski_3ch_02e_0719.pdf.
Further work on PAM4 systems after Clause 94 was completed decided that the JP03A and JP03B signals were too un-representative of normal traffic. Instead the PRBS13Q pattern is used for jitter testing. The dual dirac jitter specification methodology has also been replaced by a more direct measure of jitter at the probability relevant to the clause. (Called J?U where ? is the probability of interest) and the Jrms value. The test methodology is defined in Clause 120D.3.1.8.1

SuggestedRemedy
Replace the reference to JP03A and JP03B with a reference to PRBS13Q described in sub-clause 120.5.11.2.1 and change the references in 149.5.2.3.2 as well.

Response
REJECT.

In the case of a bidirectional PHY with echo cancellation, the JP03A and JP03B signals are sufficient to check for even/odd jitter. The echo canceller has stricter requirements for other jitter found by the PRBS13Q sequence.

It's disappointing to see these very artificial test patterns from Clause 94 being brought back when we have moved on to better methods for PAM4 testing in Annex 120D and subsequent clauses such as 136.

SuggestedRemedy
Define jitter and linearity with PRBS13Q, following 120D.3.1.8 Output jitter and 120D.3.1.2 Transmitter linearity. Make JP03A and JP03B optional.

Response
ACCEPT IN PRINCIPLE.

In the case of a bidirectional PHY with echo cancellation, the JP03A and JP03B signals are sufficient to check for even/odd jitter. The echo canceller has stricter requirements for other jitter found by the PRBS13Q sequence.

"continues pattern of {-1,+1} symbols" The meaning of the word 'continuous' is not very clear. Is this referring to toggling pattern or something else?

SuggestedRemedy
If this is about a toggle pattern, say toggling instead of continuous. If otherwise, specify more specifically what was meant.

Response
REJECT.

The current language is consistent with IEEE802.3 usage.
Cl 149 SC 149.5.1 P 155 L 50  # 120
Sedarat, Hossein Ethernovia

**Comment Type** T **Comment Status** A **Test Modes**

The transmit linearity test, as defined in 149.5.2.2, requires 2 test patterns: a low frequency short pattern to measure the accuracy of the PAM4 levels, and a high-frequency and long PRBS pattern to measure the transmit SNDR. Test mode 4 does not provide a provision to transmit 2 test patterns. Since the nonlinearity of the transmitter can be measured with respect to the ideal PAM4 levels, the short test pattern may not offer additional value. Also, the long high-frequency pattern of QPRBS13, as defined in 94.2.12.7, is constructed in a peculiar way which may be more fitting for a 100G-KP4 transmitter. A simple PRBS13 as the test pattern is as effective, more efficient to implement and less prone to misinterpretation of the specifications in another standard.

**SuggestedRemedy**

Replace “… transmit linearity test pattern defined in 94.29.4” with “… PRBS13 test pattern as defined in equation 94-3 and figure 94-6”. And in subclause 149.5.2.2, add the following to the end of first sentence: "using ideal PAM4 level of 1/3 for effective symbol levels of ES1 and ES2.”

**Response**

ACCEPT IN PRINCIPLE.

Comments 39, 40, 41, 117, 119, 120, 121, and 200 all change the text related to the transmitter linearity and jitter test modes.

Modify the text as defined in wienckowski_3ch_02e_0719.pdf.

---

Cl 149 SC 149.5.1 P 156 L 19  # 208
Dawe, Piers Mellanox

**Comment Type** TR **Comment Status** A **Test Modes**

"1.2.6 Accuracy and resolution of numerical quantities

Unless otherwise stated, numerical limits in this standard are to be taken as exact, with the number of significant digits and trailing zeros having no significance." Stating otherwise makes life more complicated, and an attempt to enforce test equipment spec is out of scope. Implementers and testers can sort out their measurement accuracy for themselves.

**SuggestedRemedy**

Delete "The tolerance of resistors shall be +/- 0.1%.”

**Response**

ACCEPT IN PRINCIPLE.

P156 L19
Delete: The tolerance of resistors shall be +/- 0.1%.

P157 L35
Add to end of current paragraph: Transmitter electrical tests are specified with a load tolerance of ± 0.1%.

---

Cl 149 SC 149.5.1.1 P 156 L 19  # 201
Dawe, Piers Mellanox

**Comment Type** TR **Comment Status** A **Test Modes**

Not a test spec

**SuggestedRemedy**

Change "shall be used” to “are defined for”

**Response**

ACCEPT.
1pF is only 50 Ohm at 3GHz. This probe will significantly degrade the performance of the signal.

**Suggested Remedy**
Delete Figure 149-36 and use Figure 149-38 for these tests.

**Response**
ACCEPT IN PRINCIPLE.

The text above the figure states that "equivalent" fixtures can be used. We will remove the specifics of the probe and leave it up to the implementer to choose the correct probe.

Modify Figure 149-36 and delete "with resistance > 10 kOhm and capacitance < 1 pF".

---

I don't know what you mean by "The PMA shall operate with AC-coupling to the MDI". Are you saying the transmitter is AC coupled? The receiver? Both? Or that AC coupling is provided to the PMA by something else?

**Suggested Remedy**
This text (as modified for this situation) might be useful:
86A.4.1 nPPI host to module electrical specifications
The module electrical input shall be AC-coupled, i.e., it shall present a high DC common-mode impedance
at TP1. There may be various methods for AC-coupling in actual implementations.

**Response**
ACCEPT IN PRINCIPLE.

From: The PMA shall operate with AC-coupling to the MDI.

To: The electrical input shall be AC-coupled, i.e., it shall present a high DC common-mode impedance at the MDI. There may be various methods for AC-coupling in actual implementations.

A transmitter with an SNDR of 31 dB, as defined in 94.3.12.7, is a significant contributor to the input noise of the far-end receiver with considerable impact on operating margin and major reduction of the noise budget left for the receiver.

**Suggested Remedy**
Replace the sentence "The transmitter shall meet the SNDR distortion as specified in 94.3.12.7" with "The transmit SNDR, as defined in 94.3.12.7 shall be greater than 38 dB".

**Response**
ACCEPT IN PRINCIPLE.

Comments 39, 40, 41, 117, 119, 120, 121, and 200 all change the text related to the transmitter linearity and jitter test modes.

Modify the text as defined in wienckowski_3ch_02e_0719.pdf.
[JITTER TEST MODE] Random jitter test description needs to be modified to reflect that there are multiple test patterns available.

Suggested Remedy

Change first sentence of 149.5.2.3.1 From: In addition to jitter measurement for transmit clock, MDI jitter is measured when in test mode 2 and using test fixture 3 as shown in Figure 149-38.

To: In addition to jitter measurement for transmit clock, MDI jitter is measured when in test mode 2 with the square wave pattern (see Table 149-15a) and using test fixture 3 as shown in Figure 149–38.

Response

ACCEPT IN PRINCIPLE.

Comments 39, 40, 41, 117, 120, 121, and 200 all change the text related to the transmitter linearity and jitter test modes.

Modify the text as defined in wienckowski_3ch_02e_0719.pdf.
IEEE P802.3ch D2.0  Physical Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet Initial Working Group ballot comments

Cl 149  SC 149.5.2.3.2  P158  L29  # 28
Anslow, Pete            Ciena

Comment Type E  Comment Status A  EZ
"as specified in Clause 94.3.12.6.1" should be "as specified in 94.3.12.6.1" and the final "1" should be in forest green font.
On line 35 "as specified in Clause 94.3.12.6.2" should be "as specified in 94.3.12.6.2"

SuggestedRemedy
Change "as specified in Clause 94.3.12.6.1" to "as specified in 94.3.12.6.1" and apply the character tag External to the final "1".
On line 35 change "as specified in Clause 94.3.12.6.2" to "as specified in 94.3.12.6.2".

Response  Response Status C
ACCEPT.

Cl 149  SC 149.5.2.3.2  P158  L35  # 72
Wienckowski, Natalie  General Motors

Comment Type E  Comment Status A  EZ
The word "Clause" doesn't belong before a subclause reference.

SuggestedRemedy
Change: Clause 94.3.12.6.2 to 94.3.12.6.2.

Response  Response Status C
ACCEPT.

Cl 149  SC 149.5.2.4  P158  L41  # 265
den Besten, Gerrit  NXP Semiconductors

Comment Type T  Comment Status A  PSD
The transmit power range was shifted from -1dB/+2dB to -1.5dB/+1.5dB based on concerns on the lower limit for 10Gbps operation. However this shift makes the upper limit unnecessarilly more critical for lower speed operation.

SuggestedRemedy
Change the upper limit back to +2dB.

Response  Response Status C
ACCEPT IN PRINCIPLE.
Change: the transmit power shall be in the range of –1.5 dBm to 1.5 dBm
To:  the transmit power shall be in the range of –1 dBm to 2 dBm

Wienckowski, Natalie  General Motors

Comment Type E  Comment Status A  EZ
unnecessary article

SuggestedRemedy
Change: using the test fixture 4
To:  using test fixture 4

Response  Response Status C
ACCEPT.

Cl 149  SC 149.5.3.1  P160  L11  # 186
Brandt, David  Rockwell Automation

Comment Type T  Comment Status R  Test Modes
I don't see where the frame error ratio comes from. If I assume this is actual MAC data with addresses and FCS, I get FER = 1e-12 * (800 + 22) * 8 = 6.6e-9. I note that 149.5.3.2 does not add any MAC frame overhead.

SuggestedRemedy
Please check the math or describe better.

Response  Response Status C
REJECT.

The comment description does not contain sufficient detail so that the TF can understand the specific changes requested by the commenter. In addition, the suggested remedy in the comment does not contain sufficient detail so that the TF can understand the specific changes requested by the commenter.

Cl 149  SC 149.5.3.2  P160  L17  # 74
Wienckowski, Natalie  General Motors

Comment Type E  Comment Status A  EZ
Missing Oxford comma.

SuggestedRemedy
Change: Gaussian distribution, bandwidths and magnitudes
To:  Gaussian distribution, bandwidths, and magnitudes

Response  Response Status C
ACCEPT.
**Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet Initial W**

**Comment Type:** T  
**Comment Status:** R  
**Test Modes**

149.5.3.1 seem inconsistent. 149.5.3.1 has "frame error ratio", but wouldn't these frames crossing XGMII also be counted as 149.5.3.2 "frame loss ratio" when they get to the MAC? There should be no further correction after RS-FEC. Both use the same link segment specified in 149.7.

**Suggested Remedy**

Consider whether the same terminology, packet sizes and measurement points can be used.

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

The comment description does not contain sufficient detail so that the TF can understand the specific changes requested by the commenter. In addition, the suggested remedy in the comment does not contain sufficient detail so that the TF can understand the specific changes requested by the commenter.

**Comment Type:** T  
**Comment Status:** A  
**Test Modes**

"The coupling attenuation is tested... Additional coupling attenuation test methodologies..." seems contradictory - it implies that the annex contains other ways to test the coupling attenuation. I believe we are requiring that the cable pass testing according to the IEC spec, with the parameters specified in Annex 149A. (or else Annex 149A can't be normative)

**Suggested Remedy**

Change "In order to limit the noise at the receiver as well as emissions, the MultiGBASE-T1 link segment shall meet the coupling attenuation values determined by using Equation (149–24). The coupling attenuation is tested as specified in IEC 62153-4-7 using triaxial tube in tube method. Additional coupling attenuation test methodologies are defined in Annex 149A." to: "In order to limit the noise at the receiver as well as emissions, when tested using the IEC 62153-4-7 triaxial tube in tube method as specified in Annex 149A, the MultiGBASE-T1 link segment shall meet the coupling attenuation values determined by using Equation (149–24)."

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

The MDI return loss at high frequency is tighter than necessary IMO. The MDI is far-end return loss which gets twice attenuated by insertion loss. This return loss component therefore doesn't worsen the RL/IL ratio. I think the currently specified link segment return loss and MDI return loss are not well balanced for a low relative cost. I would like to propose to relax the MDI return loss.

**Suggested Remedy**

Formula 12-10log(l/3000) change into 10-10*log(l/3000S) for 300S<l<3000S  
Formula 12-20*log(l/3000) change into 10-20*log(l/3000S) for 3000S<l<Fmax

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

Implement changes to Eq. 149-27 as shown on page 3 of DenBesten_3ch_03a_0719.pdf with editorial license to format the equation correctly. In addition, update associated Figure 149-47 to reflect the updated equation.

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 U/unsatisfied Z/withdrawn
SORT ORDER: Clause, Subclause, page, line

Stewart, Heath
Analog Devices

Transmitter droop was specified considering a 2uH inductance per transmitter output (4uH total). Need to revise the low frequency MDI return loss mask to be in agreement with this value. Otherwise either specification undermines the relevance of the other.

Suggested Remedy
See "stewart_3ch_01_0719" Slide 13 and 16

ACCEPT IN PRINCIPLE.
Implement changes to Eq. 149-27 as shown on page 3 of DenBesten_3ch_03a_0719.pdf with editorial license to format the equation correctly. In addition, update associated Figure 149-47 to reflect the updated equation.

Response

Tu, Mike
Broadcom

The MDI return loss specification as shown in Equation 149-27 is unnecessarily restrictive.

Suggested Remedy
See the proposal on the last page of "vakilian_3ch_01_0719.pdf".

ACCEPT IN PRINCIPLE.
Implement changes to Eq. 149-27 as shown on page 3 of DenBesten_3ch_03a_0719.pdf with editorial license to format the equation correctly. In addition, update associated Figure 149-47 to reflect the updated equation.

Response

Tu, Mike
Broadcom

This comment was WITHDRAWN by the commenter.

Stewart, Heath
Analog Devices

High frequency Return Loss was presented considering the best performance of power coupling inductors and MDI connectors. However, to provide additional protection to the PHY, allowance needs to be made for ESD clamping devices. Need to revise the high frequency mask to accommodate for additional capacitive loading due to these devices.

Suggested Remedy
See "stewart_3ch_01_0719" Slide 15 and 16

ACCEPT IN PRINCIPLE.
Implement changes to Eq. 149-27 as shown on page 3 of DenBesten_3ch_03a_0719.pdf with editorial license to format the equation correctly. In addition, update associated Figure 149-47 to reflect the updated equation.

Response
### Comment 188

**Comment Type:** T  **Comment Status:** R  
**Brandt, David**  
Rockwell Automation

**Comment:** This paragraph has 2 shalls that apply to entire products. The seems out of our scope.

**Suggested Remedy:**
- Suggest the "shall" be replaced with text in the spirit of the last sentence of the paragraph.
- Change 1st: "shall", To: "is expected be able to"
- Change 2nd: "shall be tested", To: "is expected to allow products to be tested"
- Delete: ES4 and ES5.

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

The devices are required to meet applicable laws. This is a shall in other Clauses. The CISPR 25 test methods are required. It is the specific setup and limit lines that are user specific, not the test methods.

### Comment 29

**Comment Type:** E  
**Comment Status:** A  
**Anslow, Pete**  
Ciena

**Comment:** "AN" and "EEE" appear in the Status column in 149.11.4.1, so they should be **"AN" and "EEE"** (preceded by **)"

**Suggested Remedy:**
- Change "AN" and "EEE" to **"AN" and "EEE"**

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

---

**TABLE**

<table>
<thead>
<tr>
<th>Cl 149</th>
<th>SC 149.9.2.2</th>
<th>P169</th>
<th>L41</th>
<th># 188</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandt, David</td>
<td>Rockwell Automation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comment Type:** T  **Comment Status:** R  
**Brandt, David**  
Rockwell Automation

**Comment:** This paragraph has 2 shalls that apply to entire products. The seems out of our scope.

**Suggested Remedy:**
- Suggest the "shall" be replaced with text in the spirit of the last sentence of the paragraph.
- Change 1st: "shall", To: "is expected be able to"
- Change 2nd: "shall be tested", To: "is expected to allow products to be tested"
- Delete: ES4 and ES5.

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

The devices are required to meet applicable laws. This is a shall in other Clauses. The CISPR 25 test methods are required. It is the specific setup and limit lines that are user specific, not the test methods.

<table>
<thead>
<tr>
<th>Cl 149</th>
<th>SC 149.11.3</th>
<th>P172</th>
<th>L6</th>
<th># 29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anslow, Pete</td>
<td>Ciena</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comment Type:** E  **Comment Status:** A  
**Anslow, Pete**  
Ciena

**Comment:** "AN" and "EEE" appear in the Status column in 149.11.4.1, so they should be **"AN" and "EEE"** (preceded by **)"

**Suggested Remedy:**
- Change "AN" and "EEE" to **"AN" and "EEE"**

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

---

**TABLE**

<table>
<thead>
<tr>
<th>Cl 149</th>
<th>SC 149.11.4.1</th>
<th>P172</th>
<th>L28</th>
<th># 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anslow, Pete</td>
<td>Ciena</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comment Type:** T  **Comment Status:** A  
**Anslow, Pete**  
Ciena

**Comment:** The PICS proforma tables in 149.11.4.1 do not have the appropriate entries in the "Support" column. Same issue in every other subclause of the Clause 149 PICS and also the Annex 149A PICS

**Suggested Remedy:**
- In 149.11.4.1, every other subclause of the Clause 149 PICS and also the Annex 149A PICS for items with status of: "M" change the Support entry to "Yes [ ]"  
  "O" change the Support entry to "Yes [ ] No [ ]"  
  "Something:M" change the Support entry to "Yes [ ] N/A [ ]"  
  "Something:O" change the Support entry to "Yes [ ] No [ ] N/A [ ]"

**Response Status:** C  
**Response:** ACCEPT.
Comment Type TR  Comment Status A  PICS
149.11.4.4.3 Transmitter electrical specifications
Item Feature Subclause Value/Comment Status Support
TES1 AC-coupling to the MDI

Suggested Remedy
Means? See another comment

Response  Response Status W
ACCEPT IN PRINCIPLE.

PICS Editor to have editorial license to update to match draft.

Cl 149  SC 149.A.2  P189  L12  # 130
Shariff, Masood  CommScope
Comment Type TR  Comment Status A  EZ
Incorrect statement. Alien Crosstalk defines coupling between disturbed and disturber link segments and cannot be measured using coupling attenuation test fixtures. Figure 149-41 in Clause 149.7.2 shows an illustration for alien cross talk measurements and also refers to Clause 97B for additional details. There is no reference to Annex 149A

Suggested Remedy
From: Coupling and screening attenuation are the main parameters for a shielded differential link segment to define its alien crosstalk and EMC properties. To: Coupling and screening attenuation are the main parameters for a shielded differential link segment to define its EMC properties.

Response  Response Status C
ACCEPT.
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>Page</th>
<th>Line</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>149A</td>
<td>149A.2</td>
<td>P189</td>
<td>26</td>
<td>207</td>
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<td>149A</td>
<td>149A.3</td>
<td>P189</td>
<td>31</td>
<td>76</td>
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<td>149A</td>
<td>149A.5</td>
<td>P192</td>
<td>2</td>
<td>32</td>
</tr>
</tbody>
</table>

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

**Comment Status:** D/dispatched, A/accepted, R/rejected, C/closed, U/unsatisfied, Z/withdrawn

**Response Status:** O/open, W/written, C/closed

---

**Comment from Collin:**

This isn't a test spec. Products have to work over a much wider range than this - how that is assured is up to the implementer.

**Suggested Remedy:**
Delete "Measurements to be performed at 23 ± 5°C and relative humidity of 25% to 75%.”

**Response:**
REJECT.

**Comment:**
This specification does not use a standardized cable. Instead, it defines the link segment characteristics and testing methodologies for the link segment. While it is true that products need to work over a much wider range, testing needs to be done under a defined condition to ensure comparable results in different labs.

---

**Comment from Zimmerman:**

"Measurements to be performed... 75%" isn't a sentence.

**Suggested Remedy:**
Change "Measurements to be performed" to "Measurements are performed”

**Response:**
ACCEPT.

---

**Comment from Shariff:**

"The reference cable assembly is intended to be a simplified representation of the components, that are used within a wiring harness, which are cable, PCB connectors, and inline connectors." is grammatically awkward

**Suggested Remedy:**
Suggest changing to "The reference cable assembly is intended to be a simplified representation of the components used within a wiring harness. These include cable, PCB connectors, and inline connectors.”

**Response:**
ACCEPT.

---

**Comment from Anslov:**
The annex title is quoted in four places in the PICS and each should match the actual annex title.

**Suggested Remedy:**
In the title of 149A.5, the first sentence of 149A.5.1, the top row of the table in 149A.5.2.2, and the title of 149A.5.4 change: "Coupling attenuation test methodology" to: "Coupling and screening attenuation test methodology”

**Response:**
ACCEPT.
This annex describes a suggested assignment of the OAM status bits for use with the Clause 149 MultiGBASE-T1 PHYS. Suggested bit behaviors, shown in state diagrams, and bit assignments in the OAM frame are detailed in this annex for informative purposes to enable consistent use of the OAM channel. Use of these specific assignments and the behaviors described by the state diagrams is implementation dependent.
REC hasn’t been defined yet before this section, and would benefit from being defined in parenthesis.

SuggestedRemedy
Change: "REC in OAM<13:12><7:0>"
To: "REC (Receive Error Counter) in OAM<13:12><7:0>"

Or: add a line referring the reader to section 149B.2.9

Also on Page 198, Line 4

Response
ACCEPT.

Which is most significant byte and bit?

Response
REJECT.

The details on the arrangement of the bits in these bytes can be found in Table 45-244a. This shows that the 8 MSB are in 3.2319.15:8, the 8 LSB are in 3.2319.7:0, and that the LSB is transmitted first.

Variable "mr_tx_request_rec_clear" does not match to any register bits in Table 149-9. It also looks like a duplicate of the "tx_clear_rec".

SuggestedRemedy
Propose to delete line 1 to 5

Response
ACCEPT.
Section heading "149B.3.2.3 State Diagrams" is orphaned from the diagrams it contains. Move to the next page.

**SuggestedRemedy**

Move heading "149B.3.2.3 State Diagrams" to top of page 200 with diagrams 149B-2 and 149B-3.

**Response**

Response Status: C

ACCEPT.

---

I am very confused why an informative annex would have state diagrams that describe the required behavior of the OAM functions needed for the operation of the link.

**SuggestedRemedy**

Seems like this annex ought to be normative.

**Response**

Response Status: C

ACCEPT IN PRINCIPLE.

Add a new first subclause (149B.1) with all others renumbered after.

149B.1 Purpose

This annex describes a suggested assignment of the OAM status bits for use with the Clause 149 MultiGBASE-T1 PHYs. Suggested bit behaviors, shown in state diagrams, and bit assignments in the OAM frame are detailed in this annex for informative purposes to enable consistent use of the OAM channel. Use of these specific assignments and the behaviors described by the state diagrams is implementation dependent.