Protocol implementation conformance statements throughout the document use inconsistent descriptions for the Major Capabilities/Options feature description.

**Suggested Remedy**

- Make the feature descriptions consistent. I prefer "Implementation of LPI".

**Response**

- **Response Status**: C

- ACCEPT.

---

This is a general comment regarding the structure of the draft amendment.

As an amendment to IEEE Std 802.3, the material in this draft will eventually be folded into the base standard. When this happens, the definitions for the 100BASE-X and 1000BASE-X Physical Coding Sublayers will be substantially changed, and the changes will be difficult to discern. The definitions for the MII and GMII will also be substantially changed.

The 100BASE-X and 1000BASE-X PCSs are used for many other port types besides 100BASE-TX and 1000BASE-KX. Among these are 100BASE-FX, 100BASE-LX10, 100BASE-BX10, 100BASE-SX, 1000BASE-LX, 1000BASE-CX, 1000BASE-LX10, 1000BASE-BX10, 1000BASE-PX10, 1000BASE-PX20, 10G/1GBASE-PRX-D/U1, 10G/1GBASE-PRX-D/U2, and 10G/1GBASE-PRX-D/U3.

These port types are not included in the set of objectives for P802.3az, and the specifications for the PCS and MII for these port types must not be changed or effected in any way by P802.3az. Each of these port types must have a current IEEE Std 802.3 PCS and MII to reference.

**Suggested Remedy**

There are many ways to solve this problem. I prefer the following approach:

1. Preserve the definitions for the MII, GMII, 100BASE-X PCS, and 1000BASE-X PCS without change.

2. Define the changes required to support EEE in a set of normative annexes, i.e. Annex 24A for Clause 24, and Annex 25A for Clause 25, etc. Example text for Annex 24A and Annex 25A have been provided by me to the task force chair.

3. Refer to these normative annexes from the body of Clause 78.

**Response**

- **Response Status**: U

- ACCEPT IN PRINCIPLE.

See response to Comment #410.
In reading through the draft, I've noticed statements such as:

While RX_DV is de-asserted, the PHY may indicate that it is receiving low power idle by asserting the RX_ER signal while driving the value <01> onto RXD<7:0>.

May also implies may not. This method appears to be used multiple times throughout the draft to avoid the addition of PICS requirements associated with LPI. In the case of the statement above, the only way to indicate LPI across the GMII is to de-assert RX_DV, assert RX_ER and drive 0x01 onto RXD. The statement should be such to indicate a PHY with LPI capabilities shall use that signalling to indicate LPI detection across the GMII. And there should be a PICS entry for it.

**Suggested Remedy**

This draft should be scrubbed to make sure that behaviors that differ between LPI and non-LPI have appropriate shall statements and PICS entries with an LPI capability associated with them. Otherwise, conformance testing this will be open to interpretation and confusion.

**Response**

ACCEPT IN PRINCIPLE.

In D2.1 in clause 22 and 46, the sentence has been changed to read "... the PHY indicates..." and no further change will be made.

In clause 35, the same change will be made.

The mandatory requirements are, and should be, in the appropriate PCS clauses.

This comment was not considered by the BRC and the above response is a proposed response.

This comment will be re-submitted for consideration at the Nov plenary along with all other comments received on D2.1.
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Comment</th>
<th>SuggestedRemedy</th>
<th>Response</th>
<th>Response Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>0</td>
<td>E</td>
<td>A</td>
<td>IEEE Std 802.3av-2009 was approved, which means that the TM should be used as well.</td>
<td>Change &quot;IEEE Std 802.3av-2009&quot; to &quot;IEEE Std 802.3avTM-2009&quot;. Scrub the text for any other missing &quot;TM&quot; marks.</td>
<td>ACCEPT.</td>
<td>C</td>
</tr>
<tr>
<td>01</td>
<td>1.4</td>
<td>E</td>
<td>A</td>
<td>There should be a space between a number and its unit. This should be a non-breaking space (ctrl space) to avoid the unit appearing on a different line from the number.</td>
<td>change &quot;10Mb/s&quot; to &quot;10 Mb/s&quot;</td>
<td>ACCEPT.</td>
<td>C</td>
</tr>
<tr>
<td>14</td>
<td>14.1.1</td>
<td>E</td>
<td>A</td>
<td>Figure 14-1 is unchanged from the base text</td>
<td>Delete Figure 1 as it is unchanged from the base text</td>
<td>Duplicate of comment #196</td>
<td>C</td>
</tr>
<tr>
<td>14</td>
<td>14.1.1</td>
<td>TR</td>
<td>R</td>
<td>The note is a bit confusing. It appears to be talking about implementation strategies rather than conformance issues. The critical issue the note needs to call to attention is conformance and interoperability.</td>
<td>Change note to read:</td>
<td>REJECT.</td>
<td>U</td>
</tr>
</tbody>
</table>

TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched  A/accepted  R/rejected  RESPONSE STATUS: O/open  W/written  C/closed  U/unsatisfied  Z/withdrawn
SORT ORDER: Clause, Subclause, page, line
TIA/EIA-568-A is obsolete and has been superceded by 568-B. From my understanding, unlike ISO/IEC, TIA Category 5 is unchanged between 568-A and 568-B.

**Suggested Remedy**
Update reference to 568-B.
Update throughout Clause 14.

**Response**
Accept.

Update references on
1) page 16, line 40
2) page 21, line 53
3) page 222, line 23 (clause 78)

I think the purpose of this PICS item is to identify the MAU type included in the given PHY. Wouldn't it make more sense to have a separate row / entry for 10BASE-T and 10BASE-Te, so that someone reading this PICS can identify without any doubts immediately what type of MAU is used?

**Suggested Remedy**
Per comment

**Response**
Accept.

Split PICS item into two separate lines, one for 10BASE-T and the second for 10BASE-Te.

- Anslow, Peter, Nortel Networks
- Chadha, Mandeep, Vitesse Semiconducto
- Hajduczenia, Marek, ZTE Corporation
- Kasturia, Sanjay, Teranetics

**Comment Type**
- TR
- T
- E

**Comment Status**
- A
- C
- E

**Comment**
- TS2 is an added row so the subclause number and Req should also be in underline font.
- Figure 14-9 is unchanged from the base text.

**Suggested Remedy**
- Show "14.3.1.2.1" and "C" in underline font
- Delete Figure 14-9 as it is unchanged from the base text. Also delete Table 14-1 if it is unchanged from base text. Remove associated base text if it is unchanged.

**Response**
Accept in principle.
Delete the PICS item and the table. Adjust the editing instruction appropriately.

**Comment**
- Also modify the editing instruction by changing the "insert" to a "change" as an insert does not require underlining.

**Response**
Accept in principle.
Duplicate of comment #198
Delete the figure and the table. Adjust the editing instruction appropriately.

**Comment**
- Also applies to LS5 in 14.10.7.4.1
- TS2 is an added row so the subclause number and Req should also be in underline font.

**Suggested Remedy**
- Show "14.3.1.2.1" and "C" in underline font
- Show "LS5 row in underline font

**Response**
Accept in principle.
Also modify the editing instruction by changing the "insert" to a "change" as an insert does not require underlining.
Cl 14 SC 14.3.1.2.1 P19 L 36 # 199
Chadha, Mandeep Vitesse Semiconducto
Comment Type E Comment Status A
Table 14-1 is unchanged from the base text.
Suggested Remedy
Delete table 14-1
Response Response Status C
ACCEPT.

Cl 14 SC 14.3.1.2.1 P19 L 9 # 197
Chadha, Mandeep Vitesse Semiconducto
Comment Type E Comment Status A
Figure 14-8 is unchanged from the base text.
Suggested Remedy
Delete figure 14-8
Response Response Status C
ACCEPT.

Cl 14 SC 14.3.1.2.1 P20 L 1 # 20
Hajduczenia, Marek ZTE Corporation
Comment Type E Comment Status A
Title "Table 14-1-Voltage template values for Figure 14-9 (continued)<Default ¬¹ Font>" contains some garbage. Remove "<Default ¬¹ Font>"?
Suggested Remedy
Per comment
Response Response Status C
ACCEPT IN PRINCIPLE.
Duplicate of comment #2

Cl 14 SC 14.4 P20 L 1 # 20
Anslow, Peter Nortel Networks
Comment Type E Comment Status A
Spurious "<Default-1 Font>" appears in title
Suggested Remedy
remove "<Default-1 Font>"
Response Response Status C
ACCEPT IN PRINCIPLE.
Delete table per comment #199

Cl 14 SC 14.4 P21 L 10 # 200
Chadha, Mandeep Vitesse Semiconducto
Comment Type E Comment Status A
Figure 14-10 is unchanged from the base text
Suggested Remedy
Delete figure 14-10
Response Response Status C
ACCEPT.

Cl 14 SC 14.4 P21 L 11 # 173
Kasturia, Sanjay Teranetics
Comment Type ER Comment Status A
Page 21 line 11 Delete Fig 14-10 if unchanged from base text
Page 21, line 28 - Delete Fig 14-11 if unchanged from base text
Also delete associated text if unchanged from base text.
Suggested Remedy
Delete Fig 14-10 and Fig 14-11
Response Response Status C
ACCEPT IN PRINCIPLE.
Duplicate of comments #200 and #201
Cl 14 SC 14.4 P21 L28 #201
Chadha, Mandeep Vitesse Semiconducto
Comment Type E Comment Status A
Figure 14-11 is unchanged from the base text
SuggestedRemedy
Delete figure 14-11
Response Response Status C
ACCEPT.

Cl 14 SC 14.4.1 P22 L13 #202
Chadha, Mandeep Vitesse Semiconducto
Comment Type E Comment Status A
Figure 14-12 is unchanged from base text
SuggestedRemedy
Delete figure 14-12
Response Response Status C
ACCEPT.

Cl 14 SC 14.4.1 P22 L20 #174
Kasturia, Sanjay Teranetics
Comment Type ER Comment Status A
Delete Fig 14-12 if unchanged from base text
SuggestedRemedy
Response Response Status C
ACCEPT.

Cl 14 SC 14.4.1 P22 L48 #10458
Thompson, Geoff GraCaSI
Comment Type ER Comment Status R
I find no text added anywhere to clause 14 that states or even gives a hint of the compatibility between 10BASE-T and 10BASE-Te. How is a customer to know how to mix the two on a network? Further, the text in 14.4.1 is not correct in the current market and proposed context. The word “Since is inappropriate. That is, it is no longer the case that we believe that "a significant number of 10BASE-T networks are expected to be installed utilizing in-place unshielded telephone wiring" rather, the market has evolved to the extent that most telephones and networks (especially autonegotiating multi-speed adapters) are expected to utilize Category 5 or better cabling.
SuggestedRemedy
Rewrite the introductory paragraph to better reflect both the current market AND still make provision for the historical context that made use of "left-over" telephone wiring. Also, add a new subclause to clause 14 to address the topic of cross compatibility between 10BASE-T and 10BASE-Te, i.e. the two MDI can be freely mixed as long as the cabling meets the requirements for 10BASE-Te.
Response Response Status U
REJECT.

Interoperability between 10BASE-T and 10BASE-Te is addressed in 14.1.1.1 (i).
The first paragraph in 14.4.1 is text from the original standard and was not future-proof when originally written. It is not the objective of this task force to correct such text.

There changes to 14 based on resolution of comment #356

Cl 14 SC 14.4.1 P22 L48 #10458
Thompson, Geoff GraCaSI
Comment Type ER Comment Status R
This new text is in the wrong place. It is not "overview" text. (I do recognize that it was "stuck" here in order to avoid the sticky issue of restructuring and renumbering sub-clauses.)
SuggestedRemedy
Move to within the context of 14.4.2. I recognize that there may be restructuring necessary in order for this to end up as a clean, well-structured clause.
Response Response Status U
REJECT.
The text is consistent with the rest of the overview clause. Also, the text was revised based on resolution of comment #356 on D2.0.
14.5.2 mandates that any port that offers MDI-X connectivity shall be marked with an "X". That mandate makes no allowance for current technology in which many PHY implementations are not of a fixed configuration with respect to the cross-over function. I expect many implementations of 10BASE-Te to have automatic MDI-X correction.

**Suggested Remedy**
Revise text so that the X labeling requirement only applies to ports with fixed MDI/MDI-X configuration. It would be nice if we could all agree on a single character width symbol for auto-correction.

**Response**
REJECT.

This comment requests a change to the base standard that is not impacted by the changes made for 10BASE-Te.

It should be submitted as a maintenance request to the base standard.

---

**Comment Type**: E  **Comment Status**: A  
**Comment**: items c) and d) from the base standard have been modified but no changes are shown

**Suggested Remedy**
show changes to items c) and d) with underline and strikethrough font as appropriate.

**Response**
ACCEPT.

---

**Comment Type**: E  **Comment Status**: A  
**Comment**: "Which of the two specifications is implemented, i.e. 10BASE-T or 10BASE-Te (not both)."

**Suggested Remedy**
change "i.e. 10BASE-T or 10BASE-Te (not both)." to ".e. either 10BASE-T or 10BASE-Te."

**Response**
REJECT.

The language was changed in D2.1 to the current text based on a comment on D2.0 and was approved in its current form by the BRC.

---

**Comment Type**: E  **Comment Status**: A  
**Comment**: "The mapping is changed if EEE capability is supported, this is described in 22.7a."

**Suggested Remedy**
Per comment

**Response**
ACCEPT IN PRINCIPLE.

Resolved by comment 260 on D2.0. It is no longer an issue in D2.1 and no additional change is required.
IEEE P802.3az D2.1 Energy Efficient Ethernet comments

Cl 22 SC 22.2.2.2 P27 L3 # 54
Hajduczenia, Marek ZTE Corporation

Comment Type T  Comment Status A
"when Clock stop enable is asserted" - should read "when the Clock stop enable bit is asserted"

Suggested Remedy per comment

Response Response Status C
ACCEPT.

Cl 22 SC 22.2.2.4 P27 L42 # 10195
Grow, Robert Intel

Comment Type TR  Comment Status A
Awkward and possibly misleading text.

Suggested Remedy
The PHY shall interpret the combination of TX_EN deasserted, TX_ER asserted and TXD<3:0> equal to 0001 shown in Table 22-1 as a request to enter, or remain in low power idle. Other values of TXD<3:0> with this combination of TX_EN and TX_ER shall have no effect upon the PHY.

Response Response Status C
ACCEPT IN PRINCIPLE.

Also change in the same style as suggested by comment #479

"For EEE capability, the RS shall use the combination of TX_EN deasserted, TX_ER asserted and TXD<3:0> equal to 0001 shown in Table 22-1 as a request to enter, or remain in low power idle. Other values of TXD<3:0> with this combination of TX_EN and TX_ER shall have no effect upon the PHY."

Frazier, Howard Broadcom Corporation

Cl 22 SC 22.2.2.6a P28 L46 # 10167

Comment Type TR  Comment Status R
What do the little triangles in Figure 22-6a represent? The figure presents what appears to be a timing diagram that shows the relationship between various logical signals. How does an abstract service primitive fit into a logical timing diagram, and what does a triangle indicate?

Suggested Remedy
Remove the abstract service primitive from the timing diagram, and then implement the Suggested Remedy in my general comment concerning the structure of the draft amendment.

Response Response Status U
REJECT.

The diagram is based on the proposal "law_01_1108" that was adopted as the baseline for this section.

The representation of PLS_CARRIER.indication adds clarity to the diagram without any ambiguity.

This diagram would be present regardless of the document structure chosen.

Cl 22 SC 22.2.7 P28 L30 # 35
Hajduczenia, Marek ZTE Corporation

Comment Type T  Comment Status A
"For EEE capability, the PHY indicates that it is receiving low power idle by asserting" > I thought all occurrences of "low power idle" were to be replaced with "LPI" which is already defined in the initial section of this draft?

Suggested Remedy
Per comment.

Response Response Status C
ACCEPT.
Comment Type E Comment Status A
(1) "and to the link partner that a break in the data stream is expected" - break has usually negative connotation. Use "interruption" or something in the lines.
(2) Missing space in line 8, page 30 in "specified only for 100<<HERE SHOULD BE A SPACE>>Mb/s operation"
(3) Text under Figure 22-20a is strangely indented - fix it please.

Suggested Remedy
Per comment

Response Response Status C
ACCEPT.

Response

Comment Type E Comment Status A
There should be a space between a number and its unit. This should be a non-breaking space (ctrl space) to avoid the unit appearing on a different line from the number.

Suggested Remedy
change "100Mb/s" to "100 Mb/s"

Response Response Status C
ACCEPT.

Comment Type T Comment Status A
What is "The LPI_REQUEST parameter"? Do you mean "The LP_IDLE.request parameter"? Please clarify.
The same in line 5, page 31.
Figure 22-21 seems to indicate that LP_IDLE.request is meant here
Similar comment applies to clause 46.4a.1.

Suggested Remedy
Per comment

Response Response Status C
ACCEPT IN PRINCIPLE.
The primitives should be written:
LP_IDLE.request(LPI_REQUEST)
LP_IDLE.indication(LPI_INDICATION)
Where LPI_REQUEST and LPI_INDICATION are the parameters passed by the primitives.
Fix the text in 2 locations appropriately.

Comment Type T Comment Status R
"Condition that is true until such time as the power supply for the device that contains the RS has reached the operating region." - what is this "operating region"? Do you mean "operating condition"?

Suggested Remedy
Please clarify per comment

Response Response Status C
REJECT.

This wording matches the definition used in Clause 46 (in 802.3-2008).
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>Comment Status</th>
<th>Commenter</th>
<th>Suggested Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR</td>
<td>R</td>
<td>Frazier, Howard Broadcom Corporation</td>
<td>A state diagram in the MII clause. Wow. Why can't the PHY assert/deassert the CRS signal to indicate when the transmit path is in LPI? Take out the state diagram. The 100BASE-TX PHY with LPI should be responsible for asserting and deasserting CRS, and then implement the Suggested Remedy in my general comment concerning the structure of the draft amendment.</td>
</tr>
<tr>
<td>TR</td>
<td>A</td>
<td>Thompson, Geoff GraCaSI</td>
<td>There is mention of an &quot;LPI agent&quot; in this clause as the active element that causes the 100BASE-X PHY to go back and forth between LPI and normal operation. I find it strange that (a) there is no definition or specification of an LPI agent nor even any mention of it anywhere else in the draft, not even in the other clauses where one would expect a parallel use of such an agent to cause the same sort of switch for the other LPI PHYs (except 10BASE-Te). Fully define and specify the operation and service interfaces for the activating function for LPI (be it an &quot;LPI agent&quot; or other mechanism). Further, have that mechanism act on each of the LPI PHYs in a manner that is architecturally consistent across the entire standard.</td>
</tr>
<tr>
<td>TR</td>
<td>ER</td>
<td>Kasturia, Sanjay Teranetics</td>
<td>Many of the rows are unchanged from base text. Delete most of these. Leave some if necessary to specify the insertion point/location of changes.</td>
</tr>
</tbody>
</table>

Response | Response Status |  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>REJECT.</td>
<td></td>
</tr>
<tr>
<td>ACCEPT IN PRINCIPLE.</td>
<td></td>
</tr>
<tr>
<td>ACCEPT.</td>
<td></td>
</tr>
</tbody>
</table>

The state machine in the Reconciliation Sublayer was the cornerstone of the baseline (law_01_1108) that was adopted by the Task Force. It was considered advantageous to have the control of the PLS_CARRIER.indication in the RS for a number of reasons:

1. It keeps the PHY receive and transmit paths separate (the PHY considers CRS to be part of the receive path).
2. It allows the PHY to go to sleep without having to maintain state & control the wake process.
3. It keeps the "data holdback" function close to the MAC and egress buffers, where it would be implemented in most designs.
4. It frees the PHY from having to participate in the wake time negotiation process (that is controled using LLDP frames).
5. It works for PHYs that operate at speeds greater than 1Gbps, so the same mechanism can be used for all speeds.

The state diagram would be present (or deleted according to the comment) whether the proposed changes to the document are accepted or not.
Comment Type: TR

Comment Status: D

Suggested Remedy:

There is a "LPC capability that is defined in the PICS list without the associated "shall" statement in the draft text.

Proposed Response: REJECT.

This comment was WITHDRAWN by the commenter.

---

Comment Type: TR

Comment Status: A

Suggested Remedy:

There are multiple issues with this subclause:

1. There are multiple references to an "LPI command". No such construct is defined in the draft. "Assert LPI" is signaled across the MII.

2. Item b) defining the Quiet state makes reference to a "Refresh" state which appears nowhere in the state diagrams in this clause.

3. Table 24-2 defines a wake time $T_w$ which has no relation to the actual PHY wake time as described by the state diagrams in this clause. The 30 us time is the minimum transmit deferral time defined in Table 78-4 while 36 us is an arbitrary upper bound on the time to assert that a wake error occurred.

4. In item c) it is further implied that the PHY wake time is a negotiated parameter, which is not the case. It is the system wake time that is negotiated.

In general, this subclause seems to be a rehash of the system-level view of EEE already provided in Clause 78. It seems this subclause should define operation of EEE as it specifically applies to 100BASE-TX or could be deleted altogether in deference to the functional description of the capability that follows in Clause 24 and the material in Clause 78.

Proposed Response: ACCEPT IN PRINCIPLE.

Delete 24.2.2.5
“PCS returns to the normal state when it detects the termination of an LPI command.” - so it exits the LPI mode when it detects that the LPI asset is no longer active or when it detects that the LPI deassert was activated? In the latter case, the text should read "PCS returns to the normal state when it detects an LPI termination command."

**Suggested Remedy**

Clarify please.

**Response**

**Response Status** C

ACCEPT IN PRINCIPLE.

Response to comment #144 deletes this subclause

---

"Upon receiving the LPI command," in previous clauses, you speak of LPI assert / deassert very clearly, which is fine since it identifies what happens with signals. Here you start using LPI command, which is unclear as to what it carries and how signal assertion / deassertion is mapped into it. Please clarify what an LPI command is, how it maps into specific LPI assert / deassert signals.

**Suggested Remedy**

Per comment.

**Response**

**Response Status** C

ACCEPT IN PRINCIPLE.

Response to comment #144 deletes this subclause

---

(1) "Tq before a Refresh or Wake state appears" - a state does not appear, it occurs.

(2) line 47, same page: "transmitted for default or negotiated amount of time denoted by Tw" > "transmitted for default or negotiated amount of time denoted by Tw"

(3) line 51, same page: "to notify the upper layer the change of operation mode" > "to notify the upper layer the change of operation mode"

**Suggested Remedy**

Per comment.

**Response**

**Response Status** C

ACCEPT IN PRINCIPLE.

Response to comment #144 deletes this subclause

---

"Upon successfully receiving SLEEP code-groups, the 100BASE-X PCS enters the LPI mode" - my idea was that only 100BASE-TX supports (page 34, point g) LPI. So why refer to generic 100BASE-X PCS type?

**Suggested Remedy**

Clarify per comment.

**Response**

**Response Status** C

ACCEPT IN PRINCIPLE.

Response to comment #144 deletes this subclause

---

The base standard uses "4B/5B" not "4b5b"

**Suggested Remedy**

In Table 24-2 Change "4b5b" to "4B/5B" in two places

**Response**

**Response Status** C

ACCEPT.

Subclause is being deleted
IEEE P802.3az D2.1 Energy Efficient Ethernet comments

Hajduczenia, Marek
ZTE Corporation

Comment Type: T  Comment Status: A

1) "as depicted in Figure 24-11b" - link is not live
2) line 11: "The following constants are required only for the optional EEE capability" > "The following constants are required to support the optional EEE capability. Similar changes in line 29, page 40 and line 17, page 41.
3) line 13: "The SLEEP code-group (/P/) used for LPI state delineator, as specified in 24.2.2.1" > "The SLEEP code-group (/P/) used by the LPI state delineator, as specified in 24.2.2.1"

Suggested Remedy
Per comment

Response
Response Status: C
ACCEPT IN PRINCIPLE.

For item #1, Response to comment #144 deletes this subclause

For item (2), the wording was agreed during the comment resolution on D2.0 and it is not clear that this is a significant improvement warranting a change.

For item (3) change line 13: "The SLEEP code-group (/P/) used for LPI state delineator, as specified in 24.2.2.1" to
"The SLEEP code-group (/P/) used by the LPI state delineator, as specified in 24.2.2.1"

Response
Response Status: C
ACCEPT IN PRINCIPLE.

For item #1, Response to comment #144 deletes this subclause

For item (2), the wording was agreed during the comment resolution on D2.0 and it is not clear that this is a significant improvement warranting a change.

For item (3) change line 13: "The SLEEP code-group (/P/) used for LPI state delineator, as specified in 24.2.2.1" to
"The SLEEP code-group (/P/) used by the LPI state delineator, as specified in 24.2.2.1"

---

Hajduczenia, Marek
ZTE Corporation

Comment Type: T  Comment Status: A

The "0001" is a binary, hex or any other representation? This is unclear in here, given that it is not clear what the variable is (TX_LP_IDLE, RX_LP_IDLE)

Suggested Remedy
Please clarify per comment

Response
Response Status: C
ACCEPT IN PRINCIPLE.

Change the "value 0001" to the "binary value 0001" in the following two places:
P.40, L.16
P.40, L.21

---

Hajduczenia, Marek
ZTE Corporation

Comment Type: TR  Comment Status: R

Some of the timers have a range of value which is acceptable. Who / What decides what the final value should be, how is such selection done and does that affect interoperability between devices i.e. what happens if the receiving side expect the maximum value and the transmitter uses the minimum value. Does this break operation of an EEE enabled link?

Suggested Remedy
Please clarify questions in the comment.

Response
Response Status: C
REJECT.

The purpose of the range is to allow for implementation tolerances.

This does not affect or break interoperability between devices as there is no overlap in the range of timer values for the transmitter and the receiver.

---

CHOU, JOSEPH
REALTEK SEMICOND

Comment Type: TR  Comment Status: A

There is a "shall" statement in LPI Link Fail condition without the associated PICS item.

Suggested Remedy
Insert a new PICS entry for LPI Link Fail with the following comment:
"If the PHY fails to receive a valid Refresh or Wake signal before lpi_rx_tq_timer expires, the receiver shall assume a link failure."

Response
Response Status: C
ACCEPT.
There is a “shall” statement in wake error counter of MMD register without the associated PICS item.

**Suggested Remedy**

Insert a new PICS entry for the wake error counter with the following comment:

“For each transition of lpi_rx_tw_timer_done from false to true, the wake error counter shall be incremented.”

**Response**

ACCEPT.

---

The duration of lpi_rx_tw_timer is required to be between 30 and 36 us. The lower limit here is superfluous. In addition, the PHY wake time allowance per Table 78-4 is 20.5 us and should be the gauge for correct operation of the PHY.

**Suggested Remedy**

Change:

"The timer shall have a period between 30 us to 36 us"

To:

"This timer shall have a period that does not exceed 20.5 us."

It should be noted that the 20.5 us upper limit may not be correct. The timer is started when signal_status = ON and hence the transmitter wake time shrinkage and signal detect assertion time have already passed when the receiver begins it count. The value of 20.5 us is offered for now due to a lack of a more detailed calculation.

**Response**

ACCEPT IN PRINCIPLE.

---

The Transmit state diagram (Figure 24-8) has been modified. However, the text in the Transmit Process (subclause 24.2.4.2) does not have proper description explaining the modification of the function for EEE capability.

**Suggested Remedy**

Change the first paragraph in 24.2.4.2 as shown below. Note: text enclosed by the square bracket [ ] are new.

The Transmit process sends code-groups to the PMA via tx_bits and the Transmit Bits process. When initially invoked, and between streams (delimited by TX_EN on the MII), [except in the LPI mode for the optional EEE capability,] the Transmit process sources continuous Idle code-groups (/I/) to the PMA. Upon the assertion of TX_EN by the MII, the Transmit process passes an SSD (/JK/) to the PMA, ignoring the TXD <3:0> nibbles during these two code-group times. Following the SSD, each TXD <3:0> nibble is encoded into a five-bit code-group until TX_EN is deasserted. If, while TX_EN is asserted, the TX_ERR signal is asserted, the Transmit process passes Transmit Error code-groups (/H/) to the PMA. Following the de-assertion of TX_EN, an ESD (/TR/) is generated, after which the transmission of Idle code-groups is resumed by the IDLE state.

[If EEE Capability is supported, upon the assertion of LPI on the MII (A binary value 0001 of TXD, together with the de-assertion of TX_EN and the assertion of TX_ER, see 22.2.2), the Transmit process enters the LPI mode and starts to source SLEEP (/P/) code-groups to the PMA. In the LPI mode, the Transmit process is controlled by various timers to switch between TX_SLEEP state and TX_QUIET state. The Transmit process returns to IDLE state whenever the MII de-asserts LPI.]

**Response**

ACCEPT IN PRINCIPLE.

Follow suggested remedy with the following changes:

1) Remove space between "TX_ERR" and "," in the first sentence of the second paragraph
2) Replace "...to IDLE state..." with "...to the IDLE state..." in the last sentence
There is a corner case:

The transmitter may enter the TX_QUIET state very briefly, and return to the IDLE state anytime when it receives a De-assert LPI from MII.

The duration of transmitter staying in the TX_QUIET state may be too short to effectively assert the Signal_detection of the receiver at the remote link partner.

Therefore, the receiver Equalizer (EQ) and Clock Recovery logic (CR) may lose the track due to the period of "no-signal" in the received channel.

As a result, the receiver may stay in the RX_SLEEP state unable to decode the symbols correctly, and eventually move to LPI_LINK_FAIL state when the lpi_rx_ts_timer is up.

This scenario is a mistake and needs to change.

However, the fix will affect the wake shrinkage time. To reduce the impact, it's preferable to decrease the signal_detection time.

Suggested Remedy

Modify the Transmit State Diagram (Fig 24-8):

- Change the maximum Assert time and De-assert time of Signal_detection of PMD in LPI mode (refer to Table 25-3) to 1 microsecond.
- Add a new timer lpi_tx_tm_timer in TX_QUIET state with a value range between 1 to 1.5 microseconds, and start it when entering TX_QUIET state.
- Change the branch condition between TX_QUIET and IDLE from "sentCodeGroup.indicate ? (TX_EN = TRUE + TX_ER = FALSE + TXD[3:0] != TX_LP_IDLE)" to "sentCodeGroup.indicate ? lpi_tx_tm_timer_done * (TX_EN = TRUE + TX_ER = FALSE + TXD[3:0] != TX_LP_IDLE)"

Parameters are modified in the second row of Table 78-4 under the PHY type 100BASE-TX:

Tw_phy = 22
Tphy_shrink_tx = 6.5
Tw_sys_rx = 8.5

A presentation will be made in the Nov. meeting.

Response Status: C

ACCEPT IN PRINCIPLE.
The Receive state diagram (Figure 24-11) has been modified. However, the text in the Receive Process (subclause 24.2.4.2) does not have proper description explaining the modification of the function for EEE capability.

What is more, CONFIRM_K state has been replaced with IDENTIFY_JK state. Need to change the correspondent text.

Suggested Remedy

Change the first paragraph in 24.2.4.4 as shown below:

Note: text enclosed by the square bracket [ ] are new.

The Receive process state diagram can be viewed as comprising two sections: prealigned and aligned. In the prealigned states, IDLE, CARRIER DETECT, and [IDENTIFY_JK, except for the case of detection of SLEEP code-groups when supporting the optional EEE capability,] the Receive process is waiting for an indication of channel activity followed by a SSD. After successful alignment, the incoming code-groups are decoded while waiting for stream termination.

[If EEE Capability is supported, when the Receive process successfully aligns and decodes two consecutive SLEEP (/P/) code-groups, it enters the LPI mode and stays in LPI states until either the IDLE code-groups are received, where it leads the Receive process to the IDLE state, or a link failure condition in the LPI mode occurs, where it causes the Receive process to enter the RX_LPI_LINK_FAIL state and eventually move to the IDLE state.]

Accept in principle.

Adopt suggested remedy with "...a SSD..." replaced with "...an SSD..."
Comment Type: T  Comment Status: A
What happens when FALSE is sent?
Also in 24.3.1.9.1, there is no description of what TRUE and FALSE mean, when asserted.
Suggested Remedy:
Per comment
Response  Response Status: C
ACCEPT IN PRINCIPLE.

Comment Type: TR  Comment Status: A
There is a "LPM capability that is defined in the PICS list without the associated "shall" statement in the draft text.
Suggested Remedy:
Inserted the following statement at the end of this paragraph:
24.3.2.3 is required only for the EEE capability. If implemented, the operation of the PMA shall comply with the requirements in this subclause.
Response  Response Status: C
ACCEPT.

Comment Type: T  Comment Status: A
"100BASE-X supports LPI for the EEE capability" - seems that it is mandatory. Shouldn't it say "100BASE-X may support LPI for the EEE capability"?
Suggested Remedy:
Per comment
Response  Response Status: C
ACCEPT.

Again, language "This primitive is generated by the Receive Process of PCS only for the EEE capability" should read "This primitive is generated by the Receive Process of PCS if the EEE capability is supported"
Similar comment against line 51, same page.
Suggested Remedy:
Per comment
Response  Response Status: C
ACCEPT IN PRINCIPLE.
See the response of comment #46
<table>
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<td>TR</td>
<td>A</td>
<td>There is a &quot;LPI capability that is defined. This capability has a direct impact on the functions performed by the PCS and PMA, yet the only new PICS are for the timers.</td>
<td></td>
</tr>
</tbody>
</table>

**Suggested Remedy**

Shalls are needed to define the way the PCS and PMA functions operate in LPI mode. Scrub the clause to make sure that functions modified or impacted by LPI have a corresponding PICS capability entry.

**Response**

See the response to comment #114. Multiple shalls are added.

**Comment Status**

A

**Response Status**

U

**CHOU, JOSEPH REALTEK SEMICOND**

Comment Type

TR

Comment Status

A

There is a "LPC capability that is defined. This capability has a direct impact on the functions performed by the PCS and PMA, yet the only new PICS are for the timers.

**Suggested Remedy**

"Shalls" are needed to help define the way the PCS and PMA functions operate in LPI mode. Scrub the clause to make sure that functions modified or impacted by LPI have a corresponding PICS capability entry.

**Response**

ACCEPT IN PRINCIPLE.

"Shall"s and associated PICS entries are added in the draft per comment #99, #103, and #117.

What is more, the following shall statements and associated PICS entries are added:

P.47, L.15: Change "Far-End Fault is not generated when in the LPI mode." to "Far-End Fault shall not be generated when in the LPI mode."

P.48, L.12: Change "If the EEE capability is supported, when the receiver is in the LPI mode, the assertion of lpi_link_fail sets the link_status to FAIL and eventually brings the receiver out of the LPI mode." to "If the EEE capability is supported, when the receiver is in the LPI mode, the assertion of lpi_link_fail shall set the Link Monitor to LINK DOWN state and eventually brings the receiver out of the LPI mode."

P.47, line 43 and 51: Change "operates" to "shall operate" in the sentence of "In the absence of the optional EEE capability, the PHY operates as if the value of this variable is FALSE."

**Response**

ACCEPT IN PRINCIPLE.

Sentence calls the subclause a clause and labels as optional. Given the volume of information and the need to conform with the information in 25.4.11, there should be a PICS entry associated with this.

**Suggested Remedy**

Change sentence to read: This subclause only applies to the optional low power idle is implemented. If implemented, the operation of the PMD shall comply with the requirements in this subclause.

**Response**

ACCEPT IN PRINCIPLE.

See the response to comment #104.

**Comment Type**

ER

**Comment Status**

A

The subclause number overlaps with the existing subclause 25.4.11 of IEEE Std 802.3-2008. What is more, it would be better to promote the Ethernet Efficient Ethernet to its own heading level. The volume of information here probably should not be buried as an exception.

**Suggested Remedy**

Promote 25.4.11 to be 25.5 and modify the clause number of PICS from 25.5 to 25.6.

**Response**

ACCEPT.

See the response to comment #115.
There are "shall" statements in the following area without associated PICS entries:

- 25.4.11.1, P.55, L.24
- 25.4.11.2, P.56, L.50
- 25.4.11.3, P.57, L.45
- 25.4.11.4, P.57, L.51
- 25.4.11.5, P.58, L.29
- 25.4.11.6, P.58, L.36
- 25.4.11.7, P.58, L.43
- 25.4.11.7, P.55, L.44

Suggested Remedy

Add entries in the PICS list as suggested in the comment.

Response

ACCEPT.

---

Given the volume of information and the need to conform with the information in 25.4.11, there should be a "shall" statement associated with the PICS entry "LPI.

Suggested Remedy

Insert the following statement at the end of this paragraph:

If the EEE capability is supported, the operation of the PMD shall comply with the requirements in this subclause.

Response

ACCEPT.

---

what is this 'driver'? It is used many times in this clause. Is this the laser driver or some other driver?

Suggested Remedy

Clarify per comment

Response

REJECT.

Only clarification is made here. No change is recommended.

The term "driver" is used in the TP-PMD original text. It is the last part of the Transmit functional blocks. Apparently, the driver means to drive the TP cable.

The text in this draft already points to the source of reference: "to the driver (see TP-PMD 7.1.3)."

The TP-PMD 7.1.3 has a single word title "Driver". The term "driver" (lower case) is used throughout the document of ANSI+X3.263-1995.pdf.
Need proper descriptive text for the modification made on The Encoder state diagram (Figure 25-1) for EEE capability.

SuggestedRemedy

Insert the following statement at the end of this paragraph:

The output of Encoder is set to a value ZERO_VOLTAGE when the transmitter is in a quiet line state (TX_QUIET, see PCS Transmit state diagram, Figure 24-8).

Change the last sentence of tx_quiet at L.51, P.55 from
"It is also used to set the initial state of Encoder state diagram." to
"It sets the Encoder state diagram to an initial state of ZERO_V."

Accept In Principle.

Refine the statements as follow:

The PMD Encoder function of the 100BASE-TX with EEE capability is identical to that of the TP-PMD except that the output of the Encoder is set to a value ZERO_VOLTAGE when the transmitter is in the quiet state of the LPI mode (TX_QUIET, see PCS Transmit state diagram, Figure 24-8).

Comment Status: A

Response Status: C

Hajduczenia, Marek
ZTE Corporation

Comment Type: T

"the NRZ bit" or "the nrz bit" - which is it then?

SuggestedRemedy

which is the correct capitalization?

Response Status: C

Reject.

Only clarification is made here. No change is recommended.

NRZ is an official acronym defined and used throughout the ANSI+X3.263-1995.pdf. It is also used in the original text of Clause 24 and 25.

Comment Type: TR

25.4.6 has three shall statements and only one PICS entry.

SuggestedRemedy

Add other PICS entries or delete unnecessary shalls.

Response Status: W

Accept.

See the response to comment #107.
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<th>SC</th>
<th>P</th>
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<td>54</td>
<td>40</td>
<td>107</td>
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<td></td>
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</table>

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

25.4.6 has three shall statements and only one PICS entry.

**Suggested Remedy**

- Add two more PICS entries as follows:
  - Code-groups used to measure jitter in the LPI mode shall be SLEEP code-group.
  - Jitter measurement time interval in the LPI mode shall be no less than 100 msec and no greater than 1 second.

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

ACCEPT.

---

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<tr>
<th>CI</th>
<th>SC</th>
<th>P</th>
<th>L</th>
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<th>Parnaby, Gavin</th>
<th>Solarflare Communicat</th>
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<td>243</td>
<td>18</td>
<td>20192</td>
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**Comment Type:** TR  **Comment Status:** R

Submitted on behalf of Todd Thompson, Solarflare.

Annex 28C and Clause 45.2.7.13a and Clause 45.2.7.14a require new EEE Next Pages and new message codes adding 1/2 second during autonegotiation. This time is largely wasted as the PHY must send bits for technologies it does not support and send many bits which are unused.

**Suggested Remedy**

- Use existing reserved bits in existing NP's defined in Clause 40.5 (to control EEE for 100M/1G) and XNP defined in Clause 55.6 (to control BASE-T EEE for 100M/1G/10G).
- Define existing reserved bits in Clause 22 (for 1000BASE-T) and Clause 45.2.7 (for 10GBASE-T) to control the advertising of BASE-T EEE and to report link partner's BASE-T EEE ability.

**Response**  **Response Status:** U

REJECT.

No consensus to make the change.

- Proposed AIP was discussed - see below:
  - See parnaby_02_1109.pdf
  - Add three bits in 55.6 for EEE capability, make these bits mandatory for 10GBASE-T EEE

- No changes in clauses 22 and 40

- Straw poll
  - In favor of proposed response: 2
  - Opposed: 4
  - Abstain: 11
Cl 28D  SC 28D.7  P244  L1619  # 188

Parnaby, Gavin  Solarflare Communicat

Comment Type  TR  Comment Status  A

Submitted on behalf of Todd Thompson, Solarflare.

In Annex 28D.7, it states that extended next pages "may" be used to reduce auto-negotiation time. This statement is not normative. It's an informative note. It's also incorrect. For 10GBASE-T, extended next pages are required.

SuggestedRemedy

Option 1 (preferred): Remove this informative note.
Option 2: Clarify that for those technologies requiring XNP's (such as 10GBASE-T), an XNP must be sent which is formatted based on the BASE-T EEE message page/unformatted message page as defined in Clause 78 (as suggested in another comment).

Response  Response Status  C

ACCEPT IN PRINCIPLE.

In 28D.7 replace "this use is summarized below" with:
"Autonegotiation is mandatory for all EEE PHYs that support LPI."

Delete bullets points A and B.

Cl 30  SC 30.12.1.22  P62  L19  # 52

Hajduczenia, Marek  ZTE Corporation

Comment Type  E  Comment Status  A

"LocTxSystemValue as defined in 78.4.2.3" - link is not live
Similar comment in line 33, same page.
Similar comment in line 44, same page.
Similar comment in line 4, page 63.
Similar comment in line 16, page 63.
Similar comment in line 26, page 64
Similar comment in line 40, page 64
Similar comment in line 51, page 64
Similar comment in line 13, page 65
Similar comment in line 25, page 65

In line 32, there is space missing in "DLL receiver state diagram. This attribute maps to the" > "DLL receiver state diagram.<< >>This attribute maps to the"
Similar missing space in line 19, same page
Similar missing space in line 26, page 64
Similar missing space in line 39, page 64
Similar missing space in line 51, page 64
Similar missing space in line 12, page 65
Similar missing space in line 25, page 65

SuggestedRemedy

per comment

Response  Response Status  C

ACCEPT.

Cl 30  SC 30.2  P61  L1  # 203

Barrass, Hugh  Cisco

Comment Type  T  Comment Status  A  ment submitted from the floor

For SNMP management of EEE, it would be convenient to have objects defined in clause 30 to describe LPI usage statistics.

SuggestedRemedy

Changes are detailed in barrass_01_1109.pdf

Response  Response Status  C

ACCEPT IN PRINCIPLE.

Changes are detailed in barrass_03_1109.pdf
I don't understand what this attribute indicates. Is it the state of the standard at time of implementation? Or is it the PHYs for which the PCS and higher can support EEE operation?

Suggested Remedy
Revise "BEHAVIOUR DEFINED AS:" text to clarify.

*Response*

ACCEPT IN PRINCIPLE.

"A read-only list of the possible PHY types for which the underlying system supports Energy Efficient Ethernet as defined in Clause 78."

Suggested Remedy

Per comment

ACCEPT.

"The mapping is changed for EEE capability, as described in 35.4a"

Suggested Remedy

Per comment

ACCEPT.

"The use of TXD<7:0> to signal LPI transitions is described in 35.2.2.6a" - missing "." at the end

Suggested Remedy

Per comment

ACCEPT.

"While the PHY device is indicating LPI the PHY device may halt the RX_CLK as shown in (Figure 35-9a) if and only if the Clock stop enable bit is asserted (45.2.3.1.3a)."

Suggested Remedy

Per comments

ACCEPT.
**Comment:**

Two instances of MII instead of GMII in this paragraph.

**Suggested Remedy:**

Prefix MII with a G.

**Response:**

ACCEPT.

---

**Comment:**

"For the EEE capability this variable is affected by the LPI receive state diagram. Without the EEE capability this variable is identical to code_sync_status controlled by the synchronization state diagram"

should read

"If EEE is supported, this variable is affected by the LPI receive state diagram. If EEE is not supported, this variable is identical to code_sync_status controlled by the synchronization state diagram"

**Suggested Remedy:**

Per comment

**Response:**

ACCEPT.

---

**Comment:**

"The ability to transmit or receive /LI/, /LI1/ and /LI2/ is an option for certain PHYs to support Energy Efficient Ethernet (see Clause 78)."

there is a line break in /LI1/ is a kind of awkward

**Suggested Remedy:**

per comment

**Response:**

ACCEPT.

---

**Comment:**

Encoding notation for /LI1/ and /LI2/ are missing leading and trailing forward slashes.

**Suggested Remedy:**

Change /LI1/ encoding to "/K28.5/D6.5/".

Change /LI2/ encoding to "/K28.5/D26.4/".

**Response:**

ACCEPT.

---

**Comment:**

The following constant is used only for the EEE capability." there are several entries which say "... for the EEE capability." - suggest to reword that to read "... if the EEE capability is supported." Scrub the draft, including subsections of 36.2.5.1

**Suggested Remedy:**

Per comment

**Response:**

REJECT.

**Response:**

This wording was agreed during the comment resolution for D2.0.
The assert_lpidle variable is defined to be an alias for:

\[ \text{assert_lpidle} = (\text{xmit=DATA} \land \text{TX_OSET.indicate} \land \text{TX_EN=FALSE} \land \text{TX_ER=TRUE} \land (\text{TXD<7:0> =0x01})) \]

a) The TX_OSET.indicate message should be removed from this definition. Otherwise the state diagram in Figure 36-5 would exit the XMIT_LPIDLE state immediately after entering it since TX_OSET.indicate will not be set. The transitions conditions in the XMIT_LPIDLE state should then be changed to:

- XMIT_DATA to XMIT_LPIDLE: assert_lpidle*TX_OSET.indicate
- XMIT_LPIDLE to XMIT_LPIDLE: assert_lpidle*TX_OSET.indicate
- XMIT_LPIDLE to XMIT_DATA: !assert_lpidle*TX_OSET.indicate

b) The XMIT_DATA state, and thus the XMIT_LPIDLE state, can only be reached when xmit=DATA. Therefore, the xmit=DATA could also be removed in the assert_lpidle definition.

**Suggested Remedy**

Per comment.

**Response**

**Response Status** C

**ACCEPT.**

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

**Healey, Adam**

LSI Corporation

---

The aliases detect_lpidle and detect_idle could be asserted during data reception therefore the LPI Receive state diagram (Figure 36-9b) could bounce between RX_ACTIVE and RX_SLEEP states during normal operation.

A transition to RX_SLEEP will result in "Rx LPI indication" and "Rx LPI received" from being falsely asserted during normal operation. This is not likely what is intended.

**Suggested Remedy**

Implement the state diagram changes recommended in healey_01_1109.pdf.

**Response**

**Response Status** C

**ACCEPT.**

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

**Healey, Adam**

LSI Corporation

---

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

**Koenen, David**

Hewlett-Packard

---

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

**Healey, Adam**

LSI Corporation

---

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

**Koenen, David**

Hewlett-Packard

---

rx_lpi_active is defined and appears in the state diagram, but doesn't appear to be used anywhere.

**Suggested Remedy**

Remove rx_lpi_active definition and it's appearance in state diagrams, or use it somewhere.

**Response**

**Response Status** C

ACCEPT IN PRINCIPLE.

**Suggested Remedy**

Implement changes from healey_01_1109.pdf with editorial license for state machine layout and use of aliases.
The editing instruction for Figure 36-7a is wedged below the figure and an associated note on page 81. Move the instruction to be below the subclause heading. It might be helpful to note that there was no change to Figure 36-7b and it is only included in this amendment for ease of reference.

Suggested Remedy
Per comment.

Response
Response Status C
ACCEPT.

Note that this comment refers to Figure 36-7a. There are multiple errors in this figure.

1. In the LP_IDLE state, "RUDI(/L/I/)" should be "RUDI(/LI/)". However, it is not clear why RUDI(/LI/) is even an action here since RX_UNITDATA.indicate is used by the Clause 37 Auto-Negotiation process which does not understand /LI/. It likely should just be removed.

2. Transitions to F and C should be qualified by the term "rx_lpi_active" and not "rx_lp_active" as shown.

Suggested Remedy
Implement the state diagram changes recommended in healey_01_1109.pdf.

Response
Response Status C
ACCEPT IN PRINCIPLE.

The duration of rx_tw_timer is specified to be TWR which in Table 36-3b is given a range of between 10 to 11 us. A lower limit here is superfluous. It implies that there is lower limit on the wake time.

Suggested Remedy
In the definition of rx_tw_timer change:
"The timer terminal count is set to TWR."
To:
"The timer terminal count shall not exceed the maximum value of TWR in Table 36-3b."

Response
Response Status C
ACCEPT.

TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched A/accepted R/rejected RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn
SORT ORDER: Clause, Subclause, page, line
Comment Type E  
"and transmit directions using the status variables shown in Table 36-3c" - link is not live to "Table 36-3c"

Suggested Remedy
Per comment

Response Response Status C
ACCEPT.

Comment Type T
In 36-7a there is a missing exit condition for LPI_K - SUDI([D21.5] + [D2.2])

Suggested Remedy
Add and arch from LPI_K to RX_CB (C) when SUDI([D21.5] + [D2.2])

Response Response Status C
ACCEPT IN PRINCIPLE.

See healey_01_1109.pdf

Comment Type TR
Modify the following transition conditions for RX_SLEEP to RX_ACTIVE from detect_idle * ODD
to !rx_tq_timer_done * code_sync_status = OK * detect_idle * ODD

For the self loop for RX_SLEEP should be
!rx_tq_timer_done * detect_idle

And for RX_SLEEP to RX_QUIET
!rx_tq_timer_done * signal_detect=FAIL

Suggested Remedy

Response Response Status C
ACCEPT.
Not entirely sure why the value/comment field in PCT18 and PCT19 needs to have 'shall' statements in them. The same comment against item PCR5 and PMF24 through PMF37. The same comment against item PME71 through PME77. The same comment against item AN15.

Suggested Remedy
Remove shall statements from the PCT18, PCT19, PCR5 PICS items. Remove shall statements from the PMF24 through PMF37 PICS items. Remove shall statements from the PME71 through PME77 PICS items. Remove shall statements from the AN15 PICS items. Scrub the rest of the draft for the same issue i.e. shall statements in PICS.

Update the PICS to be consistent with the style of existing Clause 40 PICS.

In the base document, PICS do incorporate the keyword "shall" in the "Feature" and/or "Value/Comment" fields. Clause 40 does this to excess. While this may appear to be unusual, there is no rule (to the editor's knowledge) that prohibits it.

However, there is a difference in the style of the EEE-related PICS and the PICS in Clause 40 of the base document. For better or worse, it is preferred to be consistent with the base document style.

In Figure 40-9, it is not necessary to enforce entry into the LOC_LPI_REQ_OFF state when link_status != OK. Per 22.7a.1, LP_IDLE.request should remain de-asserted for 1 second after link_status = READY so this requirement is redundant.

In addition, it should be made clear that, the for optional EEE capability, the PHY should be able to successfully complete training per Figure 40-15a even when loc_lpi_req and/or rem_lpi_req are set to TRUE. This is due to the fact that a 1000BASE-T link may re-train without setting link_status != OK. This implies that the LPI client will be unaware that the link is re-training and may present "Assert LPI" at the GMII.

Remove link_status != OK term from the transition into the LOC_LPI_REQ_OFF state and add clarifying text to 40.4.2.4 per the comment.

Add the following paragraph at the end of the text to be inserted in 40.4.2.4:

"When the PHY supports the optional EEE capability, it is possible for loc_lpi_req to be set to TRUE during re-training initiated in response to unsatisfactory receiver performance (i.e. transition from SEND IDLE OR DATA to SLAVE SILENT). This will correspond to the detection of rem_lpi_req = TRUE in the idle code-groups received during training. The PHY shall not be impeded from successfully completing training (e.g. acquisition of descrambler state) when rem_lpi_req = TRUE is encoded in received idle code-groups."
The duration of lpi_postupdate_timer has a period between 2.0μs to 2.2μs. It does not have a comfortable margin for the field application. The increase of this lpi_postupdate_timer has no impact on the wakeup time.

Suggested Remedy
Change the duration of lpi_postupdate_timer as follows:

Duration: This timer shall have a period between 4.0 microseconds to 4.4 microseconds

ACCEPT IN PRINCIPLE.

Prior discussion:
Duration: This timer shall have a period between 2.5μs to 3μs

Strawpoll:
In favor: 5
Opposed: 3
Abstain: 10

Several smaller issues with Figure 40-15a
(1) different font sizes for e.g. "SEND_I"
(2) text in some boxes is misaligned within the boxes e.g. "DISABLE 1000BASE-T TRANSMITTER"

Suggested Remedy
Per comment

ACCEPT IN PRINCIPLE.

These issues exist in the base document. However, since the state diagram is being modified by this amendment, the editor will correct the font size and text alignment issues.

There is little usable space in the Clause 22 register to support the control and status bits for 100BASE-TX and 1000BASE-T. The wake error counter requires another 16-bit register.

Clause 22 supplies a means to access the Clause 45 management space via registers 13 and 14. Since a EEE-capable PHY is a new PHY, the addition of this feature was expected to contribute little additional disruption.

The commenter does not provide a sufficiently detailed suggested remedy (i.e. specific modifications to the Clause 22 register map) to consider a change to the draft.
Hajduczenia, Marek  
ZTE Corporation

Comment Type: T  
Comment Status: A

"40.6.1.2.7 Transmitter operation during WAKE" 
should read 
"40.6.1.2.7 Transmitter operation during the WAKE state"

Suggested Remedy
Per comment

Response  
Response Status: C

ACCEPT IN PRINCIPLE.

This subclause defines transmitter operation following a transition from the QUIET state to the WAKE state. It is not limited to the WAKE state only.

Change heading to:
"40.6.1.2.7 Transmitter operation following a transition from the QUIET to the WAKE state"

Ganga, Ilango  
Intel

Comment Type: ER  
Comment Status: A

The table 45-83 and other tables in Clause 45 have been modified by P802.3ba. So the editing instructions should include the appropriate source document where the source is other than IEEE Std 802.3-2008. Also the table numbers should be changed to indicate the latest renumbered table numbers from previous amendment(s).

Also other PCS registers have been modified by the P802.3ba document (or other amendments e.g. P802.3av). So update the editing instructions and the change text as per the draft P802.3ba/D2.2.

For example change editing instruction as follows:
45.2.3.1 PCS control 1 register
Change Table 45-83 (IEEE P802.3ba/D2.2) for LPI clock control:
Update the table such that the base text is from the above source.

Suggested Remedy
Update the Editing instructions and Table numbers to indicate appropriate source for base text and use the renumbered table number from appropriate amendment to 802.3-2008. Also update the base text as appropriate as per the source document (for example IEEE P802.3ba/D2.2).

Response  
Response Status: W

ACCEPT IN PRINCIPLE.

See comments #39, 40, 41, 42, 43
There are still occurrences of "low power idle" which have not been replaced with LPI as defined at the initial section of the draft. Scrub the draft accordingly.

Suggested Remedy

Per comment.

Response

Response Status C

ACCEPT IN PRINCIPLE.

Also page 117, line 29

"see 22.2.2.9a, 35.2.2.9a, 46.3.2.4a"
should read
"see 22.2.2.9a, 35.2.2.9a, and 46.3.2.4a"

Similar on page 117, line 31
"see 22.2.2.9a, 35.2.2.9a, 46.3.2.4a"
should read
"see 22.2.2.9a, 35.2.2.9a, and 46.3.2.4a"

Suggested Remedy

Per comment

Response

Response Status C

ACCEPT.

The value of clock stop capable bit (3.1.6) is determined by the PHY, i.e. either the PHY supports this feature or not. The value cannot be changed by the MAC. The clock stop capable bit should be RO, not R/W.

Suggested Remedy

Change the "R/W" column for bit 3.1.6 to "RO". Also modify 40.5.1.1 Table 40-3 accordingly.

Response

Response Status C

ACCEPT.

Same as comment #249

"If bit 3.1.6 is set to 1"
in some instances, you write "set to 1/0" etc. In other instances, you write "set to a zero/a one". Pick one nomenclature and use consistently, unless there is anything in the IEEE style guidelines to define what style should be used.

Suggested Remedy

Per comment

Response

Response Status C

ACCEPT IN PRINCIPLE.

Change 1 to one.
Comment Type: E  Comment Status: A
"If the device supports EEE operation for 10GBASE-KR as defined in 72.1 this bit shall be set to 1.*

is missing a comma before "this bit ..."

Similar in lines 37, 41, 45, 49, 53 on the same page

Suggested Remedy
Per comment

Response  Response Status  C
ACCEPT.

Comment Type: TR  Comment Status: R
Submitted on behalf of Todd Thompson, Solarflare.

Clause 45.2.7.13a and 45.2.7.14a are inconsistent with the rest of the standard in that the format of NP and XNP are partially defined in this clause. In the rest of the standard, the formats of NP and XNP are separated from the control/status registers controlling and reporting the status of what's to be advertised/been advertised. (See Clause 40.5 for 1G and 55.6 for 10G). The current definition is more difficult to read/follow than the way pages have been previously defined in the standard. It is not clear from the text in 45.2.7.13a and 45.2.7.14a how many pages are being sent, whether these pages are regular next pages or extended next pages, and what the format of those pages is to be.

Suggested Remedy
Option 1 (preferred): Use existing reserved bits for previously defined Next Pages and Extended Next Pages as defined in Clause 40.5 and 55.6 and remove this new message code/format.

Option 2: Separate the definition of the NP and XNP out of Clause 45.2.7.13a and 45.2.7.14a and put the format of these pages and mapping of these bits into the EEE Clause 78 to make this consistent to the way 1G and 10G has been done previously. Insert tables into Clause 78 which define the number and format of NPs and/or XNP's similar to Clause 40.5 and 55.6.

Response  Response Status: W
ACCEPT IN PRINCIPLE.

Different bit designators are used.

See response to comment #193

Response  Response Status: U
REJECT.

These registers are consistent with other registers in 45.2.7 for autonegotiation.
The name of Register 7.61 in Clause 45.2.7 is inconsistent with the names of other similar autonegotiation registers in Clause 45.2.7 and Clause 22. Outgoing/control registers are called "advertisement" registers while link partner/incoming status registers are called "ability" registers.

Suggested Remedy

Change the name of register 7.61 from "EEE link partner advertisement" to "EEE link partner ability". Change any reference to this register to this new name (such as in Clause 40.5 Page 108 Line 34).

Response

Response Status C
ACCEPT.

Comment

"All of the bits in the EEE LP advertisement register are read only." should read "All of the bits in the EEE LP advertisement register are <<read-only>>."

Suggested Remedy

Per comment

Response

Response Status C
ACCEPT.

Comment

Should be more specific about use of 06.

Suggested Remedy

Change "Description" to...
"Only valid on all four lanes to request LP_IDLE."

Response

Response Status C
ACCEPT IN PRINCIPLE.

"Only valid on all four lanes simultaneously to request LP_IDLE."

Comment

"LP_IDLE.request shall remain to be set to DEASSERT for 1 second following link_status changing state to OK." reads awkwardly.

Suggested Remedy

Delete this sentence and change previous sentence to:

LP_IDE.request shall not be set to ASSERT unless the attached link has been operational for at least one second (i.e. link_status = OK, according to the underlying PCS/PMA).

Response

Response Status C
ACCEPT IN PRINCIPLE.

"LP_REQUEST shall not be set to asserting unless the attached link has been operational for at least one second (i.e. link_status = OK, according to the underlying PCS/PMA)."
Cl  46  SC  46.1.7  P125  L 20  # 179
Estes, Dave  UNH - IOL
Comment Type  E  Comment Status  A
"shall remain to be set to" should be "shall remain set to"

SuggestedRemedy
Change "shall remain to be set to" to "shall remain set to"

Response  Response Status  C
ACCEPT IN PRINCIPLE.

Sentence reworded by comment #24.

Cl  46  SC  46.3  P125  L 45  # 72
Hajduczenia, Marek  ZTE Corporation
Comment Type  E  Comment Status  A
"RX_CLK may be halted according to 46.3.2.4a" is written in larger font than the res of the paragraph.

SuggestedRemedy
Per comment

Response  Response Status  C
ACCEPT.

Cl  46  SC  46.3.1.5a  P126  L 21  # 240
Brown, Matt  AppliedMicro (AMCC)
Comment Type  TR  Comment Status  A
Throughout this sub-clause there are references to the LPI client. The LPI client is the MAC and this section describes RS Transmit functionality.

The LPI client indicates LPI request through LP_IDLE.request. This section describe LPI request through the XGMII.

SuggestedRemedy
Change all instances of "LPI Client" to "RS".

Response  Response Status  C
ACCEPT.

Cl  46  SC  46.3.1.5a  P126  L 22  # 73
Hajduczenia, Marek  ZTE Corporation
Comment Type  T  Comment Status  A
(1) "LPI state by asserting TXC and setting TXD to 06 (in all lanes)." - that value 06 is decimal, hexadeciml or in some other encoding. Similar comment to 46.3.2.4a, line 20, page 127
(2) "shown in Figure 46-7a if and only if the clock stop capable bit is asserted [45.2.3.2.2a]." - why is the reference in square brackets? change [45.2.3.2.2a] to (see 45.2.3.2.2a) and make sure that the link is live. Similar comment to 46.3.2.4a, line 25, page 127

SuggestedRemedy
(1) Probably 0x06 is meant, which corresponds to 0000 0110 in binary, correct? Make sure that it is clear what encoding is used.
(2) per comment

Response  Response Status  C
ACCEPT IN PRINCIPLE.
Re (1), change to 0x06
Re (2) - per comment

Cl  46  SC  46.3.1.5a  P126  L 42  # 221
Brown, Matt  AppliedMicro (AMCC)
Comment Type  ER  Comment Status  R
In Figure 46-7a, it would be instructive to show the LP_IDLE.request that triggers the assertionof LP_IDLE on the XGMII.

SuggestedRemedy
Add a signal showing the LP_IDLE.request assert message and indicate it as the impetus for asserting LP_IDLE on the XGMII.

Response  Response Status  C
REJECT.

Other diagrams do not show message transitions - e.g. PLS_DATA.request or PLS_DATA.indication.
In Figure 46-8a, it would be instructive to show the LP_IDLE.indication that results upon detection of LP_IDLE on the XGMII.

Suggested Remedy
Add a signal showing the LP_IDLE.indicate assert message and indicate it results from receipt of LP_IDLE on the XGMII.

Response
REJECT.

Other diagrams do not show message transitions - e.g. PLS_DATA.request or PLS_DATA.indication.

Should be more specific about use of 06.

Suggested Remedy
Change "Description" to ...
"Only valid on all four lanes to indicate LP_IDLE is asserted."

Response
ACCEPT IN PRINCIPLE.

"Only valid on all four lanes simultaneously to indicate LP_IDLE is asserted."

Throughout this sub-clause there are references to the LPI client. The LPI client is the MAC and this section describes RS Receive functionality.

The LPI client receives LPI indication through LP_IDLE.indication. This section describes LPI indication through the XGMII.

Change all instances of "LPI Client" to "RS".

LPI stands for Low Power Idle, therefore a second "I" would be unnecessarily redundant.
Cl 48 SC 48.2.6.1.2 P 135 L 40 # 76
Hajduczenia, Marek ZTE Corporation

Comment Type E
Comment Status A

"Missing space between "specified in 48.2.4.2.3" and "For EEE capability"."

SuggestedRemedy
Per comment

Response Response Status C
ACCEPT.

Cl 48 SC 48.2.6.1.2 P 135 L 49 # 180
Estes, Dave UNH - IOL

Comment Type T
Comment Status A

"||LI|| is currently defined as "The column of four Idle Sync or Skip code-groups consisting of either 3 lanes of ||K|| and one lane of /D20.5/ or three lanes of ||R|| and one lane of /D20.5/ as specified in 48.2.4.2.""

"||LI|| should also be indicated for the reception of an ||A|| which is preceded by a column of three /K/ and one /D20.5/ or three /R/ and one /D20.5/ as defined in 48.2.4.2.

Additionally, the ||x|| designation is used to describe a full column and should not be used for only three characters of /K/ or /R/.

SuggestedRemedy
Change the definition of ||LI|| from:
"The column of four Idle Sync or Skip code-groups consisting of either 3 lanes of ||K|| and one lane of /D20.5/ or three lanes of ||R|| and one lane of /D20.5/ as specified in 48.2.4.2."

To:
"The column consisting of three /K/ characters and one of /D20.5/ or three /R/ characters and one /D20.5/ or a column of ||A|| preceded by a column containing three /K/ characters and one /D20.5/ as specified in 48.2.4.2."

Response Response Status C
ACCEPT.

Cl 48 SC 48.2.6.1.3 P 136 L 5 # 74
Hajduczenia, Marek ZTE Corporation

Comment Type T
Comment Status R

"For EEE capability, this variable is affected by the LPI receive state diagram. Without EEE capability this variable is identical to deskew_align_status controlled by the deskew state diagram" change to

"If EEE capability is supported, this variable is affected by the LPI receive state diagram. Otherwise, this variable is identical to deskew_align_status controlled by the deskew state diagram"

SuggestedRemedy
Per comment

Response Response Status C
REJECT.

The "capability" wording was agreed after very long discussions during comment resolution for D2.0.

Cl 48 SC 48.2.6.1.4 P L # 259
Horner, Rita Avago

Comment Type TR
Comment Status R

"check_end function is not defined in 802.3az. When LPI is enabled in the device, there is a possibility that /D20.5/ will appear in the column following ||T||."

SuggestedRemedy
Check_end
Prescient Terminate function used by the PCS Receive process to set the RXD<31:0> and RXC<3:0> signals to indicate Error if a running disparity error was propagated to any Idle code-groups in ||T||, or to the column following ||T||. The XGMII Error control character is returned in all lanes less than n in ||T||, where n identifies the specific Terminate ordered-set ||Tn||, for which a running disparity error or any code groups other than /A/ or /K/ or /D20.5/ are recognized in the column following ||T||. The XGMII Error control character is also returned in all lanes greater than n in the column prior to ||T||, where n identifies the specific Terminate ordered-set ||Tn||, for which a running disparity error or any code group other than /K/ is recognized in the corresponding lane of ||T||. For all other lanes the value set previously is retained.

Response Response Status C
REJECT.

Figure 48-6 forces the column following a ||T|| to be either ||A|| or ||K||.
With the exception of the rx_wf_timer, each timer definition mistakenly refers to the "PMD's" receiver or transmitter when it should refer to the "PCS" transmitter or receiver.

SuggestedRemedy
Per comment.

Response
Response Status C
ACCEPT.

Rx_tq_timer is not precise. Not clear about the "enter RX_SLEEP" state.

SuggestedRemedy
rx_tq_timer: This timer is started when the PMD's receiver enters the RX_SLEEP state. The timer is restarted every time LPIDLE is received, sig_detect=1 and rx_tq_timer_done while in RX_SLEEP state. The timer terminal counter is set to TQR. When the timer reaches terminal count it will set the rx_tq_timer_done=TRUE.

SuggestedRemedy
The state diagram conventions make it clear that the action (start rx_tq_timer) is performed each time the state is entered (or re-entered).

Response
Response Status C
REJECT.

Change "rx_lpi_active = FALSE" to "!rx_lpi_active".

Response
Response Status C
ACCEPT.

SuggestedRemedy
Change criteria for RX_WAKE to RX_QUICK, to *(signal_detect=FAIL) * !rx_tw_timer_done
Change criteria for RX_WAKE to RX_ACTIVE, to *(signal_detect=OK) * !rx_tw_timer_done * deskew_align_status=OK * ||IDLE||
Change criteria for RX_WAKE to RX_SLEEP, to *(signal_detect=OK) * !rx_tw_timer_done * deskew_align_status=OK * ||LPIDLE||

SuggestedRemedy
Change criteria for RX_SLEEP to RX_SLEEP, to ||LPIDLE|| * !rx_tq_timer_done *(sig_detect=OK)
Change criteria for RX_SLEEP to RX_ACTIVE, to ||IDLE|| * !rx_tq_timer_done *(sig_detect=OK)

SuggestedRemedy
Change criteria for RX_SLEEP to RX_SLEEP, to ||LPIDLE|| * !rx_tq_timer_done *(sig_detect=OK)
Change criteria for RX_SLEEP to RX_ACTIVE, to ||IDLE|| * !rx_tq_timer_done *(sig_detect=OK)

Response
Response Status C
ACCEPT.

At only one instance of "true" - change to "TRUE"
In Figure 48-9b-LPI Receive state diagram page 143, RX_ACTIVE transitions to RX_SLEEP when following condition is satisfied: 

\[ ||LPIDLE|| * align_status = deskew\_align\_status \]

Is it possible that the transition occurs when both align_status=FAIL and deskew_align_status=FAIL?

In another word, is it possible for \[ ||LPIDLE|| \] to be detected when deskew_align_status=FAIL and how the MAC/RS interpret the \[ ||LFAULT|| \] (as a result of align_status=FAIL) when the XGXS Receive is in low power mode?

This should be prevented otherwise the Rx portion of the design will go into low power state when the received \[ ||LPIDLE|| \] column validity is questionable and continue to indicate \[ ||LFAULT|| \] on the RXC/RXD instead of \[ ||LPIDLE|| \].

**Suggested Remedy**

Change criteria for RX_ACTIVE to RX_SLEEP, to 

\[ ||LPIDLE|| * align\_status = OK * deskew\_align\_status = OK \]

**Response**

REJECT.

If alignment is lost, the PCS receive state diagram will prevent the decode function from operating.

The duration of rx_tw_timer is specified to be TWR which in Table 48-10 is given a range of between 8 to 9 us. A lower limit here is superfluous. It implies that there is lower limit on the wake time.

**Suggested Remedy**

In the definition of rx_tw_timer change:

"The timer terminal count is set to TWR."

To:

"The timer terminal count shall not exceed the maximum value of TWR in Table 48-10."

Remove TWR(min) from Table 48-10.

**Response**

ACCEPT.

The convention is to have similar register map for PCS, PHY XS and DTE XS. PHY and DTE LPI management registers are not defined in AZ.

**Suggested Remedy**

Add PHY XS LPI managment registers 4.1.11, 4.1.10, 4.1.9, 4.1.8, 4.22
Add DTE XS LPI managment registers 5.1.11, 5.1.10, 5.1.9, 5.1.8, 5.22

**Response**

ACCEPT IN PRINCIPLE.

Adopt the changes in barrass_02_1109.pdf

D2.2 will have the following:

1) extension of LPI signaling across XAUI
2) LPI mode for XAUI based on LPI mode of KX4

**Suggested Remedy**

Add PHY XS LPI management registers 4.1.11, 4.1.10, 4.1.9, 4.1.8, 4.22
Add DTE XS LPI management registers 5.1.11, 5.1.10, 5.1.9, 5.1.8, 5.22

**Response**

ACCEPT IN PRINCIPLE.

Adopt the changes in barrass_02_1109.pdf

D2.2 will have the following:

1) extension of LPI signaling across XAUI
2) LPI mode for XAUI based on LPI mode of KX4

**Suggested Remedy**

Add PHY XS LPI management registers 4.1.11, 4.1.10, 4.1.9, 4.1.8, 4.22
Add DTE XS LPI management registers 5.1.11, 5.1.10, 5.1.9, 5.1.8, 5.22

**Response**

ACCEPT IN PRINCIPLE.
Comment Type: TR  Comment Status: A
To make the transition from RX_SLEEP to RX_ACTIVE more robust, the condition should be changed from

\[ \text{IDLE} \land \neg \text{rx_tq_timer_done} \]

to

\[ \text{IDLE} \land \neg \text{rx_tq_timer_done} \land \text{deskew_align_status} = \text{OK} \]

Suggested Remedy

ACCEPT.

Response Status: C

Pillai, Velu Broadcom

---

Comment Type: E  Comment Status: R
I think we should rename RX_WTF to RX_EXW (Extended wake) or at least add a "K", which will make it RX_WKTF (Wake time fault)

Which ever way we decide, all the reference to WTF needs to be changed too.

Suggested Remedy

REJECT.

Response Status: C

Pillai, Velu Broadcom

---

Comment Type: T  Comment Status: R
"If the optional Energy Efficient Ethernet (EEE) capability is supported (see Clause 78) then the interface with the PMA sublayer (or FEC sublayer) includes rx_quiet and tx_quiet to control power states in lower sublayers and energy_detect that indicates whether the PMD sublayer has detected a signal at the receiver."

In the case of the FEC sublayer, it also includes rx_lpi_active.

Suggested Remedy

Amend the paragraph accordingly.

Response Status: C

Healey, Adam LSI Corporation

---

Comment Type: TR  Comment Status: A
"If the optional Energy Efficient Ethernet (EEE) capability is supported (see Clause 78) then the interface with the PMA sublayer (or FEC sublayer) includes rx_quiet and tx_quiet to control power states in lower sublayers and energy_detect that indicates whether the PMD sublayer has detected a signal at the receiver."

Suggested Remedy

Amend the paragraph accordingly.

Response Status: C

Healey, Adam LSI Corporation

---

Response Status: C

Brown, Matt Applied Micro (AMCC)

---

Response Status: U

Healey, Adam LSI Corporation

---

Response Status: C

Changing the name will effect multiple lines in multiple clauses.
Without the underlines it would not be sufficiently clear what "EEE only" applies to.

Suggested Remedy

These signals should be dotted as in Figure 51-3; so should the "Data output when scrambler_bypass is true" of Figure 49-5.

Response

ACCEPT IN PRINCIPLE.

Place dotted box around the signals.

Also around the "Data output." of Figure 49-5.

The duration of rx_tw_timer is specified to be TUL. This should be TWR. In Table 49-3 TWR is given a range between 11 to 12 us when scrambler_bypass_enable is FALSE and a range between 13 and 14 us when scrambler_bypass_enable is TRUE. A lower limit here is superfluous. It implies that there is lower limit on the wake time.

Suggested Remedy

In the definition of rx_tw_timer change:
"The timer terminal count is set to TUR."

To:
"The timer terminal count shall not exceed the maximum value of TWR in Table 49-3."

Remove TWR(min) from Table 49-3.

This comment reports an issue similar to that reported in comment #93 in CL 55. It relates to the state machine in Figure 49-14 and the definition of T_BLOCK_TYPE LI on pages 142 and 143. T_BLOCK_TYPE LI is specified as including cases with either 8 /LI/ or 4x/LI/+4x/I/. As the state machine in Figure 49-14 is currently defined this allows and requires transition to low power mode (TX_LI state) if either is detected. Transition to low power mode upon detection of 4x/LI/+4x/I/ should not be permitted. However, provision is required to allow for this special case while in the TX_LI state.

Suggested Remedy

Define LII as:
"LII: If the optional Low Power Idle function is supported then LII occurs when the vector contains four /LI/ control characters followed by four /I/ control characters."

Re-define LI as:
"LI: If the optional Low Power Idle function is supported then the LI type occurs when the vector contains eight control characters of /LI/.

In Figure 49-14...

Change the criteria for transition for the following transition to include LII:
TX_C to TX_E
TX_INIT to TX_E
TX_D to TX_E
TX_E to TX_E
TX_T to TX_E

Change the criteria for transition from TX_LI to TX_LI (loop) to "T_TYPE(tx_raw)=(LI+LII)".

Alternately, change the criteria for transition from TX_L to TX_C to T_TYPE(tx_raw)=(I+LII)."

Response

ACCEPT IN PRINCIPLE.

This has been resolved by the response to D2.0 comments #99 and #456
Comment Type: TR
Comment Status: A

It relates to the state machine in Figure 49-14 and the definition of T_BLOCK_TYPE C and LI on pages 150 and 151. T_BLOCK_TYPE LI is specified as including cases with either 8 ILI or 4xILI+4xILI. As the state machine in Figure 49-14 is currently defined this allows and requires transition to low power mode (TX_LI state) if either is detected. Transition to low power mode upon detection of 4xILI+4xILI should not be permitted. However, provision is required to allow for this special case while in the TX_LI state. Also, 4xILI+4xILI is a valid block and should not result in an error block.

Suggested Remedy

Define LII as...
"LII: If the optional Low Power Idle function is supported then LII occurs when the vector contains either (a) four ILI control characters followed by four ILI control characters or (b) four ILI control characters followed by four ILI control characters."

Re-define LI as...
"LI: If the optional Low Power Idle function is supported then the LI type occurs when the vector contains eight valid control characters of ILI."

Re-define first criteria of C as...
eight valid control characters other than /O/, /S/, /T/, /E/ and /ILI/.

In Figure 49-14...

Change the transition criteria as follows:
TX_INIT to TX_C: T_TYPE(tx_raw)=(C+LII)
TX_C to TX_C: T_TYPE(tx_raw)=(C+LII)
TX_D to TX_E: T_TYPE(tx_raw)=(E+C+S+LII+LII)
TX_E to TX_C: T_TYPE(tx_raw)=(C+LII)
TX_T to TX_C: T_TYPE(tx_raw)=(C+LII)
TX_LI to TX_LI: T_TYPE(tx_raw)=(LII+LII)

Response: C

ACCEPT IN PRINCIPLE.

Change the definition of C in R_BLOCK_TYPE and T_BLOCK_TYPE. Replace "less than eight of the characters are ILI" with 
"zero or four of the characters are ILI"

Comment Type: TR
Comment Status: A

It would help to put in a text description of the behavior of each state machine, 49-16 and 49-17, what is each SM accomplishing at a high level.

Suggested Remedy

Comment #455 may satisfy this.

Response: C

ACCEPT IN PRINCIPLE.

Move the "start rx_tq_timer" from RX QUIET state to the RX_SLEEP state (as proposed in Comments #425 and #448) and add a transition to RX_LINK_FAIL on "rx_tq_timer_done * signal_ok". Note that this transition is already included in the CL 49 LPI RX SM.

Response: C

ACCEPT IN PRINCIPLE.

This was resolved by the response to D2.0 comments #99 and #456.
Cl 49 SC 49.2.13.3.1 P156 L26 # 166
Koenen, David Hewlett-Packard

Comment Type E Comment Status A
Missing arrow head on line from RX_QUIET to RX_LINK_FAIL.

Suggested Remedy
Add arrow head.

Response Response Status C
ACCEPT.

Cl 49 SC 49.2.13.3.1 P156 L43 # 215
Brown, Matt AppliedMicro (AMCC)

Comment Type ER Comment Status A
For clarity and consistency re-name SCR_BYPASS to TX_WAKE_SCR_BYPASS.

Suggested Remedy
Re-name SCR_BYPASS to TX_WAKE_SCR_BYPASS.

Response Response Status C
ACCEPT.

Cl 49 SC 49.2.13.3.1 P156 L43 # 235
Brown, Matt AppliedMicro (AMCC)

Comment Type TR Comment Status A
Transition from RX_REF_SCR_BYPASS or RX_REF_SCR_ON to TX_WAKE will cause result in far end receiver transiting to RX_ACTIVE state the receiving random behaviour when local TX is in SCR_BYPASS state (should be labelled TX_WAKE_SCR_BYPASS).

Suggested Remedy
Change SM as follows:
(1) change transition "TX_REFRESH_SCR_BYPASS-TX_WAKE" to TX_REFRESH_SCR_BYPASS-TX_ACTIVE
(2) For (1) change criteria from "T_TYPE(tx_raw)=I" to "(T_TYPE(tx_raw)=I)*one_us_timer_done"
(3) change transition "TX_REFRESH_SCR_ON-TX_WAKE to TX_REFRESH_SCR_ON-TX_ACTIVE"

Response Response Status C
ACCEPT IN PRINCIPLE.

See pillai_02_1109.pdf which was adopted in the response to comment #140

Cl 49 SC 49.2.13.3.1 P156 L8 # 18
Mark, Gustlin Cisco

Comment Type E Comment Status A
Clean up the overlap in the text and state machine lines in figure 49-16.

Suggested Remedy
as above.

Response Response Status C
ACCEPT.

Cl 49 SC 49.2.13.3.1 P157 L19 # 232
Brown, Matt AppliedMicro (AMCC)

Comment Type T Comment Status A
Transition criteria from RX_SLEEP to RX_ACTIVE or RX_SLEEP not consistent with rest of SM. R_TYPE is elsewhere anded with rx_block_lock.

Suggested Remedy
Simple fix.
Change "R_TYPE(rx_coded) = IDLE" to "(R_TYPE(rx_coded) = IDLE) * rx_block_lock". Alternately:
Consider/define (R_TYPE(x) = y) being TRUE to include the condition that rx_block_lock = TRUE. In which case, we can clean up the SM by removing the rx_block_lock condition from the following transitions:
RX_WAKE to RX_SLEEP
RX_WAKE to RX_ACTIVE
RX_WTF to RX_SLEEP
RX_WTF to RX_ACTIVE
RX_ACTIVE to RX_SLEEP

Response Response Status C
ACCEPT IN PRINCIPLE.

Use the simple fix.

Cl 49 SC 49.2.4.7 P148 L7 # 181
Estes, Dave UNH - IOL

Comment Type T Comment Status A
Comment #130 was accepted but not all of the text was changed.

Suggested Remedy
Change "0x07" to "0x06" on page 148 line 7 and on page 149 line 42 to fulfill the changes accepted in comment #130.

Response Response Status C
ACCEPT.
The response to comment #466 (on Clause 55) on draft 2.0 said that the control code for /LI/ in clause 49 would be changed to 0x06.

This was missed in the draft update.

Suggested Remedy
Change the /LI/ control code to 0x06 in clause 49 as agreed in the response to comment #466 on draft 2.0.

Response
ACCEPT.

"Change 49.2.6 for scrambler reset" is out of date, should be bypass.

Suggested Remedy
Change to:
"Change 49.2.6 for scrambler bypass"

Response
ACCEPT.

I believe this statement should be deleted:
"To aid block synchronization in the receiver when the optional LPI function is supported, the registers of scrambler shall be held at logic zero while scrambler_reset is TRUE."

Suggested Remedy
Replace sentence with...
"To aid block synchronization in the receiver when optional LPI function is supported, a scrambler bypass will be provided. When scrambler_bypass = true the scrambler bypass is used and the scrambler will otherwise continue to operate normally."

Response
ACCEPT IN PRINCIPLE.

The change to draft 2.0 was implemented incorrectly. The paragraph on p. 149 l. 1 should have been replaced by the paragraph that was placed on p. 149 l. 15.

The paragraph that is in d2.0 p.141 .15 was incorrectly replaced.

Move paragraph from p.149 l.15 to l.1 (replacing the current). Move paragraph from D2.0 p.151 l.15 to p.149 l.15 (to repair the error).
Cl 49 SC 49.2.6 P149 L 2 # 120
Dawe, Piers Independent

Comment Type T Comment Status A
"while scrambler_reset is TRUE": I can't find any other occurrence of "scrambler_reset".

SuggestedRemedy

Response Response Status C
See comment #239

Cl 49 SC 49.2.9 P149 L 15 # 17
Mark, Gustlin Cisco

Comment Type T Comment Status A
This statement says the scrambler will be bypassed to aid synchronization, but I think this is only needed if FEC is enabled, state this condition.

SuggestedRemedy

 Clarify the statement that this only applies if FEC is used.

Response Response Status C
See comment #239

add "when Clause 74 FEC is in use"

Cl 49 SC 49.2.9 P150 L 28 # 127
Dawe, Piers Independent

Comment Type TR Comment Status R
The Lock state diagram, which I don't think is optional, uses the variable "rx_block_lock" where the current standard has "block_lock". Yet 49.2.13.2.2 says "The following variables are used only for the EEE capability... rx_block_lock". Problem - and there may be similar problems e.g. in Clause 36. So I'm piling on to D2.0 comment 190 and 174, we need to preserve the non-EEE material in an undamaged state, by use of annexes like 4A, duplicate state diagrams or other means. Otherwise, users will go back to 802.3-2008 for non-EEE product, and any future maintenance to affected areas will be ignored.

SuggestedRemedy

Preserve the non-EEE material in an undamaged state, by use of annexes like 4A, duplicate state diagrams or other means.

Response Response Status W
REJECT.

This was discussed at length during the resolution of comments against draft 2.0 and the task force decided against the suggested remedy.
**Responses**

**IEEE P802.3az D2.1 Energy Efficient Ethernet comments**

**Cl 49**

**SC 49.2.9**

**P 152**

**L 37**

**# 126**

Dawe, Piers

Independent

---

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

Lines 22, 29, 33, 47 "A boolean"

Line 37 "An boolean"

Line 40 "this Boolean"

**Suggested Remedy**

See online editors' guidance (capital B for Mr Boole) and correct. Scrub the draft.

**Response**

**Response Status** C

ACCEPT.

---

**Cl 49**

**SC 49**

**SC 49.2.9**

**P 151**

**L 2**

**# 129**

Pillai, Velu

Broadcom

---

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

When the transmitter goes through activation or deactivation, the receiver will see invalid code words. hi_ber might get set before rx_block_lock becomes false (Page 151, line 31).

This will cause the receive SM (fig 49-15) to transit from RX_LI to RX_INIT (because of Page 155, line 3).

**Suggested Remedy**

Change the transition to BER_MT_INIT (Page 151, line 2)

from reset + r_test_mode + !rx_block_lock

To reset + r_test_mode + rx_lpi_active.

This will make it consistent with Clause 55: fig 55-14 (LFER monitor state diagram).

**Response**

**Response Status** C

ACCEPT IN PRINCIPLE.

---

**Cl 49**

**SC 49**

**SC 49.2.9**

**Fig 49-13**

**P 151**

**L 37**

**# 126**

Pillai, Velu

Independent

---

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

Lines 22, 29, 33, 47 "A boolean"

Line 37 "An boolean"

Line 40 "this Boolean"

**Suggested Remedy**

See online editors' guidance (capital B for Mr Boole) and correct. Scrub the draft.

**Response**

**Response Status** C

ACCEPT.

---

**Cl 49**

**SC 49**

**SC 49.2.9**

**P 151**

**L 2**

**# 129**

Pillai, Velu

Broadcom

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

Presently in CL49 LPI receive state machine, the transition from RX QUIET to RX_WAKE is enabled by energy_detect. Energy detect is more susceptible to noise and cross talks. This will unnecessarily make the LPI RX State machine transition out of the RX QUIET state. Several comments and concerns were put forward against Draft 2.0 during the September interim. Changes were made to the CL49 LPI transmit and receive state diagrams to handle this appropriately during false energy detect. These changes still do not address the vulnerability of the Energy Detect.

**Suggested Remedy**

Pillai_1109_01.pdf addresses this issue and proposes a solution in detail. The idea is for the Transmitter to send out a pattern as a prequel before the refresh or wake sequence. During EEE mode, Energy detect function may use this alert pattern to detect electrical energy at the receiver.

The proposed pattern is a repeating "0xFF00" (eight "1"s and eight "0") for 1 usec.

Change to fig 49-16, LPI TX state diagram and all the other edits needed are show in Pillai_1109_01.pdf.

**Response**

**Response Status** C

ACCEPT IN PRINCIPLE.

And make an additional change to the receive LPI state diagram:

Add another state RX_SCR_BYPASS.

The transitions from RX_WAKE need to change:

Transitions - RX_WAKE -> RX_ACTIVE; RX_WAKE -> RX_SLEEP; RX_WTF -> RX_ACTIVE; RX_WTF -> RX_SLEEP - all need to be "and-ed" with NOT scrambler_bypass_enable.

New transition - RX_WAKE -> RX_SCR_BYPASS = !rx_tw_timer_done * rx_block_lock * scrambler_bypass_enable

New transition - RX_WTF -> RX_SCR_BYPASS = !rx_wf_timer_done * rx_block_lock * scrambler_bypass_enable

In state RX_SCR_BYPASS, start one_us_timer

New transition - RX_SCR_BYPASS -> RX_ACTIVE = one_us_timer * 

R_TYPE(rx_coded) = IDLE

New transition - RX_SCR_BYPASS -> RX_SLEEP = one_us_timer * 

R_TYPE(rx_coded) = LI
If the FEC is enabled, then the transitions from TX_SLEEP to TX_WAKE, TX_REF_SCR_BYPASS to TX_WAKE and TX_RE_SCR_ON to TX_WAKE will cause the state transitions to go through SCR_BYPASS state. But by this time the LP receiver has gone to RX_ACTIVE state, because:

- In the case of TX_SLEEP to TX_WAKE: the receiver never went to RX_QUIET.
- And in the other two cases, the FEC did see a determinist frame and would have locked to it.

But if the LPI TX SM again asserts Scrambler bypass in any of the above three cases, then this may cause the FEC decoder to de-assert FEC_block_lock and PCS to assert local fault at the XGMII side.

**Suggested Remedy**

The way to avoid this is by modifying the LPI transmit state diagram from entering SCR_BYPASS state during these three scenarios. Each of the above three transitions needs to be modified to:

- TX_SLEEP to TX_ACTIVE, TX_REF_SCR_BYPASS to TX_ACTIVE and TX_RE_SCR_ON to TX_ACTIVE, respectively.

Pillai_1109_01.pdf also addresses these changes.

**Response**

ACCEPT IN PRINCIPLE.

Transition from TX_SLEEP: T_TYPE(tx_raw) != LI, goes to TX_ACTIVE

Transition from TX_REF_SCR_BYPASS: T_TYPE(tx_raw) != LI * one_us_timer_done, goes to TX_ACTIVE

Transition from TX_RE_SCR_ON: T_TYPE(tx_raw) != LI, goes to TX_ACTIVE

(the last one doesn't need to wait for the timer).

Both the conditions out of TX_REF_SCR_BYPASS and TX_REF_SCR_ON should be qualified with one_us_timer_done.

**Suggested Remedy**

Modify the transition condition from:

\[ T_{TYPE}(tx_{raw}) \neq LI \]

to:

\[ T_{TYPE}(tx_{raw}) \neq LI \ast \text{one_us_timer_done} \]

for both these states.

pilai_1109_01.pdf also addresses this change.

**Response**

ACCEPT IN PRINCIPLE.

To make the transition from RX_SLEEP to RX_ACTIVE more robust, we should change transition condition from:

\[ \text{frx_tq_timer_done} \ast \text{R_{TYPE}(rx_{coded})} = \text{IDLE} \]

to:

\[ \text{frx_tq_timer_done} \ast \text{rx_block_lock} \ast \text{R_{TYPE}(rx_{coded})} = \text{IDLE} \]

**Suggested Remedy**

ACCEPT.
Comment Type: E  Comment Status: R
I think we should rename RX_WTF to RX_EXW (Extended wake)
or at least add a "K", which will make it RX_WKTF (Wake time fault)
Which ever way we decide, all the reference to WTF needs to be changed too.

Suggested Remedy

Response  Response Status: C
REJECT.

Changing the name will effect multiple lines in multiple clauses.

Comment Type: TR  Comment Status: A
Resolution on Comment #130 against draft D2.0 was to change control code to 0x06, but it
is still 0x07.

Suggested Remedy
Change the control code to 0x06 at these locations.
Page 148, line 7
Page 149, line 42

Response  Response Status: C
ACCEPT.

The transmitter can get a wake command while it is in TX_REFRESH, which means the
LPI TX SM will go through the following state changes.
TX_ENERGY_ALERT -> TX_REFRESH -> TX_WAKE -> TX_WAKE_SCR_BYPASS and
then to TX_ACTIVE.
Which means 1usec + 14usec + 12usec + 1usec + 1usec = 29usec.
The receiver wake timer is only 17 usec, hence the LPI RX SM will transition to RX_WTF
state. But the above scenario is a valid wake. The way to avoid this is to increase the
rx_tw_timer value.

Please note that the comment shows TX_ENERGY_ALERT state which is coming from a
solution for a different comment. And its solution is addressed through pillai_1109_01.pdf.
Now even without it, the issue exists.

Suggested Remedy
Increase the timeout for RX wake timer to 29us (min) to 30us (max).
The following are the changes that are required.
1. sub clause: 49.2.13.2.5, page 153, Line 19 Change TUL to TWR.
2. table 49-3, page 158, line 28: Change the values to 29us (min) to 30us (max).
3. table 49-3, page 158, line 31: Remove this line. There is no need for two TWR.

Response  Response Status: C
ACCEPT IN PRINCIPLE.

If scrambler_bypass is not used then the wake time may be shorter.
1. as written
2. 26uS, 27 uS
3. 29uS, 30uS
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<td>rx_lpi_active appears in Figure 49-4 &amp; Figure 74-2 going to the PMA, but does not appear in the PMA diagram or signal definitions.</td>
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<td>SuggestedRemedy: Either add it to the PMA diagram and definitions or delete from the other figures and definitions.</td>
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<td>Response: ACCEPT IN PRINCIPLE.</td>
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<tr>
<td>The signal should not be shown going to the PMA in Figure 74-2.</td>
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<td>In Figure 49-4 add &quot;(FEC sublayer only)&quot;</td>
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<td>SuggestedRemedy: should be &quot;optional&quot; (4 times in this diagram) Bug in base document: compare Figure 52-7 (which has its own bugs, but that's off topic).</td>
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<td>Subclause heading for Table 51-3 is missing</td>
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<td>SuggestedRemedy: Insert &quot;51.4 Sixteen-Bit Interface (XSBI)&quot;</td>
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<td>Many instances of both &quot;EEE capability&quot; and &quot;LPI capability&quot;, but both have the same meaning. The latter is used only in Clause 55.</td>
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<td>SuggestedRemedy: Change &quot;LPI capability&quot; to &quot;EEE capability&quot;.</td>
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<td>In many figures, there is a statement &quot;... mandatory for EEE.&quot; This doesn't say that it's not required by non-EEE PHYs and might be interpreted as saying that its optional for non-EEE PHYs.</td>
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<tr>
<td>SuggestedRemedy: Wherever there is statement &quot;...mandatory for EEE capability&quot; or similar statement also indicate something like &quot;...mandatory for EEE-capable PHYs and is not required for non-EEE PHYs&quot;.</td>
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Adding 'not required for non-EEE PHYs' does not change the normative requirements of the text so it is not necessary.

However, the wording will be changed to match that in other clauses (see e.g. page 89 of draft 2.1), for consistency (though this doesn't seem to address the meat of the comment, which is why the proposed response is reject):

NOTE--Signals and functions shown with dashed lines are only required for the EEE capability. The editor also notes that in at least one state diagram a new variable has been added which are not defined for non-EEE PHYs - in Figure 55-14 lpi_rx_wake_timer_done is used. Add a note to this figure that states

NOTE- The variable lpi_rx_wake_timer_done is only required for the EEE capability and should be treated as if the value of this variable is TRUE otherwise.
LI and LII are defined as RBLOCKS not TBLOCKS.

**Suggested Remedy**
Redefine LI and LII T_BLOCK types for XGMII.

**Response**
ACCEPT IN PRINCIPLE.

**Comment Status** A

---

"a LPI" should be "an LPI"

**Suggested Remedy**
change "a LPI" to "an LPI"

**Response**
ACCEPT IN PRINCIPLE.

Make change identified at location in comment as well as in other places in Clause 55.

---

Change "Receive 64B/65B state diagram" to "64B/65B receive state diagram in Figure 55-16".

**Suggested Remedy**

**Response**
ACCEPT.

---

Description of pma_unidata.request is not consistent with ALERT request. Changing the description will resolve this problem.

**Suggested Remedy**
Change description to...
"During transmission, ... and BI_DD. For EEE capable PHYs, the vector also requests the PMA to send the ALERT signal during LPI. The tx_symb_vector parameter takes on the form:"

**Response**
ACCEPT.
IEEE P802.3az D2.1 Energy Efficient Ethernet comments

Cl 55 SC 55.3.2.2.0 P174 L38 #226
Brown, Matt AppliedMicro (AMCC)

Comment Type ER Comment Status A

Use lp_idle to indicate lp idle characters. Also, "/li/s" seems like bad syntax.

SuggestedRemedy
- Change "/li/s may be added following LPI" to "/li/ control characters may be added following lp_idle".

Response Response Status C
ACCEPT IN PRINCIPLE.

The '/li/s' terminology was used to maintain consistent bad-syntax with non-EEE PHYs - '/li/'s are used in 55.3.2.2.9 in the existing standard. The new subclause parallels 55.3.2.2.9 with '/li/'s replaced with '/li/s'.

Change the sentence to ' /li/s may be added follow low power idle control characters'.

Cl 55 SC 55.3.2.2.1 P174 L7 #225
Brown, Matt AppliedMicro (AMCC)

Comment Type ER Comment Status A

Blocks and frames have as much or as little significance in LPI mode as in any other mode. Also, LPDC frame boundaries delimit LPI cycles. So retain, legacy wording and change new sentence.

SuggestedRemedy
- Change two sentences from "Outside the LPI ... and alert times." to "Blocks and frames are unobservable and have no meaning outside the PCS. During the LPI mode, LDPC frame boundaries delimit sleep, wake, refresh, quiet and alert cycles."

Response Response Status C
ACCEPT.

Cl 55 SC 55.3.2.2.21 P175 L47 #2027
Brown, Matt AppliedMicro (AMCC)

Comment Type ER Comment Status A

It is not clear what these two sentences are saying. Are they saying that there are two wake timer values for the transmitter depending on when the wake is requested? Or are they talking about the maximum time that the receive requires to wake up in each of the two modes. The use of the word maximum seems to have two meanings here.

SuggestedRemedy
- On page 175, line 46-48
  Change ...
  "The maximum PHY wake time, lpi_wake_timer, is 7.36 us (lpi_wake_timer=Tw_phy as defined by Clause 78), which occurs only when wake is requested before sleep has been transmitted. Typically, wake will be requested after the sleep signal is transmitted and in this case the maximum PHY wake time value is 4.48 us."
  To...
  "Typically, wake will be requested after the sleep signal is transmitted and in this case the maximum PHY wake time, phy_wake_timer, is 4.48 us. When wake is requested before sleep has been transmitted the maximum PHY wake time, is 7.36 us to allow extra time at the receiver for the sleep sequence to complete. In either case, the wake signal will be sent for a minimum time as indicated by phy_wake_timer."

Response Response Status U
REJECT.

Not clear that this is an improvement and the second sentence in the suggested remedy is confusing.
Presumably, the scrambler continues to run as well.

**Suggested Remedy**

Change sentence to:

"After the sleep signal is transmitted, LP_IDLE characters shall be input to the PCS scrambler continuously and the scrambler shall continue to operate until the transmit LPI mode ends."

**Response**

There is no text saying that the scrambler is disabled.

Stating that it runs continuously is not necessary.

**Suggested Remedy**

"The PHY receive sends /l/ to the XGMII for 9 LDPC frame periods then resumes normal operation decoding received 64B/65B blocks and sending the decoded values to the XGMII."

**Response**

"The PCS receive function sends /l/ to the XGMII for 9 LDPC frame periods then resumes normal operation."

**Comment Type:** ER  **Comment Status:** A  **Response Status:** C

Fix wording in headers of columns 2 and 3.

**Suggested Remedy**

"The 8B/10B codes provided for lp_idle are for the lp_idle used in Clause 36. They should be the 8B/10B codes for lp_idle used in Clause 48."

**Response**

Same as comment #204
<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
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</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>55.3.2.2.9</td>
<td>174</td>
<td>23</td>
<td>204</td>
</tr>
<tr>
<td>Brown, Matt</td>
<td>AppliedMicro (AMCC)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comment Type: T  Comment Status: A

In Table 55-1, 8B/10B column is for codes used in 10GBASE-X not 1000BASE-X. For instance, the idle row lists K28.0, K28.3, K28.5 which are used in 10GBASE-X for idle as opposed to /K28.5/D5.6/ and /K28.5/D16.2/ used for 1000BASE-X.

Suggested Remedy:
- Delete "K28.5/D6.5" and "K28.5/D26.4" and replace with "K28.0, or K28.3, K28.5 with D20.5".
- Add idle row and change 8B/10B column to "K28.0, K28.3, or K28.5 without D20.5".
- Add footnote to both rows "Use of idle and lp_idle ordered set per 48.2.4.2.*

Response: Response Status: C

ACCEPT.

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
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<tbody>
<tr>
<td>55</td>
<td>55.3.4a.1</td>
<td>177</td>
<td>41</td>
<td>230</td>
</tr>
<tr>
<td>Brown, Matt</td>
<td>AppliedMicro (AMCC)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comment Type: TR  Comment Status: A

Loop timing in slave mode is never explicitly stated as a requirement for EEE.

Suggested Remedy:
- Change...

"Non-loop timed links are not supported by EEE."

To...

"An EEE capable PHY shall support loop timing and loop timing shall be enabled."

Response: Response Status: C

ACCEPT IN PRINCIPLE.

<table>
<thead>
<tr>
<th>Cl</th>
<th>SC</th>
<th>P</th>
<th>L</th>
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</thead>
<tbody>
<tr>
<td>55</td>
<td>55.3.5.2.2</td>
<td>179</td>
<td>33</td>
<td>208</td>
</tr>
<tr>
<td>Parnaby, Gavin</td>
<td>Solarflare Communicat</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comment Type: ER  Comment Status: A

Separate the eee definitions. Applies to variables, constants, timers, functions, counters.

Suggested Remedy:
- As comment

Response: Response Status: C

ACCEPT.
Cl 55 SC 55.3.5.2.3 P 181 L 18 # 235
Brown, Matt AppliedMicro (AMCC)

Comment Type T Comment Status A
Definition of "lpi_rx_wake_timer" does not match SM.

SuggestedRemedy
Change definition to...
"This timer defines the time the receiver continues to send IDLE and/or LF blocks after the ALERT signal is detected."

Response Response Status C
ACCEPT IN PRINCIPLE.
Change definition to:
"This timer defines the time the receiver sends IDLE blocks after the ALERT signal is detected."

Cl 55 SC 55.3.5.2.4 P 181 L 34 # 247
Grimwood, Michael Broadcom

Comment Type T Comment Status A
Simplify the definition of R_BLOCK_TYPE C to be consistent with the new definition for T_BLOCK_TYPE C proposed in another comment.

SuggestedRemedy
Change:
C; The vector contains a data/ctrl header of 1 and one of the following:
a) A block type field of 0x1E and eight valid control characters, none of which are /E/ and, if
the low power idle function is supported, none of which are /LI/;

To:
C; The vector contains a data/ctrl header of 1 and one of the following:
a) A block type field of 0x1E and eight valid control characters other than /E/ and /LI/;

Response Response Status C
ACCEPT.
In the T_BLOCK_TYPE definition, type C conflicts with LII. Redefine type C to eliminate conflict (another comment addresses LII by redefining it).

**Suggested Remedy**

Change:

C: The vector contains one of the following:
- a) eight valid control characters other than /O/, /S/, /T/ and /E/ and, if the LPI function is supported, less than eight valid control characters of /LI/ and less than eight valid control characters of /I/;

To:

C: The vector contains one of the following:
- a) eight valid control characters other than /O/, /S/, /T/, /E/, and /LI/.

**Response**

Response Status C

ACCEPT.

---

In the T_BLOCK_TYPE definition, type LII conflicts with LI. Redefine LII to eliminate conflict (another comment addresses LI by redefining it).

**Suggested Remedy**

Change:

LII: If the optional Low Power Idle function is supported then the LII type occurs when the vector contains a data/ctrl header of 1, a block type field of 0x1e, and four control characters of /I/ followed by four control characters of /LI/;

To:

LII: If the optional Low Power Idle function is supported then the vector contains one of the following:
- a) four control characters of /LI/ followed by four control characters of /I/;
- b) four control characters of /I/ followed by four control characters of /LI/.

Also on page 182 line 6, add LII to the list of types.

**Response**

Response Status C

ACCEPT.
Comment Type: E  Suggested Remedy: Change...
   "to the eight types"
   To...
   "to one of eight types"

Response: REJECT.

C and I overlap, so the type can be classified as more than one type, as indicated by the
next sentence in the draft, so the suggested change would not be correct.

Comment Type: E  Suggested Remedy: On line 47
   change
   "that counts transmitted LDPC frames"
   to
   "that counts transmit LPDC frame periods"
   On line 53
   change
   "that counts received LDPC frames"
   to
   "that counts receive LPDC frame periods"

Response: ACCEPT.

Comment Type: ER  Suggested Remedy: Change
   "from the time that the 64B/65B receiver detects a sleep block"
   To
   "from the time that the 64B/65B receiver enters TX_L state"

Response: ACCEPT.
Link monitoring and recovery during the LPI state needs more study.

In the current draft the criteria used to drop the link during LPI is not specified. Since PHYs can monitor link quality only during refreshes (and then only for 4 LDPC frames (~1.2us)) and since some PHYs may choose not to wake for all refreshes, it may take multiple refresh cycles before link drop is detected by both sides of the link. Then both sides need to go through a complete training sequence, taking up to 2s, to return to the normal operation mode.

If the link is disturbed during LPI the ability of the PHY to recover is limited by the quiet-refresh signaling since only 4 LDPC frames out of 512 can be used for equalizer/echo training. It would be extremely valuable to include a method by which EEE-10GBASE-T PHYs are able to recover a disturbed link without a full retrain.

**Suggested Remedy**

See presentation.

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

No consensus to change the draft at this time. The 10GBASE-T AD-HOC will prepare a detailed proposal when the ballot opens and will make it available on the website.

Add an editors note in the draft to indicate that a proposal to address this comment is available (and identify where this is available)

History of discussion is captured below:

PROPOSED ACCEPT IN PRINCIPLE.

Yes: 11  
No: 4  
Abstain: 6  
Motion fails.

In favor of proposed response: 6  
Opposed: 3  
Abstain: 11

Use slides 5-13 and 15 of parnaby_03_1109.pdf to make changes to draft 2.2  
Add two new state diagrams and modify three existing state diagrams  
Add four new variables, two timers and two counters  
Add PMA link fail signaling as describes in Slide 10

**Comment Status**: A  
**Response Status**: C  
NO ACTION REQUESTED.

In favor of proposed response: 6  
Opposed: 3  
Abstain: 11

b) allow a fast retrain process to recover from poor link quality

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

When LPI is supported, valid sets of control characters and should not trigger transitions to TX_E and subsequent transmission of the Error control block. Currently, 4/I/I/ followed by 4/I/ causes transitions to TX_E.

**Suggested Remedy**

Eliminate II from the following transitions:

- TX_INIT to TX_E
- TX_C to TX_E
- TX_E to TX_E
- TX_T to TX_E

Add II to the following transitions: (Outside of TX_L, act upon II exactly as C)

- TX_INIT to TX_C
- TX_C to TX_C
- TX_E to TX_C
- TX_T to TX_C

**Response**  
**Response Status** C  
ACCEPT.
Cl 55 SC 55.3.5.4 P 186 L 24 # 242
Brown, Matt AppliedMicro (AMCC)

Comment Type TR Comment Status A
In Figure 55-15a state TX_WE, local fault blocks are sent to indicate that the link has failed. It is previously sent only form transmit when transmit is in reset mode and from receive when receive is in reset or the input has failed (e.g., loss of block lock). A stream of local faults generates a local fault alarm at the RS and indicates that a link is failed and triggers re-calculation of routing tables at higher layers. Also, the state is wake error not wake fault :).

Normally, error characters or blocks are used to convey that an error event has occurred. In TX_WE state, send error blocks instead of local faults.

SuggestedRemedy
In TX_WE state, change "tx_coded <= LBLOCK_T" to "tx_coded <= EBLOCK_T".

On page 175, line 42, change "local fault 64B/65B blocks" to "64B/65B error blocks".

Response Response Status C
ACCEPT IN PRINCIPLE.

Delete the TX_WE state and all transitions to and from it.
Delete the transition from TX_WN to TX_E.
Change the transition condition from TX_WN to TX_C to "tx_lpi_active".
Change the transition condition from TX_L to TX_WN to "T_TYPE(tx_raw) = (C + D + E + S + T)"
Change the transition condition from TX_WN to TX_WN to "tx_lpi_active"

This simplifies the operation of the transmit state diagram.

Cl 55 SC 55.3.5.4 P 188 L 23 # 195
Parnaby, Gavin Solarflare Communicat

Comment Type TR Comment Status A
There are no means to monitor RX wake errors in the current draft. Wake errors are monitored in 1000BASE-T.

There are no means to monitor TX wake errors in the current draft.

SuggestedRemedy
Add a counter which increments in the RX_W rx wake on error condition and the management to support this counter.
Add a counter which increments in the TX_WE tx wake on error condition and the management to support this counter.

Response Response Status C
ACCEPT IN PRINCIPLE.

Add counter lpi_rxw_err_cnt
lpi_rxw_err_cnt increments in a delayless state added to the transition between RX_W and RX_E

Make terminology consistent with other PHYs

Cl 55 SC 55.3.5.4 P 189 L 23 # 194
Estes, Dave UNH - IOL

Comment Type T Comment Status A
Comment #141 was accepted but the text to define ldpc_frame_done was not added.

SuggestedRemedy
Add the text from comment #141.

Response Response Status C
ACCEPT.

Cl 55 SC 55.3.5.4 P 189 L 8 # 211
Brown, Matt AppliedMicro (AMCC)

Comment Type E Comment Status A
comparison to boolean value redundant

SuggestedRemedy
Change "tx_lpi_req=true" to "tx_lpi_req".

Response Response Status C
ACCEPT.
alert is a 4 frame signals comprised of 3.5 frame periods (7 repeats) of 128-symbol xpr_master or xpr_slave sequence followed by 0.5 frame periods (128 symbols) of zero.

**Suggested Remedy**
- Change "(3.5 LDPC ... silence)" to "(3.5 LDPC frame periods of xpr_master or xpr_slave sequence and 0.5 frame periods of zero symbols)"

**Response**
- ACCEPT IN PRINCIPLE.
- Change "(3.5 LDPC ... silence)" to "(3.5 LDPC frame periods of xpr_master or xpr_slave sequence and 0.5 frame periods of zero symbols)"

---

Last sentence refers to deleted state diagram. The functionality was moved to the PCS state diagram.

**Suggested Remedy**
- Delete sentence...
  - "The receive state ... signalling sleep."

**Response**
- ACCEPT.

---

The frequency variation should apply when changing to and from low power mode as well.

**Suggested Remedy**
- Add sentence...
  - The short-term frequency variation limit shall also apply when switching to and from LPI mode.

**Response**
- ACCEPT.
- Add add PICS item
<table>
<thead>
<tr>
<th>Comment</th>
<th>Type</th>
<th>Status</th>
<th>Comment</th>
<th>Response</th>
<th>Suggested Remedy</th>
<th>Rejected</th>
<th>Accepted</th>
<th>Written</th>
<th>Closed</th>
<th>Unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>#119</td>
<td>E</td>
<td></td>
<td>As D2.0 comment 118: P802.3ba will be adding the objective &quot;a 4 lane 40Gb/s PHY&quot;. The addition by 802.3az of &quot;Optionally support Energy Efficient Ethernet will imply that 40GBASE-KR4 will support EEE.</td>
<td></td>
<td>If you intend to mandate EEE as an option for 40GBASE-KR4, Table 69-1 will make this clear. If you don't, change &quot;Backplane Ethernet optionally supports Energy Efficient Ethernet (EEE) to reduce energy consumption.&quot; to &quot;1000BASE-KX, 10GBASE-KX4 and 10GBASE-KR optionally support Energy Efficient Ethernet (EEE) to reduce energy consumption.&quot;</td>
<td></td>
<td>ACCEPT IN PRINCIPLE. See response to comment 26.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#10118</td>
<td>E</td>
<td></td>
<td>P802.3ba will be adding the objective &quot;a 4 lane 40Gb/s PHY&quot;. The addition by 802.3az of &quot;Optionally support Energy Efficient Ethernet will imply that 40GBASE-KR4 will support EEE.</td>
<td></td>
<td>Change added objective text to &quot;Optionally support Energy Efficient Ethernet for PHYs that support MAC rates of 10 Gb/s or lower.&quot;</td>
<td></td>
<td>REJECT.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#121</td>
<td>T</td>
<td></td>
<td>As D2.0 comment 186: Clause 69 is also being amended by P802.3ba.</td>
<td></td>
<td>Show Table 69-1 as in P802.3ba (with the 40GBASE-KR4 row and extra columns) as your basis for modification.</td>
<td></td>
<td>ACCEPT IN PRINCIPLE. Will change table to match that of P802.3ba with editors note to show source.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IEEE P802.3az D2.1 Energy Efficient Ethernet comments

November 2009

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

Cl 70 SC 70.6.10 P 200 L 35 # 20

Marris, Arthur Cadence

Comment Type: E

Comment Status: A

‘responds’ should not be underlined

Suggested Remedy:
as above

Response

Response Status: C

ACCEPT.

Cl 70 SC 70.6.5 P 200 L 18 # 19

Marris, Arthur Cadence

Comment Type: E

Comment Status: A

optional should not be underlined as it is in the base document. Same problem in 70.6.4 on line 4.

Suggested Remedy:

Remove underlining from the word ‘optional’.

Also remove underlining from ‘is optional and’ on line 4.

Response

Response Status: C

ACCEPT.

Cl 71 SC 71.6.4 P 204 L 46 # 21

Marris, Arthur Cadence

Comment Type: E

Comment Status: A

Incorrect underlining

Suggested Remedy:

Remove underlining from ‘is optional and’ on line 46.

Remove underlining from the word ‘optional’ on line 7 page 205.

Response

Response Status: C

ACCEPT.

Cl 72 SC 72.10 P 214 L 5 # 170

Kasturia, Sanjay Teranetics

Comment Type: E

Comment Status: A

Change "FED" to "FEC" to fix typo.

Suggested Remedy:

Response

Response Status: C

ACCEPT.

Cl 72 SC 72.6.4 P 207 L 26 # 10189

Ganga, Ilango Intel

Comment Type: TR

Comment Status: A

Clause 72 supports digital signal detect mechanisms. Analog signal detect (or energy detect) was not part of this clause as it was felt that robust analog signal detect functions are difficult to define/implement in the backplane environment. (see thaler_01_0505.pdf, minutes_01_0505.pdf). Hence define a suitable digital signaling mechanism to exit from the low power idle state.

Suggested Remedy:

As per comment

Response

Response Status: W

ACCEPT IN PRINCIPLE.

At this point there is no clear alternative to a basic energy detect to waking up the PHY from sleep.

The receiver is just required to wake up within a certain time after detecting the electrical energy on the diff signal pair from a compliant, enabled transmitter.

The original KR signal_detect would not work for EEE because it requires that training to be complete before it could wake up the receiver. This was believed to be too long and we needed something to wake the PHY's receiver prior to that.

For EEE, the KR's transmit coefficients and receive equalization state are assumed to be saved before going quiet and quickly restored after wake so it can sync and lock much more quickly.

Changes were made to the state diagrams (see response to comment #425) to fix the observable behavior that may be caused by false detection. There is concern that the energy detect threshold level and detection circuitry could cause unnecessary activity in the receiver (due to noise and cross-talk).
Comment Type: TR  Comment Status: R
"The value of the SIGNAL_DETECT is defined by the training state diagram shown in Figure 72-5 when rx_quiet = FALSE."
Does not sound correct. The rx_quiet = FALSE happens several times when the PHY is in EEE. Change this line to
SuggestedRemedy
"The value of the SIGNAL_DETECT is defined by the training state diagram shown in Figure 72-5 when rx_lpi_active = FALSE."
Response  Response Status: C
REJECT.

There currently is no rx_lpi_active signal defined from the PMA to the KR PHY. But based on other proposals, I believe there should be.

Comment Type: E  Comment Status: A
Remove underlining from 'is' and 'optional'
SuggestedRemedy
as above
Response  Response Status: C
ACCEPT.

The variable fec_rapid_block_lock_edge "is set to TRUE to detect when fec_rapid_block_lock changes state from FALSE to TRUE." When is it set to FALSE?
Referring the FEC Lock state diagram (Figure 74-3).

1. If rx_lpi_active is TRUE and the link partner's transmission ceases during the quiet period (signal_ok), the state diagram will not transition to FEC_LOCK_INIT state. It is not clear why this transition is inhibited; perhaps to stop fec_block_lock from being set to FALSE. However, there will be repeated parity check failures corresponding to the lack of an input signal. It seems that it can be safely assumed that fec_block_lock will be set to FALSE at some point during the quiet period and held there until refresh or wake.

2. As long as fec_rapid_block_lock_edge is TRUE, the state diagram is held in the RESET_CNT state.

3. When fec_rapid_block_lock_edge transitions from TRUE to FALSE, the state diagram tests the next available block. It proceeds to check for n = 4 consecutive good parity checks before fec_block_lock is set back to TRUE.

4. The variable fec_signal_ok is defined (page 219, line 10) to be signal_ok*(fec_block_lock+fec_rapid_block_lock_edge). Therefore, this value will be set to TRUE while fec_rapid_block_lock is TRUE, and then be set to FALSE for at least n = 4 FEC blocks before being set to TRUE again.

5. This fec_signal_ok variable is communicated to the PCS via the FEC_SIGNAL.indication primitive, and used in the PCS Lock state diagram (Figure 49-12). The behavior of fec_signal_ok implies that the PCS lock diagram will first try to obtain block synchronization, and then be forced to lose it, and then try to obtain it again.

The intended behavior is unclear.
SuggestedRemedy
1. If the intent is to have the PCS begin to acquire block lock when fec_block_lock is TRUE, then it seems unnecessary to include the term "+fec_rapid_block_lock_edge" in the definition of fec_signal_ok.

2. If the intent is to have the PCS begin to acquire block lock when fec_rapid_block_lock_edge is TRUE, the perhaps to correct entry point is FEC_BLOCK_LOCK where fec_block_lock is TRUE. In this case, the term "+fec_rapid_block_lock_edge" becomes redundant in the definition of fec_signal_ok. This assumes that the fec_rapid_block_lock process reliably identifies FEC block boundaries, since erroneous alignment wouldn't be detected for at least m = 8 FEC frames.

3. In either case, it seems that the qualification of fec_signal_ok for the optional EEE capability in 74.10.2.2 is not necessary and can be removed.
4. In either case, it seems necessary to define when fec_rapid_block_lock_edge is set to FALSE. It seems that this time should be (considerably?) less than one FEC block following its time of its assertion.

Response  
Response Status  C

ACCEPT IN PRINCIPLE.

Agree with the commenter. The way fec_rapid_bloc_lock_edge is used in the state machine is not going to work correctly. The basic idea is to find the SLIP through the deterministic block and guide the FEC lock state machine to achieve fec_block_lock gracefully.

#1: Change the 2nd paragraph of 74.7.4.8 to FEC Rapid block lock mechanism will start looking for a lock on deterministic block when the rx_lpi_active is asserted and rx_quiet is deasserted. A lock on the deterministic FEC block will find the right SLIP and this SLIP is maintained as long as the decoder receives the deterministic frame.

#2: Remove the following sub clauses

74.7.4.7 FEC block synchronization
74.10.2.2 Variables
74.10.3 State diagram

Response  
Response Status  C

ACCEPT IN PRINCIPLE.

Please refer to Suggested remedy of #134

---

Comment Type  T  Comment Status  A

PICS section is empty. If EEE does not changes to this subclause, why have it at all?

SuggestedRemedy

Either fill it in or remove it ...

Response  
Response Status  C

ACCEPT IN PRINCIPLE.

Please refer to Suggested remedy of #134

---

Comment Type  TR  Comment Status  A

Add row in major capabilities table to cover EEE. Remove editor's note. Add shalls if needed in the clause text.

SuggestedRemedy

ACCEPT IN PRINCIPLE.

Please refer to Suggested remedy of #134
Add EEE to CL 74 PICS

Under 74.11.3 Major capabilities/options

Item: LPI
Feature: Rapid block lock
Subcals: 74.7.4.8
Value/Comment: Device implements Rapid block lock mechanism to support EEE.
Status: O
Support: Yes [ ] / No [ ]

ACCEPT IN PRINCIPLE.

Under 74.11.3 Major capabilities/options

Item: LPI
Feature: Rapid block lock
Subcals: 74.7.4.8
Value/Comment: Device implements Rapid block lock mechanism to support EEE.
Status: O
Support: Yes [ ] / No [ ]

ACCEPT.

In Figure 74-2...
1) There is a typ-o in the title -- "diagra" should be "diagram"
2) The figure implies that rx_lpi_active is passed from the FEC sublayer to the PMA sublayer. It is not, remove it.

Per comment.

ACCEPT.
Cl 74  SC 74.4.1  P 215  L 46  # 10
Anslow, Peter  Nortel Networks
Comment Type  E  Comment Status  A
In title of Figure 74-2 "diagra" should be "diagram"
SuggestedRemedy
Change "diagra" to "diagram"
Response  Response Status  C
ACCEPT.

Cl 74  SC 74.4.1  P 221  L 40  # 169
Koenen, David  Hewlett-Packard
Comment Type  T  Comment Status  A
rx_lpi_active is not an output of the FEC nor an input to the PMA sublayer.
SuggestedRemedy
Delete from signal name from FEC to PMA on diagram.
Response  Response Status  C
ACCEPT.

Cl 74  SC 74.5  P 214  L 12  # 10184
Ganga, Ilango  Intel
Comment Type  ER  Comment Status  A
74.5.4 should really be 74.5.1.4
74.5.5 should really be 74.5.1.5
74.5.6 should really be 74.5.1.6
74.5.7 should really be 74.5.1.7
Underline new primitive defined in item e) RX_LPI_ACTIVE
Also subclause numbering and Figure numbers for functional block diagram are incorrect.
Update the numbering as per the base spec (for example 74.0.1 should be 74.4.1 and Figure 74-1 should be Figure 74-2).
Response  Response Status  W
ACCEPT IN PRINCIPLE.

Cl 74  SC 74.5.1.4  P 216  L 37  # 27
Marris, Arthur  Cadence
Comment Type  TR  Comment Status  A
74.5.4 should really be 74.5.1.4
74.5.5 should really be 74.5.1.5
74.5.6 should really be 74.5.1.6
74.5.7 should really be 74.5.1.7
Change
Insert 74.5.1.4 through 74.5.1.7 as shown below after 74.5.3
To
Insert 74.5.1.4 through 74.5.1.7 as shown below after 74.5.1.3
Change paragraph numbering appropriately
Response  Response Status  W
ACCEPT.

Cl 74  SC 74.5.4.1  P 216  L 51  # 23
Marris, Arthur  Cadence
Comment Type  E  Comment Status  A
Change
FEC
To
The FEC
Response  Response Status  C
ACCEPT.  

TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched  A/accepted  R/rejected  RESPONSE STATUS: O/open  W/written  C/closed  U/unsatisfied  Z/withdrawn
SORT ORDER:  Clause, Subclause, page, line
Cl 74  SC 74.5.5  P216  L 38  # 158
Healey, Adam  LSI Corporation

Comment Type  ER  Comment Status  A

Subclause headings make it impossible to reference the desired subject matter from the bookmarks.

"74.5.4 Service primitive from FEC for EEE support (optional)" should be "74.5.5 FEC_ENERGY.indication (optional)"

"74.5.5 Service primitive from PCS for EEE support (optional)" should be "74.5.5 FEC_LPIACTIVE.request (optional)"

"74.5.6 Service primitive from PCS for EEE support (optional)" should be "74.5.6 FEC_RXQUIET.request (optional)"

eetc...

SuggestedRemedy
Please review the structure of the base document, as amended by P802.3ba, and be consistent with it. It would also be be nice if the primitive were defined in the same order they are listed in 74.5.1.

Response  Response Status  C
ACCEPT.
"These counters shall not count if FEC_SIGNAL.indication (RX_LPI_ACTIVE) is TRUE" - why not say that "These counters shall be disabled if ..." - sounds more natural.

Per comment

---

(1) I thought that MAC was not operated at any specific data rate. I suggest to drop "EEE supports the IEEE 802.3 MAC operation at 100 Mb/s, 1000 Mb/s, and 10 Gb/s." EEE should not care about what data rate the MAC is operating it, since it does not use MAC directly in any way. EEE does not extend MAC in any specific way.

(2) Change sentence "For operation over twisted pair cabling systems, the PHYs supported are 100BASE-TX, 1000BASE-T and 10GBASE-T. For operation over electrical backplanes, the PHYs supported are 1000BASE-KX, 10GBASE-KX4 and 10GBASE-KR." to read "For operation over twisted pair cabling systems, EEE supports the following PHYs: 100BASE-TX, 1000BASE-T and 10GBASE-T. For operation over electrical backplanes, EEE supports the following PHYs: 100BASE-KX, 10GBASE-KX4 and 10GBASE-KR."

Per comment.

---

"EEE also specifies a means to exchange capabilities between" change to "EEE also specifies means to exchange capabilities between"

Per comment

---

"LPI_IDLE.request shall not be set to ASSERT unless the attached link is operational (i.e. link_status = OK, see 28.2.6.1.1). LP_IDLE.request shall remain set to DEASSERT for 1 second following the change of link_status to OK."

to:

"The effect of receipt of this primitive is undefined if link_status is not OK (see 28.2.6.1.1) or if LPI_REQUEST=ASSERT within 1 second of the change of link_status to OK."
Comment Type: TR  Comment Status: A

Is signaling of LPI between an RS and its link partner, or between the RS and the lower parts of the PHY? If the PHY has no option to signal the request, then the language is appropriate, but it seems inconsistent with MII text describing the xMII signals. The effect of the primitive is to generate signals on the MII and that isn't specified here, but should be.

Suggested Remedy
Assure MII clause are consistent in what layer is signaling to what peer layer, and that any additional requirements on conveying the LPI request in lower sublayers is properly represented. Add generic text that covers the three MII types - how the assert or deassert is signaled, can probably be generic using the MII definition of assert low power idle.

Response
ACCEPT IN PRINCIPLE.

The PHY has no option to signal the request so the language is appropriate however editor will look into adding clarifying text as in the suggested remedy.

Comments

Comment Type: T  Comment Status: A

"xMII interface in this diagram represents any of the family of medium independent interfaces supported by EEE" and which are those in particular? Since there is already such an introduction, you are invited to provide details what types of xMII are supported. IMHO it would improve transparency of the description.

Suggested Remedy
Per comment

Response
REJECT.

It is not clear to the editor that listing the xMII interfaces adds any significant clarity.
Comment Type: TR  Comment Status: A  sleep signal

"At the start of 'assert LPI' encoding on the xMII, the PHY signals sleep" should read "When the start of 'assert LPI' encoding on the xMII is detected, the PHY signals "

I am not sure what 'signal sleep' really means. Is it a special code-group or something else altogether? The sentence reads just fine without it. This term 'sleep' is also used in following sentences without ever defining what this is and what it is used for. Please remove it consistently or define altogether what this 'sleep' is, how it is transmitted etc. Otherwise it seems like a poor description of transmission of LPI encoding onto the other side of the link.

Suggested Remedy
Per comment

Response  Response Status: C
ACCEPT IN PRINCIPLE.

Change:
"At the start of 'assert LPI' encoding on the xMII, the PHY signals sleep" to:
"When the start of 'assert LPI' encoding on the xMII is detected, the PHY signals sleep"

The sleep signal is PHY specific and described in the PHY clauses.

Comment Type: TR  Comment Status: A  sleep signal

"and 10GBASE-KX4) requires the transmit function of the local PHY to enter a quiet mode after sleep is" OK so now we have 'sleep mode', 'quiet mode' and 'low power mode' - are they the same or not? I have not seen a single definition of either of them so far so it is hard to tell. Please make nomenclature uniform or define each and every single of these terms which are used to describe operation of LPI system elements.

Suggested Remedy
Per comment

Response  Response Status: C
ACCEPT IN PRINCIPLE.

"sleep mode" is not used in the draft.  

"quiet mode" is used in two places - Page 226 lines 19 and 32.

Replace:
"...the transmit function of the local PHY enters a quiet mode..." with:
"...the local PHY transmitter goes quiet..."
on Page 226, lines 29 and 32 and any other place.

"quiet" refers to the state of a transmitter.

Depending on the PHY, LPI mode can involve a repeating sequence of sleep and refresh states. It is defined in clause 1 on page 14 and does not need to be redefined in Clause 78.

Response  Response Status: C
ACCEPT.

Comment Type: E
Comment Status: A

I don’t see the value in calling the wake signal "special"

Suggested Remedy
delete "special"

Response  Response Status: C
ACCEPT.
<table>
<thead>
<tr>
<th>Type</th>
<th>Comment Status</th>
<th>Comment Type</th>
<th>Comment</th>
<th>Suggested Remedy</th>
<th>Response Status</th>
<th>Comment Status</th>
<th>Response Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR</td>
<td>A</td>
<td>T</td>
<td>&quot;The PHY then enters the normal operating state where data is transmitted or IDLEs are transmitted&quot; why do we need to mention what is transmitted in a normal state? Just change that sentence to read &quot;The PHY then enters the normal operating state.&quot;</td>
<td>Per comment</td>
<td>ACCEPT.</td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td>TR</td>
<td>R</td>
<td>TR/technical</td>
<td>&quot;Figure 78-3 illustrates general principles of the EEE-capable transmitter operation.&quot; to read &quot;Figure 78-3 illustrates a general operating principle of an EEE-capable transmitter.&quot;</td>
<td>Per comment</td>
<td>REJECT.</td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td>TR</td>
<td>A</td>
<td>T</td>
<td>Change caption of Figure 78-3 to read &quot;EEE operating cycle: active state - LPI mode - active state&quot;</td>
<td>Per comment</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td>T</td>
<td>A</td>
<td>T</td>
<td>The description seems accurate as is. Stating that disabling functionality requires disabling of some functional blocks makes an assumption on implementation that is unnecessary. Capitalize the &quot;A&quot; in &quot;assert&quot; through out the draft to be consistent with the rest of the draft.</td>
<td>Per comment</td>
<td>ACCEPT IN PRINCIPLE.</td>
<td>A</td>
<td>C</td>
</tr>
</tbody>
</table>
EEE defines a low power mode of operation for the following 802.3 PHYs. Table 78-1 lists the clauses associated with each PHY.

The existing table title seems adequate.

Change the heading of the first column from "Nomenclature" to "PHY type"
Comment Type: TR  Comment Status: A
Tw_sys is not a valid parameter name described in 78.2-LPI mode timing parameters description. Instead, it is Tw_sys_tx which should be the only parameter negotiated between link partners by EEE LLDP.

This comment will affect the entire text of 78.4. It also affects Figure 78.4-EEE DLL Transmitter State Diagram, and Figure 78.5-EEE DLL Receiver State Diagram.

Suggested Remedy:
Replace Tw_sys with Tw_sys_tx in the entire subclause 78.4.

The commenter is correct in that the terminology was not updated to align with the one decided by the wake-shrinkage ad-hoc.

Response: 
ACCEPT.

Comment Type: TR  Comment Status: A
separate terms tx_dll_enable, tx_dll_ready and rx_dll_enable, rx_dll_ready are not necessary.

Comment:- The TX and RX state machines uses the above conditions as an entry/exit point to the states. It is noted that both TX and RX state machine works on the transmission and reception of EEE TLV's and both conditions are need to be considered while entering/exitng to each of the state machine.

Suggested Remedy:
Search and Replace tx_dll_enable and rx_dll_enable with dll_enable and clean up tables to reflect proper definition.

Search and Replace tx_dll_ready and rx_dll_ready with dll_ready and clean up tables to reflect proper definition.

Response: 
REJECT.

The comment requests a simplification to the current scheme but the current scheme is not broken. Implementing the suggested remedy would result in considerable changes to the section and could introduce errors for a very marginal benefit.
**Comment Type:** TR  **Comment Status:** A

The two exit conditions of the TX UPDATE state in Figure 78-4 "EEE DLL Transmitter State Diagram" should be swapped.

That means the branch from TX UPDATE with conditions
"(NEW_TX_VALUE < LocResolvedTxSystemValue) * (NEW_TX_VALUE < TempRxVar)" goes to MIRROR UPDATE state, while the branch with conditions
"(NEW_TX_VALUE >= LocResolvedTxSystemValue) + (NEW_TX_VALUE >= TempRxVar)" goes to SYSTEM REALLOCATION state.

**Suggested Remedy**

Per comment

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

**ACCEPT.**

### Comment

**Cl 78  SC 78.4.2.5  P 234  L 28  # 112**

**CHOU, JOSEPH  REALTEK SEMICOND**

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

The figure number of "Figure 78-4 EEE DLL Transmitter State Diagram" duplicates with that of "Figure 78-4 LPI mode timing parameters and their relationship to minimum system wake time".

**Suggested Remedy**

Change the figure number of "Figure 78-4 EEE DLL Transmitter State Diagram" to 78-5 and make the correspondent change on all the subsequent figures.

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

**ACCEPT.**
<table>
<thead>
<tr>
<th>Cl 79</th>
<th>SC 79</th>
<th>P 239</th>
<th>L 1</th>
<th># 12</th>
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<td>Anslow, Peter</td>
<td>Nortel Networks</td>
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**Comment Type** E  **Comment Status** A
The format of the clause title for clause 79 is still incorrect. As pointed out in comment 14 against draft 2.0 there should be a "." after the "79"

**Suggested Remedy**
change "79 IEEE" to "79. IEEE"

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

Seems to be a Framemaker issue. Editors will check pdf to see if the fix worked.

<table>
<thead>
<tr>
<th>Cl 79</th>
<th>SC 79.3</th>
<th>P 239</th>
<th>L 19</th>
<th># 97</th>
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<td>ZTE Corporation</td>
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**Comment Type** TR  **Comment Status** A
IEEE 802.3 subtype for EEE is not yet assigned. This comment serves as a reminder to get the IEEE 802.3 subtype for EEE TLVs.

**Suggested Remedy**
Per comment

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

This will be assigned by the IEEE 802.3 WG Chair or his designee at the IEEE-SA Sponsor Ballot stage.

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**Comment Type** E  **Comment Status** A
The response to comment 15 against draft 2.0 has not been implemented. The heading numbers are still incorrect

**Suggested Remedy**
Change from

| 79.3.a | 79.3.0.1 | 79.3.0.2 | 79.3.0.3 | 79.3.0.4 |
| 79.3.a | 79.3.a.1 | 79.3.a.2 | 79.3.a.3 | 79.3.a.4 |

to

| 79.3.a | 79.3.a.1 | 79.3.a.2 | 79.3.a.3 | 79.3.a.4 |

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

Will check this editorially at all steps of producing the next version draft.