In many of the state machine figures, new transition criteria include comparison of boolean variable with boolean value (e.g., energy_detect = FALSE). This comparison is redundant and is inconsistent in style.

**Suggested Remedy**

Replace all instances in draft as follows:

- `<boolean_variable> = TRUE` with `<boolean_variable>`
- `<boolean_variable> = FALSE` with `!<boolean_variable>`

**Response**

ACCEPT IN PRINCIPLE.

Recommended change will be made where it does not, by itself, cause a change in the base text of the draft.

In places where this would create a change in the base text that is not required by the objectives of this task force, i.e., it is a service to humanity, the editors will use their discretion.

---

Except for Clause 40 it is nowhere explicitly written how the sequencing of the Next-Pages required to advertise the EEE capability is ordered. For instance the Clause 24/25 mode naturally does not require any Next-Page for Capability exchange but for EEE it does. So it is expected that the EEE pages are the first Next-Pages to be sent before any Software-Next-Page is about to be sent - similar and consistently to how it is defined in Annex 40C for the Gigabit Ethernet or Clause 55.6.1.2 Capability Next-Pages.

**Suggested Remedy**

At least do the following:

- Add a paragraph for clause 24/25 which defines the EEE pages to be the first
- Add information to 55.6.1 which defines the NP-sequence

**Proposed Response**

REJECT.

This comment was WITHDRAWN by the commenter.

---

Clarification of the ordering of next pages is a general issue that should be addressed globally in working group ballot.
<table>
<thead>
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<th>Cl</th>
<th>SC</th>
<th>P</th>
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<td>31</td>
<td>34</td>
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<td>A</td>
<td>C</td>
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<td>A</td>
<td>Grimwood, Michael</td>
<td>Broadcom</td>
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<td>A</td>
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Comment Type: T/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Response Status: O/open  W/written  C/closed  U/unsatisfied  Z/withdrawn  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

To achieve consistency with related comments submitted against Clauses 35 and 46, change link_status from READY to OK. Clauses 40 and 55 and the associated link monitors do not have a "READY" state in their link monitor functions nor do they specify READY as an allowable value for link_status.

Suggested Remedy
Change:

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

To:

LPI_IDLE.request shall not be set to ASSERT unless the attached link is operational (i.e. link_status = OK, see 24.3.3.2). LP_IDLE.request shall remain to be set to DEASSERT for 1 second following link_status changing state to OK.

Response  Response Status: C

ACCEPT IN PRINCIPLE.

The commenter is correct that "link_status = OK" indicates that the link is operational not "link_status = READY" (which indicates that the autoneg has resolved and the link may be enabled). However, the definition of link_status from 28.2.6.1.1 must be used because it comes from the autonegotiation function and this clause is defining the RS behavior (not the PCS/PMA).

Therefore change "link_status = READY" to "link_status = OK" - 2 instances.

The text: "the PHY enters the low power idle mode during periods of low link utilization." is, shall we say, mysterious. There is no "low link utilization" signal available within the PCS/PMA.

Suggested Remedy
It would be more appropriate to say something like that the transmitter, and in turn the linked receiver transition into low power mode in response to a command sent across the MII that is expected when the transmitting station is expecting low link utilization.

Response  Response Status: C

ACCEPT IN PRINCIPLE.

Change the second sentence of the paragraph starting on line 8 to read:

When a transmitting station does not need the full bandwidth of a link with this capability, the LPI agent can put the local PHY transmitter and the link partner's receiver into low power idle mode to conserve energy.

For 100BASE-TX EEE, require that jitter specifications be met during low-power operation.

Suggested Remedy
In subclause 25.4.5, after the sentence, "The jitter measurement specified in 9.1.9 of TP-PMD may be performed using scrambled IDLEs.", add the following:

During Low Power operation, jitter shall be measured using scrambled SLEEP code groups transmitted during the TX_SLEEP state. Total transmit jitter with respect to a continuous unjittered reference shall not exceed 1.4 ns peak-to-peak with the exception that the jitter contributions from the clock transitions occurring during TXQUIET and the first 5 usec of TX_SLEEP are ignored. The jitter measurement time period shall be not less than 100 msec and not greater than 1 second.

Response  Response Status: C

ACCEPT.
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
Add text to clarify.

ACCEPT IN PRINCIPLE.

Change the "BEHAVIOUR" definition to:

A read-only list of the possible PHY types for which the underlying system could support Energy Efficient Ethernet as defined in Clause 78. If Clause 28 or Clause 73 Auto-Negotiation is present, then this attribute will map to the local technology ability or advertised ability of the local device.

Minor editorial change: replace semicolon with comma in list of "during the assertion of low power idle; carrier extend or carrier extend error code-groups." Semicolon is not appropriate in this context.

Suggested Remedy
Replace semicolon with comma. It should read "during the assertion of low power idle, Carrier Extend or Carrier Extend Error code-groups."

ACCEPT IN PRINCIPLE.

Also change spelling to "assertion"
During the adhoc/meetings, the decision was to have the wake timer to be for 1ms. But in the draft is point to TWR, which is only 10-11uSec. The purpose of this timer is to give the receiver a chance to gracefully recover from a wake time fault.

**Suggested Remedy**

Add a row to Table 36-3b for Twtf and assign 1ms. In fact replace the TDA row for this.

**Comment Status** A

**Response** ACCEPT IN PRINCIPLE.

Change definition of rx_wf_timer:

"The timer terminal count is set to Twr" to "The timer terminal count is set to Twtf"

Replace last row of Table 36-3b with:

<table>
<thead>
<tr>
<th>Twtf</th>
<th>Wake time fault recovery time</th>
<th>1mS</th>
</tr>
</thead>
</table>

**Comment Type** TR

**Comment Status** A

Wake_error_counter needs to be added to the counter section

**Suggested Remedy**

Add the description and link to the Register

**Response** ACCEPT IN PRINCIPLE.

Add wake error counter (identical to 49.2.13.2.2).

**Comment Type** ER

**Comment Status** A

Figure references wrong

**Suggested Remedy**

Change "Figures 36-1 and 36-2" to "figures 36-5 and 36-6" (with active links).

**Response** ACCEPT.

Also, P.74, change figure title to "Figure 36-5"
The "loop" transitions for states TX_SLEEP, TX_QUIET and TX_REFRESH are all invalid because they would cause the timers to keep restarting (even if they didn't, they would be redundant since the state machine remains in the state unless an exit is valid.

**Suggested Remedy**
Delete the "loop" transitions for states TX_SLEEP, TX_QUIET and TX_REFRESH.

**Response**
ACCEPT.

---

When detect_idle or detect_lpidle is asserted, the next ordered set to be received is an LPI, which is \( K28.5/D6.5 \) or \( K28.5/D26.4 \). Then after \( K28.5 \) is received, detect_idle would be asserted using the definition from section 36.2.5.1.3 and the state would transition to RX_ACTIVE. When \( D6.5 \) or \( D26.4 \) is received then detect_lpidle is asserted, thus transitioning back to RX_SLEEP from RX_ACTIVE. This means, as long as the LPI ordered set is received then the state transitions back and forth between RX_ACTIVE and RX_SLEEP and that is clearly not the intended behavior.

**Suggested Remedy**
To avoid toggling back and forth, while in RX_SLEEP active, detect_idle should be sampled only for every other code word. This way when an ordered set \( K28.5/<\text{some code word}> \) is received, then detect_idle or detect_lpidle will go high appropriately after decoding \(<\text{some code word}> \). One possible way to do this is to split RX_SLEEP into two states RX_SLEEP_1 and RX_SLEEP_2, both having the same functionality of the existing RX_SLEEP state.

When detect_lpidle is asserted, RX_ACTIVE/RX_WAKE/RX_WTF would transition into RX_SLEEP_1 state and as long as detect_lpidle is asserted state would always be RX_SLEEP_1. While in RX_SLEEP_1, detect_idle would transition to RX_SLEEP_2 state. If current state is RX_SLEEP_2 and detect_idle is asserted, then state transitions to RX_ACTIVE else if detect_lpidle is asserted then state transitions to RX_SLEEP_1. If signal_detect fails while either in state RX_SLEEP_1 or RX_SLEEP_2 then state transitions to RX_QUIET.

**Response**
ACCEPT IN PRINCIPLE.

The commenter has correctly identified the behavior problem.

The same can be achieved by including the term "* ODD" (qualifying detect_idle) in the exit conditions for RX_SLEEP; RX_WAKE and RX_WTF.
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<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>TR</td>
<td>A</td>
<td>C</td>
<td>The variable rx_lpi_fail is not used any more. Hence remove rx_lpi_fail = TRUE condition to enter LINK_FAILED. Implement the suggested remedy and also delete definition for rx_lpi_fail and assignment in state RX_ACTIVE (fig 36-9b).</td>
</tr>
<tr>
<td>TR</td>
<td>A</td>
<td>C</td>
<td>Transition from LPI_K to IDLE_D is not checking EVEN boundary. Change the transition condition to detect_idle * rx_lpi_active =FALSE * !EVEN. Use &quot;ODD&quot; instead of &quot;EVEN&quot; in the suggested remedy.</td>
</tr>
<tr>
<td>ER</td>
<td>A</td>
<td>C</td>
<td>Arc from RX_WTF to RX_SLEEP has !rx_tw_timer_done it should be rx_wf_timer_done. Both this arc and the arc from RX_WTF to RX_ACTIVE need to be changed.</td>
</tr>
<tr>
<td>TR</td>
<td>R</td>
<td>C</td>
<td>Transition out of RX_ACTIVE back to itself has a condition sync_status!=code_sync_status. But sync_status latches code_sync_status inside RX_ACTIVE. Hence this transition condition is meaning less. Instead of the above, please use code_sync_status = FAIL. Suggested remedy does not work. This topic will be added to the agenda for the July meeting. Comments 10, 25 &amp; 36 bring up the same issue in clauses 36, 48 and 49 respectively.</td>
</tr>
</tbody>
</table>
Table 36-3b

Comment Type: ER  Comment Status: A

There is a row for Tda. But there is no debounce state, hence no need for this timer value.

Suggested Remedy:
Remove the entire row.

Response: Response Status: C
ACCEPT.

Comment Type: E  Comment Status: A

In the main 802.3 document, the cext_errn definition is before the Sdn[1] definition. When the cext_errn definition change was added back to this document in D1.3, it was inadvertently placed after the Sdn[1] definition.

Suggested Remedy:
Swap cext_errn and Sdn[1] definition changes.

Response: Response Status: C
ACCEPT.

Comment Type: TR  Comment Status: A

The states "WAIT_SILENT, QUIET, WAKE, and WAKE_SILENT" are listed with "WAIT_SILENT" in the list twice. I believe the first instance was intended to be "WAIT_QUIET".

Suggested Remedy:
Change list to "WAIT_QUIET, QUIET, WAKE, and WAKE_SILENT".

Response: Response Status: C
ACCEPT.
Comment responses

IEEE P802.3az D1.4 Energy Efficient Ethernet comments

June 2009

Cl 46 SC 46.5a P 124 L 34 # 111
Grimwood, Michael
Broadcom

Comment Type T Comment Status A
A one second timer for LP_IDLE.request assertion was applied to Clause 22 but not globally to all PHYs since only Clause 22 defines LP_IDLE.request.

Suggested Remedy
As has been done in 22.7a, add a section 46.5a entitled "LPI messages". Modify that section for XGMII compatibility.
In this new section, add the following requirement to the definition of LP_IDLE.request:

LP_IDLE.request shall not be set to ASSERT unless the attached link is operational (i.e. link_status = OK, see 55.4.5.1). LP_IDLE.request shall remain to be set to DEASSERT for 1 second following link_status changing state to OK.

Response Response Status C
ACCEPT IN PRINCIPLE.
This should be added in 46.1.7 (where the rest of the mapping changes are described).

Add after "This behavior and restrictions are the same as described in 22.7a, with the details of the signaling described in 46.3."

"LP_IDLE.request shall not be set to ASSERT unless the attached link is operational (i.e. link_status = OK, according to the underlying PCS/PMA). LP_IDLE.request shall remain to be set to DEASSERT for 1 second following link_status changing state to OK."

Cl 48 SC 48.2.3 P 126 L 30 # 49
Brown, Matt
AMCC

Comment Type ER Comment Status A
The diagram shows XGMII and PCS encoding spanning all LPI states but labels only the WAKE cycle.

Suggested Remedy
Label columns 1-2 and 16-18 as active time.
Label columns 3 to 15 as LPI time.
Label columns 3 to 9 and LPI sleep/quiet/refresh time.

Response Response Status C
ACCEPT.
The spec mentions that on receive, all ||I|| received during idle are translated to XGMII Idle control characters for transmission over the XGMII. All other ||I|| received during idle are mapped directly to XGMII data or control characters on a lane by lane basis, with the exception of /D20.5/ (Low Power Idle) being detected in any row and the rest of the rows in the same column being detected /K/ only or /R/ only, which will result in reporting LP_IDLE in all lanes.

This implies that ||A|| is always translated to normal XGMII Idle characters, even if the previous column was a low power idle stripe (/D20.5/ in one row and /K/ or /R/ in all other rows). Is this the intention? This would make the received XGMII sequence quite different from the link partner's transmitted XGMII, and complicate the detection of LPI in the MAC. I think the received ||A|| that is part of a stream of low power stripes of idles should be translated to LPI as well.

**Suggested Remedy**

Change the spec to:

Whenever sync_status=OK, all ||I|| received during idle are translated to XGMII Idle control characters for transmission over the XGMII. All other ||I|| received during idle are mapped directly to XGMII data or control characters on a lane by lane basis, with the following exceptions:

1. /D20.5/ (Low Power Idle) being detected in any row and the rest of the rows in the same column being detected /K/ only or /R/ only, which will result in reporting LP_IDLE in all lanes.
2. ||A|| being detected AND /D20.5/ (Low Power Idle) being detected in any of the previous column and the rest of the rows in the previous column being detected /K/ only or /R/ only, which will result in reporting LP_IDLE in all lanes.

**Response**

ACCEPT.

---

Clarify that this means LP_IDLE characters.

**Suggested Remedy**

Change LP_IDLE to LP_IDLE characters.

**Response**

ACCEPT IN PRINCIPLE.

Because Low Power Idle is defined as a case of IDLE, the same rules described in 48.2.4.2.3 still apply. This can be made clearer to the reader.

Add the following sentence at the end of the paragraph on line 38 of page 128:

Clock compensation may be performed during Low Power Idle according to the rules described in 48.2.4.2.3.
### IEEE P802.3az D1.4 Energy Efficient Ethernet comments

**Comment responses June 2009**

<table>
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<td>128</td>
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<td>This is not an &quot;alias&quot;. [LPIDLE] is not the same as [I].</td>
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<td>Change definition of [LPIDLE] to ... &quot;Low power idle ordered sets are a special case of Idle ordered sets [I] transmitted during low power idle mode as described in 48.2.4.2.&quot;</td>
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<td>Alternately, make changes suggested for 48.2.4.2 and delete this definition altogether.</td>
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<td>What is an &quot;enumerated variable&quot;?</td>
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<td>Change &quot;enumerator&quot; to &quot;boolean&quot;.</td>
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<td>When rx_lpi_active is FALSE it may not be &quot;capable of receiving data&quot; as there may be an input fault.</td>
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<td>Change &quot;capable of receiving data&quot; to &quot;is not in the LPI mode&quot;.</td>
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<td>Change &quot;when it is in an active state and capable of receiving data&quot; to &quot;when it is in an active state and is not restricted by the LPI receive state machine&quot;</td>
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<td>Rx_lpi_fail also indicates that the link has failed during LPI.</td>
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<td>Append the sentence with &quot;or if the link has otherwise failed&quot;.</td>
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<td>Append the sentence with &quot;or if the link has otherwise failed during LPI&quot;.</td>
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</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

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6/11/2009 3:15:46 PM
Comment responses

Cl 48 SC 48.2.6.1.3 P 129 L 6 # 55
Brown, Matt AMCC

Comment Type T Comment Status A
deskew_align_status is the same as align_status used to be not as it is. Need to adopt old align_status definition for deskew_align_status and re-define align_status.

Suggested Remedy
Delete current definition of deskew_align_status.
Pull in definition from 802.3-2008 for align status and rename from "align_status" to "deskew_align_status".

deskew_align_status
A parameter set by the PCS Deskew process to reflect the status of the ane-to-lane code-group alignment.
Values:
FAIL: The deskew process is not complete.
OK: All lanes are synchronized and aligned.
Re-define align status as follows ...
align_status
Variable equivalent to deskew_align_status when not in LPI mode. During LPI mode align_status is overridden by the LPI receive state machine as specified in Table 48-9.

Response Response Status C
ACCEPT IN PRINCIPLE.
Add a note as shown below to the definition of align_status:

NOTE: If the optional low power idle function is implemented, then this variable is affected by the LPI receive state machine

Delete the second and third sentence of the paragraph starting on page 129, line 5 and the copy the values definition from align_status.

Make a similar change to clause 36 and clause 49.

Cl 48 SC 48.2.6.1.3 P 129 L 25 # 55
Pillai, Velu Broadcom

Comment Type ER Comment Status A
Cl 48 SC 48.2.6.1.5 P 129 L 26 # 61
Brown, Matt AMCC

Comment Type T Comment Status A
LPI_fail_timer is no longer used in this section.

Suggested Remedy
Delete LPI_fail_timer and description.

Response Response Status C
ACCEPT.

Cl 48 SC 48.2.6.1.5 P 129 L 29 # 62
Pillai, Velu Broadcom

Comment Type ER Comment Status A
Rx_deact_timer is no longer used

Suggested Remedy
Remove the timer

Response Response Status C
ACCEPT.

Cl 48 SC 48.2.6.1.5 P 129 L 31 # 62
Brown, Matt AMCC

Comment Type T Comment Status A
rx_deact_time is no longer used in this section.

Suggested Remedy
Delete rx_deact_time and description.

Response Response Status C
ACCEPT.
During the adhoc/meetings, the decision was to have the wake timer to be for 1ms. But in the draft is point to TWR, which is only 8-9uSec. The purpose of this timer is to give the receiver a chance to gracefully recover from a wake time fault.

**Suggested Remedy**
Add a row to Table 48-10 for Twtf and assign 1ms. In fact replace the TDA row for this.

**Response**

Accept in Principle.

Change definition of rx_wf_timer:
"The timer terminal count is set to Twr" to "The timer terminal count is set to Twtf"

Replace last row of Table 48-10 with:

| Twtf | Wake time fault recovery time | 1mS

---

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

The tx_tr_timer is part of the PCS LPI transmit state machine not PMD receiver.

**Suggested Remedy**
Change "PMD's receiver enters the TX_REFRESH state" to "LPI transmit state machine enters the TX_REFRESH state".

**Response**

Accept in Principle.

See response to comment #63

---

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

The tx_tq_timer is part of the PCS LPI transmit state machine not PMD receiver.

**Suggested Remedy**
Change "PMD's receiver enters the TX_QUIET state" to "LPI transmit state machine enters the TX_QUIET state".

**Response**

Accept in Principle.

The same typo is in the definitions for tx_ts_timer, tx_tq_timer, and tx_tr_timer. Change the 3 instances of "receiver" to "transmitter."

---

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

The tx_tq_timer is part of the PCS LPI transmit state machine not PMD receiver.

**Suggested Remedy**
Delete current description and replace with the following:
"A boolean signal sent by the PCS to the PMD to indicate, when the value is TRUE, that the PMD may power down non-essential functions. The value of PMD_RXQUIET.request(rx_quiet) is equal to the rx_quiet variable as set in the LPI receive state machine.

**Response**

Accept in Principle.

The current definition is adequate and there was no consensus to change to the suggested remedy however it could potentially be improved and commentor is invited to suggest better alternatives.

Change "PCS/PMA" to "PCS" on lines 19 and 22 of page 130
PMD_TXQUIET.request(tx_quiet) description not correct.

Suggested Remedy:
Delete current description and replace with the following:
"A boolean signal sent by the PCS to the PMD to indicate when the value is TRUE that the PMD must disable the driver output and may power down non-essential functions. The value of PMD_TXQUIET.request(tx_quiet) is equal to the rx_quiet variable as set in the LPI receive state machine."

Response: ACCEPT IN PRINCIPLE.

See response to comment 65.

Brown, Matt AMCC

Comment Type: T
Comment Status: A

The "loop" transitions for states TX_SLEEP, TX_QUIET and TX_REFRESH are all invalid because they would cause the timers to keep restarting (even if they didn't, they would be redundant since the state machine remains in the state unless an exit is valid.

Suggested Remedy:
Delete the "loop" transitions for states TX_SLEEP, TX_QUIET and TX_REFRESH.

Response: ACCEPT.

Brown, Matt AMCC

Comment Type: T
Comment Status: R

In the notes at the bottom of Figure 48-6, /D20.5/ is replaced in one row not column.

Suggested Remedy:
Replace "one column is replaced" with "one row is replaced".

Response: ACCEPT.

Brown, Matt AMCC

Comment Type: ER
Comment Status: A

Redundant and out of style to equate variable to Boolean value.

Suggested Remedy:
Change "reset=TRUE" to "reset"

Response: ACCEPT.

Brown, Matt AMCC

Comment Type: ER
Comment Status: A

Redundant and out of style to equate variable to Boolean value.
Comment responses

IEEE P802.3az D1.4 Energy Efficient Ethernet comments

June 2009

---

Cl 48 SC 48.2.6.2.5 P 135 L 10 # 70
Brown, Matt AMCC

Comment Type T Comment Status A

In Figure 48-9b, in the transition from RX_ACTIVE state to itself the condition ||IDLE|| is unnecessary since the only purpose for this transition appears to be to keep align_status up to date.

Suggested Remedy

Change "||IDLE|| + align_status != deskew_align_status" to "align_status != deskew_align_status".

Perhaps the intent was the following...
"||LPIDLE|| * align_status != deskew_align_status"

Response Response Status C

ACCEPT IN PRINCIPLE.

Change "||IDLE|| + align_status != deskew_align_status" to "align_status != deskew_align_status".

Add the term "*align_status=deskew_align_status" to the transition from RX_ACTIVE to RX_SLEEP.

Make the equivalent changes to clauses 36 and 49.

---

Cl 48 SC 48.2.6.2.5 P 135 L 16 # 71
Brown, Matt AMCC

Comment Type E Comment Status A

In Figure 48-9b, there are two instances of ||IDLE|| where the right-hand bars appear to be "II" (two "I"s) not "[]" (two bars).

Suggested Remedy

Replace ||IDLE|| with ||IDLE||.

Response Response Status C

ACCEPT.

---

Cl 48 SC 48.2.6.2.5 P 135 L 26 # 72
Brown, Matt AMCC

Comment Type TR Comment Status R

In Figure 48-9b, the transition from RX_WAKE to RX_QUIET when signal_detect=FAIL could be an endless loop in realistic failure conditions such as link partner driver soft failing where the signal level on the link is sporadic. The problem is caused by the timer being continually reset.

Suggested Remedy

The suggested remedy is to create a new state that prevents the timer from being reset every time a false wake or refresh is detected.

Create a new state between RX_SLEEP and RX_QUIET.
Call the new state RX_QUIET_INIT (or other suitable name).
The transition criteria from RX_SLEEP to RX_QUIET_INIT will be "signal_detect=fail". Within RX_QUIET_INIT state include the following action:
"Start rx_tw_timer"
The transition criteria from "RX_QUIET_INIT to "RX_QUIET" is UCT (unconditional transition).
In RX_QUIET state delete Start rx_tq_timer. (This is the key to letting the timer run.)

As a result, regardless of how many transitions occur between RX_QUIET and RX_WAKE or RX_WTF due to sporadic energy, the rx_tq_timer will time out and an fault will be detected.

Response Response Status C

REJECT.

The commentor has identified a problem with the state machine. This will be addressed in the July meeting.

---

TYPE: TR/technical required ER/editorial required GR/general required T/technical E/editorial G/general
COMMENT STATUS: D/dispatched A/accepted R/rejected RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn
SORT ORDER: Clause, Subclause, page, line
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</table>
Cl 48  SC 135  L 43  # 17
Pillai, Velu  Broadcom

Comment Type  ER  Comment Status  A
Arc from RX_WTF to RX_LINK_FAIL should have !rx_wf_timer_done instead of rx_tw_timer_done.

SuggestedRemedy

Response  Response Status  C
ACCEPT IN PRINCIPLE.

Arc from RX_WTF to RX_LINK_FAIL is OK, however:
Arc from RX_WTF to RX_ACTIVE should have !rx_wf_timer_done instead of !rx_tw_timer_done.

Cl 48  SC 135  L 5  # 19
Pillai, Velu  Broadcom

Comment Type  TR  Comment Status  A
RX_ACTIVE state should set rx_quiet <= FALSE

SuggestedRemedy

Response  Response Status  C
ACCEPT. See response to 75

Cl 48  SC 135  L 10  # 25
Pillai, Velu  Broadcom

Comment Type  TR  Comment Status  R
Transition out of RX_ACTIVE back to itself has a condition align_status!=deskew_align_status. But align_status latches deskew_align_status inside RX_ACTIVE. Hence this transition condition is meaning less.

SuggestedRemedy

Instead of the above, please use deskew_align_status = FAIL

Response  Response Status  C
REJECT.

Suggested remedy does not work.
This topic will be added to the agenda for the July meeting.

Comments 10, 25 & 36 bring up the same issue in clauses 36, 48 and 49 respectively

Cl 48  SC 135  L 45  # 18
Pillai, Velu  Broadcom

Comment Type  TR  Comment Status  A
Arc from RX_WTF to RX_ACTIVE should be !||LPIDLE||  instead of ||IDLE||. Any recovery from RX_WTF is not guaranteed to be receiving idle codewords.

SuggestedRemedy

Response  Response Status  C
ACCEPT.

Cl 48  SC 135  L 18  # 23
Pillai, Velu  Broadcom

Comment Type  ER  Comment Status  A
There is a row for Tda. But there is no debounce state, hence no need for this timer value

SuggestedRemedy

Response  Response Status  C
ACCEPT.
Comment responses

IEEE P802.3az D1.4 Energy Efficient Ethernet comments

June 2009

Comment Type T  Comment Status A
What is an "enumerated variable"?
SuggestedRemedy
Change "enumerated" to "boolean".
Response Response Status C
ACCEPT.

Comment Type ER  Comment Status R
Signal from PMA is signal_detect not energy_detect.
SuggestedRemedy
Change energy_detect to signal_detect.
Response Response Status C
REJECT.
The signal is, indeed, called energy_detect - see 51.8a.1 for definition.

Comment Type T  Comment Status R
The energy_detect variable is derived from the message
PMA_SIGNAL.indication(signal_detect). Define it as such.
SuggestedRemedy
Replace definition for energy_detect with ...
"A boolean variable that indicates when energy is detected at the receiver. Set to TRUE if
PMA_SIGNAL.indication(signal_detect) = OK or FALSE if
PMA_SIGNAL.indication(signal_detect) = FAIL."
Response Response Status C
REJECT.
See 51.8a.1

Comment Type ER  Comment Status A
Clarify rx_quiet definition.
SuggestedRemedy
Change "while in the RX_QUIET state" to "while the reciever is in the RX_QUIET state".
Response Response Status C
ACCEPT.

Response Response Status C
ACCEPT.

Comment Type T  Comment Status A
Clarify scrambler_reset definition.
SuggestedRemedy
Change "this variable is used" to "the boolean variable is used".
Response Response Status C
ACCEPT.
Comment responses

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<tr>
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<th>SC</th>
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<th>Comment Status</th>
<th>Suggested Remedy</th>
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<td>T</td>
<td>A</td>
<td>LI is by definition here not a special case of C type, rather its a type on its own.</td>
<td>ACCEPT.</td>
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</table>

Response: Brown, Matt AMCC

Comment Type | Comment Status | Suggested Remedy | Response |
-------------|----------------|------------------|----------|
TR | A | A new T_BLOCK_TYPE of LI has been introduced for use in Figure 49-14. However the text description of this block is incorrect as it describes the input vector as if it were a 65B block. The 72-bit tx_raw vector has no data/ctrl header or block type field. | ACCEPT. |
ER | A | LI is by definition here not a special case of C type, rather its a type on its own. | ACCEPT. |

Response: McClellan, Brett Solarflare
During the adhoc/meetings, the decision was to have the wake timer to be for 1ms. But in the draft is point to TWR, which is only 11-12uSec (13-14uSec if FEC is ON). The purpose of this timer is to give the receiver a chance to gracefully recover from a wake time fault.

Suggested Remedy

Add a row to Table 49-3 for Twtf and assign 1ms. In fact replace the TDA row for this.

Response

Response Status: C

Accept In Principle.

Change definition of rx_wf_timer:

"The timer terminal count is set to Twr" to "The timer terminal count is set to Twtf"

Replace last row of Table 49-3 with:

| Twtf | Wake time fault recovery time | 1mS |

Rx_deact timer is no longer used

Suggested Remedy

Remove it.

Response

Response Status: C

Accept.

Rx_deact timer is no longer used

Suggested Remedy

Delete rx_deact_timer and definition.

Response

Response Status: C

Accept.

Incorrect use of /LI/.

Suggested Remedy

In RX_LI state replace /LI/ with LI.

Response

Response Status: C

Accept.

"loop" transitions for states TX_SLEEP, TX QUIET and TX_REFRESH are all invalid because they would cause the timers to keep restarting (even if they didn't, they would be redundant since the state machine remains in the state unless an exit is valid.

Suggested Remedy

Delete the "loop" transitions for states TX_SLEEP, TX QUIET and TX_REFRESH.

Response

Response Status: C

Accept.

Redundant and out of style to equate variable to Boolean value.

Suggested Remedy

Change "reset=TRUE" to "reset"

Response

Response Status: C

Accept.
In Figure 49.17, in the transition from RX_ACTIVE state to itself, the criteria logic doesn’t seem correct.

**Suggested Remedy**

Change criteria to the following (changing OR to AND):

*R_TYPE(rx_coded) != LI * align_status != deskew_align_status*

**Response**

Accept in principle.

See resolution to comment #70

---

In Figure 49-17, the transition from RX_WAKE and RX_WTF to RX_QUIET when !energy_detect could be an endless loop in realitic failure conditions such as link partner driver soft failing where the signal level on the link is sporadic or taps at wrong value. The problem is caused by the timer being continually reset.

**Suggested Remedy**

The suggested remedy is to create a new state that prevents the timer from being reset every time a false wake or refresh is detected.

Create a new state between RX_SLEEP and RX_QUIET.

Call the new state RX_QUIET_INIT (or other suitable name).

The transition criteria from RX_SLEEP to RX_QUIET_INIT will be "signal_detect=fail".

Within RX_QUIET_INIT state include the following action:

"Start rx_tw_timer"

The transition criteria from "RX_QUIET_INIT to "RX_QUIET" is UCT (unconditional transition).

In RX_QUIET state delete Start rx_tq_timer. (This is the key to letting the timer run.)

As a result, regardless of how many transitions occur between RX_QUIET and RX_WAKE or RX_WTF due to sporadic energy, the rx_tq_timer will time out and a fault will be detected.

**Response**

Accept.

---

Redundant and out of style to equate variable to Boolean value.

**Suggested Remedy**

Replace all instances of "energy_detect=false" with "energy_detect=false".

Replace all instances of "energy_detect=true" with "energy_detect=true".

Replace "reset=TRUE" with "reset".

**Response**

Accept.

---

rx_lpi_fail is not set to any value other than FALSE and is not defined in this Clause. Is this a necessary variable?

**Suggested Remedy**

In RX_ACTIVE state delete "rx_lpi_fail"

**Response**

Accept.

---

Incorrect variable name in transition criteria from RX_ACTIVE to RX_SLEEP in Fig 49-17.

**Suggested Remedy**

Change "R_TYPE(rx_raw)" to "R_TYPE(rx_coded)"

**Response**

Accept.
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<th>Cl</th>
<th>SC 49.2.13.3.1</th>
<th>P 149</th>
<th>L 21</th>
<th># 95</th>
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<td><strong>Comment Type</strong></td>
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<td><strong>Comment Status</strong></td>
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<td>Incorrect comparison in Fig 49-17. rx_block_lock is a boolean variable.</td>
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<td><strong>Suggested Remedy</strong></td>
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<td>Replace all instances of &quot;rx_block_lock=OK&quot; with &quot;rx_block_lock&quot;.</td>
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<td>In Figure 49-17, need to initialize rx_quiet variable.</td>
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<td><strong>Suggested Remedy</strong></td>
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<td>In RX_ACTIVE state add line... &quot;rx_quiet &lt;= FALSE&quot;</td>
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<td>It doesn't make sense that the refresh time is longer than the time that the receiver is allowed to recover a wake signal. This also poses problems for the receive LPI state machine.</td>
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<td>Change T(ul) to 11uS</td>
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<td><strong>Comment Type</strong></td>
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<td><strong>Comment Status</strong></td>
<td>R</td>
<td>Energy detect is indicated through PMA_SIGNAL.indication(signal_detect).</td>
<td></td>
</tr>
<tr>
<td><strong>Suggested Remedy</strong></td>
<td></td>
<td></td>
<td></td>
<td>Remove energy_detect line and label from figure.</td>
<td></td>
</tr>
<tr>
<td><strong>Response</strong></td>
<td></td>
<td></td>
<td></td>
<td>REJECT.</td>
<td></td>
</tr>
<tr>
<td><strong>Response Status</strong></td>
<td></td>
<td></td>
<td></td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

Reducing the refresh time will reduce the quality of the link.
Comment responses

IEEE P802.3az D1.4 Energy Efficient Ethernet comments

June 2009

---

**Comment 49**

**Comment Type:** ER

**Comment Status:** A

Clarify sentence.

**Suggested Remedy:**

Replace "idle control code 0x00 is replaced with 0x07" with "low power idle control character /LI/ (0x07) is sent continuously in place of /I/."  

**Response:**

ACCEPT.

---

**Comment 49**

**Comment Type:** T

**Comment Status:** A

SCR_RESET_2 is a redundant state as the transition out of that state is a UCT to TX_ACTIVE and scrambler_reset variable is set to false in TX_ACTIVE state. The original proposal had this state to assert 1uSec of IDLE codeword after the SCR_RESET_1 state. But that extra time is added to the T_wake Sys time budget. This serves the same purpose. Hence remove this state and rename the previous state from SCR_RESET_1 to SCR_RESET.

**Suggested Remedy:**

Accept.

---

**Comment 49**

**Comment Type:** TR

**Comment Status:** A

Transition from RX_SLEEP to RX_ACTIVE needs be R_TYPE(rx_coded) = IDLE and not R_TYPE(rx_coded) != LI. When Transmitter deactivates, received codewords may not be LI.

**Suggested Remedy:**

Instead of the above, please use rx_block_lock = FAIL

**Response:**

ACCEPT.

---

**Comment 49**

**Comment Type:** ER

**Comment Status:** A

The arrow that goes out of TX_ACTIVE for the condition T_TYPE(tx_row) != LI needs to touch the Arc that goes back to TX_ACTIVE

**Suggested Remedy:**

Accept.

---

**Comment 49**

**Comment Type:** TR

**Comment Status:** A

Transition out of RX_ACTIVE back to itself has a condition block_lock != rx_block_lock. But block_lock latches rx_block_lock inside RX_ACTIVE. Hence this transition condition is meaning less.

**Suggested Remedy:**

Instead of the above, please use rx_block_lock = FAIL

**Response:**

REJECT.

---

Comments 10, 25 & 36 bring up the same issue in clauses 36, 48 and 49 respectively

---
Comment Type: TR 
Comment Status: A

LPI TX state diagram designed only to go through scrambler reset only during WAKE. Hence during refresh the PCS will not detect codewords, if FEC is ON. Which means the receiver will not take the arc from RX_WAKE to RX_QUIET shown in LPI receive state diagram. The refresh time for KR PHY is 17usec and rx_tw_timer timeout is 13-14usec, hence it is guaranteed that rx_tw_timer_done will be asserted during every refresh cycle.

Suggested Remedy

A state is needed between RX_WAKE and RX_WTF when rx_tw_timer_done is asserted. This new state (RX_REFRESH_WITH_FEC), should set Start rx_wf_timer and the transition out of it needs to be
1. An arc to RX_QUIET for energy_detect = false.
2. And arc to RX_WTF for rx_rwt_timer_done + (R_TYPE(rx_coded != LI * rx_block_lock).

Remove the arc going from RX_WTF to RX_SLEEP and also to RX_QUIET. Remove setting Start rx_wf_timer.

Response

ACCEPT IN PRINCIPLE.

Change the value loaded into rx_tw_timer to Tul.

Comment Type: TR 
Comment Status: A

RX_QUIET state should set rx_quiet <= FALSE.

Suggested Remedy

Response

ACCEPT.

Comment Type: ER 
Comment Status: A

There is a row for Tda. But there is no debounce state, hence no need for this timer value.

Suggested Remedy

Remove the entire row.

Response

ACCEPT.
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>TR</th>
<th>Comment Status</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both Clause 55 and Clause 49 share a common block encoder (64B/65B and 64B/66B). However the changes made for /LI/ are different between Clause 49 and 55. The control code for Clause 49 is 0x07 while the control code for Clause 55 is 0x06. These clauses should maintain commonality as much as possible.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggested Remedy</td>
<td>Change the control code for /LI/ in Clause 55 to 0x07. Also make the associated changes to R_BLOCK_TYPE LI and T_BLOCK_TYPE LI.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>Response Status</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>This does not fix anything that is broken, however it may be a good idea. The commenter may wish to resubmit this in the working group ballot phase of this project.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Comment Type</th>
<th>TR</th>
<th>Comment Status</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>A new T_BLOCK_TYPE LI and R_BLOCK_TYPE of LI has been introduced for use in Figure 55-15a and Figure 55-16a. However the control code listed as 0x07 is incorrect. The control code for an idle control character in the 64B/65B encoder is 0x00.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Suggested Remedy</td>
<td>Change the control code for LI from 0x07 to 0x00 on lines 3 and 32 on page 171.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>Response Status</td>
<td>C</td>
<td></td>
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<tr>
<td>Accept in principle.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After a brief discussion with the commentor it was noted that there is a typo in the comment. LI should be replaced with I in the comment and the suggested remedy.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Change the control code for /I/ from 0x07 to 0x00 on line 3 on page 171.</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Comment Type</th>
<th>TR</th>
<th>Comment Status</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two new T_BLOCK_TYPEs of I and LI has been introduced for use in Figure 55-15a and Figure 55-16a. However the text description of these blocks is incorrect as they describe the input vector as if it were a 65B block. The 72-bit tx_raw vector has not data/ctrl header or block type field. Furthermore, there is an error in the state machine that will cause an exit from the TX_L state to the TX_WE state if a block of /LI/ /LI/ /LI/ /LI/ /I/ /I/ /I/ /I/ /I/ /I/ /I/ /I/ /I/ /I/ /I/ is to be transmitted. The intended transition is to state TX_L only when a full block of idle is to be transmitted.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Suggested Remedy</td>
<td>Change the text for T_BLOCK_TYPEs I and LI to:</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>C; The vector contains one of the following:</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>a) eight valid control characters other than /O/, /S/, /T/ and /E/ and, if the low power idle function is supported, is not a T_BLOCK_TYPE LI defined below</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>all of which are not /LI/ or four /LI/ followed by four /I/;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response</td>
<td>Response Status</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Accept in principle.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| See response to 115
vector contains eight control characters of /LI/, or contains four /LI/ followed by four /I/ characters. The following changes will be made to the state diagrams:
1) remove LI from transition from TX_E to TX_E on Figure 55-15
2) add transition from TX_E to TX_L conditioned on /LI/ on Figure 55-15
3) change C to (C..I) on transition from TX_L to TX_WE on Figure 55-15a
4) change C to (C..I) on transition from TX_WN to TX_WE on Figure 55-15a
5) change C to (C..I) on transition from TX_WN to TX_E on Figure 55-15a
6) remove LI on transition from RX_E to RX_E on Figure 55-16.
7) Add transition from RX_E to RX_L on Figure 55-16.
8) Correct a typo on Figure 55-15a: tx_lpi_done=false should be tx_lpi_active=false.

Also note that the E (circle) entrance to TX_E has disappeared from the diagram and will be replaced.

Brown, Matt AMCC

Comment Type: T
Comment Status: A
Clarification of Tx target level. No need to specify "maximum" value. Also, the values are trained not negotiated.

Suggested Remedy
Replace "greater than 90% of the negotiated maximum value" with "greater than 90% of the trained peak-to-peak value".

Response: ACCEPT.
Comment responses

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Cl 72 SC 72.7.1 P 211 L 16 # 103
Brown, Matt AMCC

Comment Type ER Comment Status A
In Table 72.6, fix deact. time description.

SuggestedRemedy
Change description to "Transmitter deactivation time (TTD) from active to LPI quiet.

Response Response Status C
ACCEPT.
Also fix it in Clause 70 and Clause 71

Cl 72 SC 72.7.1 P 211 L 18 # 104
Brown, Matt AMCC

Comment Type ER Comment Status A
In Table 72-6, fix act. time description.

SuggestedRemedy
Change description to "Transmitter activation time (TTA) from LPI quiet to active.

Response Response Status C
ACCEPT.
Also fix it in Clause 70 and Clause 71

Cl 72 SC 72.7.1 P 212 L 15 # 105
Brown, Matt AMCC

Comment Type ER Comment Status A
In Table 72.9, fix deact. time description.

SuggestedRemedy
Change description to "Signal detect deactivation time (TSD) from active to LPI quiet.

Response Response Status C
ACCEPT.
Also fix it in Clause 70 and Clause 71

Cl 73A SC P 250 L 32 # 37
Pillai, Velu Broadcom

Comment Type TR Comment Status A
The wording is not representative of the number of pages needed nor does it provide enough information for implementation. Suggested fix is similar to existing wording for other next pages defined in the existing annex.

SuggestedRemedy
Change wording from "Multiple clauses use next page message code 10 to indicate that EEE technology will follow the transmission of this page [the initial, Message (formatted) next page] with at least one unformatted next pages that contain information defined in 45.2.7.13a." to "Multiple clauses use next page message code 10 as an identifier for EEE technology. The EEE technology code message shall consist of only a Message next page. The message code field, 000 0000 1010 shall be contained in bits 10:0 and 45.2.7.13.6:0 shall be contained in bits 22:16. The remaining field bits, 47:23 shall be sent as zero and ignored on receipt."

Response Response Status C
ACCEPT.
Cl 78 SC 78.1.2 P 228 L 47 # 1
Fuller, John Lawrence Berkeley Na

Comment Type TR Comment Status D
LPi Client will need additional interfaces to control the Layer 2 LLDP negotiation of Transmit Tw and Receive Tw. There are cases within 802.1 AVB standards where LPi is desired but only if the negotiated transmit wait time is held to some maximum that may or may not be less than what the Ethernet implementation could otherwise support (when AVB streams are active on the link). Other upper layer technologies may have similar constraints that will be known to the LPi Client.

Suggested Remedy
Add following primitives:
- LP_MAX_TX_WAIT.request(time)
  time in usec, 0 means no restriction imposed by LPi Client
- LP_MAX_RX_WAIT.request(time)
  time in usec, 0 means no restriction imposed by LPi Client
- LP_TX_WAIT.indication(time)
  time is negotiated transmit wait time in usec
- LP_RX_WAIT.indication(time)
  time is negotiated receive wait time in usec

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

Cl 78 SC 78.1.2.1.2 P 229 L 17 # 112
Grimwood, Michael Broadcom

Comment Type T Comment Status A
A one second timer for LP_IDLE.request assertion was applied in Clause 22 for MII but not globally to all PHYs.

Suggested Remedy
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 link_status changing state to OK.

Response Response Status C
ACCEPT IN PRINCIPLE.

Cl 78 SC 78.4.2.5 P 238 L 21 # 5
Dietz, Bryan Alcatel-Lucent

Comment Type E Comment Status A
Suggestion to simplify language and eliminate "set of link partners".

Suggested Remedy
The transmitting side controls the data placed on the medium connecting the transmit and receive link partners and enforces Tw_sys. The transmitting link partner shall wait for the time indicated by the Transmit Tw_sys after deasserting Low Power Idle at the xxMII before sending data frames.

The receiving link partner shall be ready to accept data based on (its echoed value of the) Transmit link partner's Tw_sys. This ensures that the link partners transition out of LPI mode and receive frames without loss or corruption.

Response Response Status C
ACCEPT IN PRINCIPLE.

Text in existing draft could be simplified without loss of content:
- Delete the words "Thus, ", "a set of" from the second sentence
- Delete the words "Similarly," from the third sentence
<table>
<thead>
<tr>
<th>Comment Type</th>
<th>ER</th>
<th>Comment Status</th>
<th>A</th>
</tr>
</thead>
</table>

The description on the front page is only a project description, not a draft description.

**Suggested Remedy**

Please expand the description to include where the draft was in the process and a result of what meeting. This sort of information has turned out to be tremendously helpful when it is necessary to go back and pull out old drafts. A macro textual description of what changes went into the particular draft is also very helpful.

**Response**

Description will be expanded to include where the draft was in the process and the result of what meeting.

A macro textual description of what changes went into the particular draft may be too long to put into the abstract in general though this will be done if there are a few very significant changes.

<table>
<thead>
<tr>
<th>Thompson, Geoff Nortel</th>
</tr>
</thead>
</table>

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

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**Comment responses**  
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