Cl **00** *SC* **0** *P* **151** *L* **22** # 16

Maguire, Valerie Siemon

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

Add a reference to TIA.

SuggestedRemedy

Re-write bullet point d) as follows:

"Support copper medium from ISO/IEC 11801:2002 ot ANSI/TIA-568-C.2, with appropriate augmentation as specified in 55.7"

Proposed Response *Response Status* **O**

Cl **00** *SC* **0** *P* **38** *L* **23** # 14

Maguire, Valerie Siemon

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

1) Screened systems should not be excluded from the objectives (delete "UTP")
2) 150 Ohm is not a recognized media in ISO/IEC 11801:2002 and is not commonly found as a legacy cabling type (delete "150 ohm STP")
3) Add reference to TIA Standards
4) ISO refers to cabling in terms of "class" not "category" of performance (copy text from 802.3at draft)
4) Allow cabling grades higher than category 5 (copy text from 802.3at draft)

SuggestedRemedy

Re-write bullet point d) as:

"Support cable plants using Class D or better or optical fiber cabling as specified in ISO/IEC 11801:1995. When Class D cabling is used, the cabling system components (cables, cords, and connectors) used to provide the link segment shall consist of Category 5e components as specified in ANSI/TIA/EIA-568-C.2 and ISO/IEC 11801:2002.

NOTE—ANSI/TIA/EIA-568-C.2 provides a specification (category 5e) for cabling that meets the minimum requirements for 100BASE-X operation."

Proposed Response *Response Status* **O**

Cl **00** *SC* **0** *P* **38** *L* **27** # 15

Maguire, Valerie Siemon

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

100BASE-X operates on screened and unshielded cabling. Delete "unshielded".

SuggestedRemedy

Re-write bullet point 1) as:

1) Twisted-pair links of 100 m;

Proposed Response *Response Status* **O**

Cl **00** *SC* **0** *P* **82** *L* **14** # 55

Pillai, Velu Broadcom

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

Arrow head sizes are not consistent in the state machine shows in the following pages:

Page	Figure
82	36-9a
83	36-9b
134	48-7
135	48-9a
136	48-9b
146	49-16
147	49-17

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **00** *SC* **0** *P* **82** *L* **23** # 56

Pillai, Velu Broadcom

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

In IEEE state machines true/false values for a variable are show as "TRUE"/ ' "FALSE". But in the following figures it is show as "true" / "false":

Page	Figure
82	36-9a
83	36-9b
135	48-9a
136	48-9b
146	49-16
147	49-17
205	72-6
206	72-7

SuggestedRemedy

Change all "true" to "TRUE" and all "false" to "FALSE"

Proposed Response *Response Status* **O**

Cl **14** *SC* **14.1.1.1** *P* **19** *L* **10** # 173

Law, David 3Com

Comment Type **TR** *Comment Status* **D** *late*

Now that we have the two 10BASE-T PHYs we need to be clear what the distances are supported for the various cabling types. These are:

10BASE-T supports 0 to 100 m on simplex link segments meeting or exceeding the channel specified in subclause 14.4 . 10BASE-Te supports 0 to 100m on simplex link segments meeting or exceeding the Class D channel as specified in ISO/IEC 11801:1995.

SuggestedRemedy

Make the following changes:

[1] In subclause 14.1.1.1 add the following text to the end of item c):

The 10BASE-T PHY provides for operating over 0 m to at least 100 m of twisted pair cabling meeting or exceeding the simplex link segment specification found in 14.4. This specification is generally met by 0.5 mm telephone twisted pair. The 10BASE-T PHY provides for operation over 0 m to at least 100 m of ISO/IEC 11801:1995 Class D or better cabling.

[2] In subclause 14.1.1.3 'Twisted-pair media' (not currently included in draft) add the following new paragraph:

The medium for 10BASE-Te is a channel meeting or exceeding the requirements of the Class D channel specified by ISO/IEC 11801:1995.

[3] Subclause 14.4 'Characteristics of the simplex link segment' needs to be reviewed and updated in respect to the use of Cat 5 by 10BASE-Te.

Proposed Response *Response Status* **O**

Cl **14** *SC* **14.3.1.2** *P* **20** *L* **41** # 172

Law, David 3Com

Comment Type **TR** *Comment Status* **D** *late*

Class D can be either Category 5 or Category 5e dependant on the year of the standard. ISO/IEC 11801:1995 Class D is equivalent to Category 5, ISO/IEC 11801:2002 Class D is equivalent to Category 5e.

SuggestedRemedy

Suggest that '.. Class D channel as specified in ISO/IEC 11801.' be change to read '.. Class D channel as specified in ISO/IEC 11801:1995.'.

Proposed Response *Response Status* **O**

Cl **22** *SC* **22.2.1** *P* **28** *L* **13** # 71

Dietz, Bryan Alcatel-Lucent

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

The fundamental reason for changing CRS is not obvious to the first time reader. Edit text slightly to clarify.

SuggestedRemedy

Change the following sentence

"The definition of low power idle signaling assumes the use of the MAC defined in Annex 4A for simplified full duplex operation (with carrier sense deferral)."

To

"The definition of low power idle signaling assumes the use of the MAC defined in Annex 4A for simplified full duplex operation (with carrierSenseMode = TRUE). This provides full duplex operation but uses the carrier sense signal to defer transmission when the PHY is in low power idle mode."

Proposed Response *Response Status* **O**

Cl **22** *SC* **22.2.1.1** *P* **29** *L* **1** # 70

Dietz, Bryan Alcatel-Lucent

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

Subclause numbers do not appear to match 802.3-2005. Should this be numbered 22.2.1.3?

SuggestedRemedy

Update numbering if appropriate.

Proposed Response *Response Status* **O**

Cl **22** *SC* **22.2.1.1** *P* **29** *L* **17** # 73

Dietz, Bryan Alcatel-Lucent

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

PLS_Carrier.indication is now based on both LPI and traditional RX_DV and CRS signals. Carrier indication is normally ignored in the full duplex Annex 4A MAC. However, with LPI, the MAC will operate in full duplex and use PLS_Carrier.indication to deferr transmit.

The precedence between LPI and RX_DV/CRS is unclear. Unnecessary transmit deferral could occur due to Rx activity. See presentation.

SuggestedRemedy

See presentation. Revise section 22.2.1.1.3 to clarify signals and algorithm used to assert carrier indication.

Proposed Response *Response Status* **O**

Cl **22** *SC* **22.2.1.1.3** *P* **29** *L* **23** # 72

Dietz, Bryan Alcatel-Lucent

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

The meaning of the second paragraph is unclear, perhaps due to an editing error. The phrase "any transitions of the CRS signal" occurs in two sentences without any clear reason for the second sentence.

SuggestedRemedy

Revert to the 802.3-2005 wording or else clarify what is meant by this change. The 802.3-2005 wording was:

While the RX_DV signal is de-asserted, any transition of the CRS signal from de-asserted to asserted must cause a transition of CARRIER_STATUS from the CARRIER_OFF to the CARRIER_ON value, and any transition of the CRS signal from asserted to de-asserted must cause a transition of CARRIER_STATUS from the CARRIER_ON to the CARRIER_OFF value. At any time after CRS and RX_DV are both asserted, de-assertion of RX_DV must cause CARRIER_STATUS to transition to the CARRIER_OFF value. This transition of CARRIER_STATUS from the CARRIER_ON to the CARRIER_OFF value must be recognized by the MAC sublayer, even if the CRS signal is still asserted at the time.

Proposed Response *Response Status* **O**

Cl **22** *SC* **22.7.1** *P* **33** *L* **43** # 95

Healey, Adam LSI Corporation

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

Is the behavior described by the Transmit LPI state machine normative for Energy Efficient Ethernet? There is no text stating that implementations shall conform to the state diagram shown in Figure 22-21.

SuggestedRemedy

Add appropriate statement and the corresponding PICS.

Proposed Response *Response Status* **O**

Cl **22** *SC* **22.7.1** *P* **33** *L* **46** # 92

Healey, Adam LSI Corporation

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

Superflous ")".

SuggestedRemedy

Delete ")".

Proposed Response *Response Status* **O**

Cl **22** *SC* **22.7.1.2** *P* **34** *L* **10** # 97

Healey, Adam LSI Corporation

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

LP_IDLE.indication is not used by the Transmit LPI state diagram.

SuggestedRemedy

Delete variable definition.

However, it seems like LP_IDLE.indication and LPI_IDLE.request consistitute a service interface that should be defined somewhere in the document, and not necessarily in the list of state variables for the Transmit LPI state diagram.

Proposed Response *Response Status* **O**

Cl **22** *SC* **22.7.1.2** *P* **34** *L* **8** # 96

Healey, Adam LSI Corporation

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

"The link fault signaling state diagram uses the following variables and counters:"

This subclause describes the "Transmit LPI state diagram."

SuggestedRemedy

Correct text accordingly.

Proposed Response *Response Status* **O**

Cl **22** *SC* **22.7.1.3** *P* **35** *L* **1** # 93

Healey, Adam LSI Corporation

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

The state diagram depicted in Figure 22-21, in combination with the definition of CARRIER_STATUS in 22.2.1.1.3, describes the desired behavior, but this could be more clearly shown by adding the assignment of CARRIER_STATUS to the state diagram.

SuggestedRemedy

Modify the state diagram to show CARRIER_STATUS = ON assignment in LPI_ASSERTED state and CARRIER_STATUS = OFF assignment in LPI_DEASSERTED state. Define state variables as appopriate.

Proposed Response *Response Status* **O**

Cl **22** *SC* **22.7.1.3** *P* **35** *L* **1** # 94

Healey, Adam LSI Corporation

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

tw_timer should be defined as timer rather than a counter. The "++" operator only implies that the counter tw_timer is incremented, not that it is incremented repeatedly while in the LPI_WAIT state or on what timescale it is incremented. Per 21.5.1, "After performing all the actions listed in a state block one time, the state block then continuously evaluates its exit conditions until one is satisfied at which point control passes through a transition arrow to the next block. While the state awaits fulfillment of one of its exit conditions, the actions inside do not implicitly repeat."

SuggestedRemedy

Add action "Start tw_timer" to the LPI_WAIT state and replace the tranition condition for exiting the state with "tw_timer_done." Define tw_timer as a timer in 22.7.1 accordingly and state that the terminal count of the timer is the resolved wake time. Delete variable "resolved_tw."

Proposed Response *Response Status* **O**

Cl **22** *SC* **22.7.2** *P* **34** *L* **32** # 98

Healey, Adam LSI Corporation

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

Constraints must be placed on the use of the LP_IDLE.request primitive to ensure correct PHY operation. A set of constraints has been described in law_02_1108, slide 10. One essential constraint is that the LP_IDLE must be asserted for a minimum period before it may be deasserted. This minimum assertion period may be PHY dependent. For example, for 1000BASE-T, it must exceed the maximum value of lpi_update_timer in order to ensure correct PHY operation (refer to comment against 40.4.6.1 for an explanation).

SuggestedRemedy

Include appropriate constraints regarding the use of Energy Efficient Ethernet service interface primitives.

Proposed Response *Response Status* **O**

Cl **22** *SC* **22.7.3** *P* **34** *L* **40** # 57

Pillai, Velu Broadcom

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

"Reconcilliation" Spelling

SuggestedRemedy

Reconciliation

Proposed Response *Response Status* **O**

Cl **24** *SC* **24.1.1** *P* **38** *L* **12** # 152

Bennett, Michael LBNL

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

The sentence "The transmit and receive paths can enter and exit low power state independently" is stating that there is a low power state for each path, so "state" should be "states"

SuggestedRemedy

change state to states

Proposed Response *Response Status* **O**

Cl **24** *SC* **24.2.2** *P* **39** *L* **37** # 153

Bennett, Michael LBNL

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

"remote site" should be link partner

SuggestedRemedy

change "remote site" to link partner
change state to states

Proposed Response *Response Status* **O**

Cl **24** *SC* **24.2.2.5** *P* **43** *L* **13** # 137

Dietz, Bryan Alcatel-Lucent

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

Two extra words in sentence "with a sequence of signal stream".

SuggestedRemedy

Delete "sequence of" so it reads "it replaces the continuous IDLE code-groups with a signal stream comprising".

Proposed Response *Response Status* **O**

Cl **24** *SC* **24.2.4.1** *P* **45** *L* **39** # 80

Michael, Grimwood Broadcom Corporation

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

1000BASE-T and 100BASE-TX LPI have the same nominal quiet time but different nominal sleep and refresh times. For consistency, make the 100BASE-TX sleep and refresh timers, lpi_tx_ts_timer and lpi_tx_tr_timer, have the same nominal value as the 1000BASE-T lpi_update_timer.

SuggestedRemedy

For both lpi_tx_ts_timer and lpi_tx_tr_timer, change

"The timer shall have a period between 100 us to 120 us."

To:

"The timer shall have a period between 180 us to 250 us."

Proposed Response *Response Status* **O**

Cl **24** *SC* **24.2.4.4** *P* **47** *L* **18** # 99

Healey, Adam LSI Corporation

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

Per the Receive state diagram (Figure 24-11), from the IDENTIFY JK state, if rx_bits[9:0] is neither /I/P/ or /J/K/ then the state diagram transitions to the BAD SSD state where it remains until rx_bits[9:0] = IDLES again.

This implies that when the initial /I/P/ is not correctly detected (due to a bit error, for example), the PHY receiver will remain in the BAD_SSD state until normal idle signaling is received, and the receiver will not enter low power mode.

SuggestedRemedy

Add a transition from BAD SSD to RX SLEEP with the transition condition rx_bits[9:0] = /P/P/.

Proposed Response *Response Status* **O**

Cl **24** *SC* **24.2.4.4** *P* **47** *L* **19** # 74

CHOU, JOSEPH REALTEK SEMICON

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

The original branch condition from RX_SLEEP to IDLE state
signal_status = ON * (rx_bits[9:5] = /I/ + rx_bits[4:0] = /I/)
can be made more restrictive to
signal_status = ON * (rx_bits[9:5] = /I/ * rx_bits[4:0] = /I/)

SuggestedRemedy

change to
signal_status = ON * rx_bits[9:0] = IDLES

Proposed Response *Response Status* **O**

Cl **24** *SC* **24.3.1** *P* **47** *L* **23** # 88

Michael, Grimwood Broadcom Corporation

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

The "Receive State Diagram" in Figure 24-11 has a corner case condition in which under certain degenerate signal status conditions, it is possible to indefinitely transition back and forth between RX_QUIET and RX_WAKE, and never transition to RX_LPI_LINK_FAIL . This condition could occur if signal_status toggles between ON and OFF with the following sequence and associated states:

1. State is RX_QUIET and signal_status toggles to ON.
2. State transitions to RX_WAKE and lpi_rx_tw_timer is reset.
3. signal_status toggles to OFF prior to lpi_rx_tw_timer expiring causing a transition back to RX_QUIET, causing lpi_rx_tq_timer to be reset.
4. Prior to lpi_rx_tq_timer expiring, signal_status toggles to ON (Causing a Repeat of step 1 and potentially an endless sequence of 2. through 4.).

SuggestedRemedy

Modify the "Receive State Diagram" such that lpi_rx_tq_timer is effectively not reset upon re-entry to state RX_QUIET.

A presentation will be submitted detailing this suggested remedy.

Proposed Response *Response Status* **O**

Cl **28C** *SC* **28C.13** *P* **222** *L* **48** # 174

Law, David 3Com

Comment Type **TR** *Comment Status* **D** *late*

I'm maybe missing something here by 45.2.7.13a 'EEE advertisement (Register 7.60)' only defines 6 bits of the 11 bits available in a Unformatted Next Page so I can't see why in the Annex 28C changes both Message code 10 and Message code 11 are defined for EEE. Further the Annex 73A changes only define Message code 10.

SuggestedRemedy

Either define what Message code 11 is required for or return it to be a reserved value.

Proposed Response *Response Status* **O**

Cl **30** *SC* *P* **65** *L* **1** # 53

Diab, Wael Broadcom

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

The MIB extention to support the LLDP framework defined will need to go into C30. This needs to be as an update to the changes that 802.3bc does.

SuggestedRemedy

Please an editor's note to that effect so it can be a placeholder

Proposed Response *Response Status* **O**

Cl **35** *SC* **35.2.2.6a** *P* **68** *L* **52** # 78

Michael, Grimwood Broadcom Corporation

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

Section 45.2.3.1.3a points to the Receive clock stoppable bit but this section deals with the transmit clock.

SuggestedRemedy

Change 45.2.3.1.3a to the appropriate new section with the transmit clock stoppable bit (45.2.3.1.3b proposed in another comment).

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.1.3** *P* **75** *L* **25** # 58

Pillai, Velu Broadcom

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

Closing brackets are not matching.
* SUDI(![/D21.5/] * ![/D2.2/] * SUDI(![/D26.4/] * ![/D6.5/]))

SuggestedRemedy

It can either be
* SUDI(![/D21.5/] * ![/D2.2/]) * SUDI(![/D26.4/] * ![/D6.5/]))

or

* SUDI(![/D21.5/] * ![/D2.2/] * ![/D26.4/] * ![/D6.5/]))

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.1.3** *P* **75** *L* **36** # 60
Pillai, Velu Broadcom

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

On line 36 and 39 change

a Active state

SuggestedRemedy

an Active state

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.1.5** *P* **75** *L* **51** # 61
Pillai, Velu Broadcom

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

rx_deact_timer
This timer is started when the PMD's receiver enters the RX_SLEEP state.

But on page 83, Fig 36-9b shows that this timer starts when the receiver enters "RX_DEACT" state.

SuggestedRemedy

rx_deact_timer
This timer is started when the PMD's receiver enters the RX_DEACT state.

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.1.6** *P* **76** *L* **30** # 194
Barrass, Hugh Cisco

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

Need to add a note for devices that do not support LPI

SuggestedRemedy

Add to both PMD_RXQUIET and PMD_TXQUIET:

Note that this message is ignored by devices that do not support the optional LPI mechanism.

(2 instances)

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.2.1** *P* **79** *L* **1** # 195
Barrass, Hugh Cisco

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

new term needs to be underlined.

SuggestedRemedy

underline + rx_lpi_fail=TRUE

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.2.6** *P* **81** *L* **24** # 196
Barrass, Hugh Cisco

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

Sync state machine needs changing for LPI.

SuggestedRemedy

Change sync state machine - sync_status becomes code_sync_status (add new variable in 36.2.5.1.3).

Add a penultimate paragraph.

If the optional Low Power Idle function is not implemented then sync_status is identical to code_sync_status. Otherwise the relationship between sync_status and code_sync_status is given by 36-9b the LPI receive state diagram.

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.2.8** *P* **82** *L* **11** # 197
Barrass, Hugh Cisco

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

State TX_ACTIVE needs to set tx_quiet = false

SuggestedRemedy

Add term to state:

tx_quiet <=false

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.2.8** *P* **83** *L* **32** # 200
Barrass, Hugh Cisco

Comment Type **T** *Comment Status* **D**
Transition from RX_WAKE needs to include sync status and no timeout.

SuggestedRemedy
change detect_lpidle

to !rx_tw_timer_done * code_sync_status = OK * detect_lpidle

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.2.8** *P* **83** *L* **36** # 201
Barrass, Hugh Cisco

Comment Type **T** *Comment Status* **D**
Transition from RX_WAKE needs to include sync status and no timeout.

SuggestedRemedy
change detect_idle

to !rx_tw_timer_done * code_sync_status = OK * detect_idle

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.2.8** *P* **83** *L* **37** # 202
Barrass, Hugh Cisco

Comment Type **T** *Comment Status* **D**
State RX_LINK_FAIL needs to change sync_status

SuggestedRemedy
Add a term

sync_status<=FAIL

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.2.8** *P* **83** *L* **6** # 198
Barrass, Hugh Cisco

Comment Type **T** *Comment Status* **D**
sync_status is now distinct from code_sync_status

add a term to update sync_status

SuggestedRemedy
Add a term in state RX_ACTIVE:

sync_status<=code_sync_status

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.2.8** *P* **83** *L* **7** # 199
Barrass, Hugh Cisco

Comment Type **T** *Comment Status* **D**
sync_status is now distinct from code_sync_status

transition must be forced to update sync_status appropriately.

SuggestedRemedy
Change detect_idle

to detect_idle + sync_status != code_sync_status

Proposed Response *Response Status* **O**

Cl **36** *SC* **36.2.5.2.9** *P* **84** *L* **20** # 203
Barrass, Hugh Cisco

Comment Type **T** *Comment Status* **D**
The MDIO status variables need to be here (not Clause 70)

SuggestedRemedy
Add a new section 36.2.5.2.8, with the information currently in Table 70-3

Proposed Response *Response Status* **O**

Cl **36** *SC* **Fig 36-3a** *P* **79** *L* **7** # 59
Pillai, Velu Broadcom

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

RUDI(L/I/) needs to be RUDI(/LI/)

SuggestedRemedy

RUDI(/LI/)

Proposed Response *Response Status* **O**

Cl **36** *SC* **Figure 36-1** *P* **77** *L* **46** # 62
Pillai, Velu Broadcom

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

XMIT_DATA is already used. Hence the new state name needs to be different.

SuggestedRemedy

XMIT_LPIDLE

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.1.3** *P* **86** *L* **19** # 175
Law, David 3Com

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

Low power idle on the receive GMII is indicated by 'Assert low power idle', see Table 35-2 (page 71).

SuggestedRemedy

Change '.. is indicated as low power idle at the GMII ..' to read ' .. is indicated as Assert low power idle at the GMII ..'. Update similar reference to the GMII as required.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.1.3** *P* **87** *L* **24** # 10
McIntosh, James Vitesse

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

1000BTreceive is shown as an input to LOCAL LPI REQUEST function. As seen in the logic in Figure 40-9, 1000BTreceive is not used, but link_status is.

SuggestedRemedy

Change connection from 1000BTreceive to link_status.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.1.3** *P* **87** *L* **28** # 178
Law, David 3Com

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

The variable 1000BTreceive is shown as an input to the LOCAL LPI REQUEST block (lowest signal on right side of box) yest the state diagram in Figure 40-9 doesn't use this varaible.

SuggestedRemedy

Remove 1000BTreceive connection from LOCAL LPI REQUEST block in Figure 40-3 and 40-5.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.1.4** *P* **88** *L* **49** # 138
Dietz, Bryan Alcatel-Lucent

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

Missing word

SuggestedRemedy

Insert "that it" after PHY to read: "Optionally, the ability to signal to the remove PHY that it has entered the low power mode or that it is in the normal mode of operation."

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.2.11.1** *P* **90** *L* **5** # 176

Law, David 3Com

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

According to the state diagram shown in Figure 40-9 this value will only be asserted when 1000BTtransmit is also true, not just when 'Assert low power idle' is present on the GMII.

SuggestedRemedy

Update the description of the TRUE and FALSE conditions as required. Also may need to updated the current definition of 1000BTtransmit in subclause 40.3.3.1 which states 'Use by Carrier Sense process'.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.3** *P* **93** *L* **21** # 11

McIntosh, James Vitesse

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

1000BTreceive is shown as an input to LOCAL LPI REQUEST function. As seen in the logic in Figure 40-9, 1000BTreceive is not used, but link_status is.

SuggestedRemedy

Change connection from 1000BTreceive to link_status.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.3.1.3.4** *P* **94** *L* **40** # 1

McIntosh, James Vitesse

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

The underscores for the entire Sdn[2] equation implies that this is new.

SuggestedRemedy

Remove underscores from all but new part of the equation.
i.e., only "and (tx_mode != SEND_Z)" should be underlined.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.3.1.3.4** *P* **94** *L* **46** # 100

Healey, Adam LSI Corporation

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

There are conceptual issues with loc_lpi_mode encoding via cext_errn:

1. When the PHY is instructed to wake from low-power mode via that assertion of normal inter-frame at the GMII, the actual value of loc_lpi_mode can no longer be communicated (e.g. cext_errn will be tx_errorn since TXD = 0x00). Since the wake process does look that the state of rem_lpi_mode, this has not impact on PHY operation. However, this behavior is inconsistent with concept of signaling a state variable to the remote PHY.

2. Carrier Extension has no bearing on Energy Efficient Ethernet. Nesting the encoding of loc_lpi_mode in cext_errn should be avoided if possible.

SuggestedRemedy

Remove changes to cext_errn. Instead, define sdn[1] as follows:

if (tx_enablen-2 = 1), sdn[1] = scn[1]^TXDn[1]
else if (loc_lpi_mode = ON) and (tx_mode != SEND_Z), scn[1]^1
else sdn[1] = scn[1]^cext_errn

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.4.2.4** *P* **99** *L* **33** # 3

McIntosh, James Vitesse

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

The phrase "the both" should be "both" in line 33 near the bottom of the paragraph (in the conext of "If lpi_update_timer expires and the both PHYs continue"). This was pointed out previously, but a different "the both" error was corrected.

SuggestedRemedy

Change "the both" to "both".

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.4.2.4** *P* **99** *L* **7** # 2

McIntosh, James Vitesse

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

This very long paragraph is difficult to read. Please add a few breaks to make it easier. I realize that this is in the "service to humanity" catagory, but this is new text.

SuggestedRemedy

Add a few new line breaks in the paragraph for readability.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.4.2.4** *P* **99** *L* **7** # 67

Dietz, Bryan Alcatel-Lucent

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

The large inserted paragraph is difficult to read. It should be edited to clarify the content by breaking into smaller paragraphs.

SuggestedRemedy

Replace the large paragraph with the following edited text:

When the PHY supports Energy Efficient Ethernet, PHY Control will transition to a low power idle mode in response to concurrent requests for low power operation from the local PHY (loc_lpi_req = TRUE) and remote PHY (rem_lpi_req = TRUE).

Upon activation of the low power mode, the PHY Control asserts tx_mode = SEND_I for period of time defined by lpi_update_timer which allows the remote PHY to prepare for the transition to the WAIT_QUIET state.

When lpi_update_timer expires, PHY Control asserts tx_mode = SEND_Z and transmission ceases.

During the WAIT_QUIET and QUIET states, the PHY may deactivate transmit and receive functions in order to conserve energy. However, in the WAIT_QUIET state, the PHY shall be capable of correctly decoding rem_lpi_req and rem_lpi_mode.

The PHY will remain in the QUIET state no longer than the time implied by lpi_quiet_timer. When lpi_quiet_timer expires, the PHY initiates a wake sequence.

The wake sequence begins with a transition to the WAKE state where the PHY will transmit (tx_mode = SEND_I) for period lpi_waketx_timer and simultaneously start a parallel timer, lpi_wakemz_timer. Since it is likely that transmit circuits were deactivated while in the QUIET state, this transmission is not expected to be compliant 1000BASE-T signaling, but rather of sufficient quality and duration to be detected by the remote PHY receiver and initiate the wake sequence in the remote PHY. Upon expiration of lpi_waketx_timer, the PHY will enter the WAKE_SILENT state and cease transmission (tx_mode = SEND_Z). The PHY will remain in the WAKE_SILENT state until lpi_wakemz_timer has expired, at which point it is assumed transmitter circuits have stabilized and compliant 1000BASE-T signaling can be transmitted.

At this point the MASTER transitions to the WAKE_TRAINING state and transmits to the SLAVE PHY. The remaining wake sequence is essentially an accelerated training mode sequence leading to entry into the UPDATE state. Once scrambler synchronization is acheived, the incoming value of rem_lpi_req can be determined.

If low power operation is no longer requested by either the local or remote PHY, then both PHYs return to the SEND IDLE OR DATA state and the normal mode of operation (tx_mode = SEND_N). If both PHYs continue to request low power operation, then both PHYs remain in the UPDATE state and continue to transmit for time defined by lpi_update_timer. This time is intended to allow the remote PHY to refresh its receiver state

(e.g. timing recovery, adaptive filter coefficients) and thereby track long term variation in the timing of the link or the underlying channel characteristics. If lpi_update_timer expires and the both PHYs continue to request low power operation, then both PHYs transition to the WAIT_QUIET state.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.4.5.1** *P* **100** *L* **33** # 7

McIntosh, James Vitesse

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

I believe there are two errors here. First, there are many new clause "46" items that exist in clause 40 that I believe should be 40 instead.
Second, I believe the reference here should be pointing to the "Signal_detect" subclause rather than the "Transmitter operation during WAKE" subclause.

SuggestedRemedy

Change "46.6.1.2.7" to "40.6.1.3.5".

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.4.5.2** *P* **101** *L* **7** # 103

Healey, Adam LSI Corporation

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

There are two distinct application spaces to be addressed by Energy Efficient 1000BASE-T. One application space places higher value on the lowest acheivable power while the other places a higher value on the fastest acheivable wake time. These ojectives are at odds since measures that may be taken to reduce power require longer wake up times. Furthermore, in many cases, applications that prioritize lower power are less sensitive to latency.

This suggests a need for a negotiated wake time.

SuggestedRemedy

Define two energy modes: lowest energy and fastest wake. Define a "Preferred energy mode" bit to be advertised during Auto-Negotiation with the following values:

0 - indicates that lowest energy mode is preferred
1 - indicates that fastest wake is preferred

If either PHY advertises that fastest wake is preferred, then both PHYs will use fastest wake mode. If both PHYs advertise a preference for lowest energy, then both PHYs will use lowest energy mode.

Each mode is realized via the values of lpi_wake_timer and lpi_wakemz_timer.

For fastest wake mode:
lpi_wake_timer = 16 us +/- TBD%
lpi_wakemz_timer = 5 us +/- TBD%

For lowest energy mode:
lpi_wake_timer = 24 +/- TBD%
lpi_wakemz_timer = 8 +/- TBD%

Both modes must be implemented by a compliant PHY. The advertisment may also be sent via LLDP to allow the system to configure the mode during link operation based on application needs.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.4.6.1** *P* **103** *L* **1** # 102

Healey, Adam LSI Corporation

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

Failure to assert both loc_rcvr_status = OK and rem_rcvr_status = OK within lpi_wake_timer following initiation of the wake process will cause the PHY to enter the SLAVE SILENT state and initiate re-training. This will correspond to an interruption of service spanning hundreds of milliseconds.

However, the consequences of not retraining seem minor in comparison. In some cases, the failure to successfully wake within the alloted time interval will correspond to the corruption of the packet transmitted immediately after the wake time expired. In the majority of cases, failure to wake within the given time will have no consequence to data integrity (for example, normal refresh intervals or when the system wake time is much greater than the PHY wake time).

While the operating parameters should be defined so that the probability of failing to wake within the allocated time is acceptably small, it may be beneficial to defer retraining until some longer timer expires to ensure that there truly an unrecoverable PHY error before the link is taken out of service. In this model, the wake timer would be used as a means to monitor overall link health, e.g. a counter would be incremented to indicate when the PHY failed to wake within lpi_wake_timer, and these statistics could be used by management to establish whether the link was operating properly or not.

SuggestedRemedy

PHY Control state diagram changes will be submitted as a presentation to the Task Force.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.4.6.1** *P* **103** *L* **1** # 101

Healey, Adam LSI Corporation

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

Per the PHY Control state diagram, part b, a transition from the UPDATE state to the WAKE state may be forced at any time by the assertion of loc_lpi_req = FALSE. Following additional IDLE transmission of duration lpi_waketx_timer, a period of forced silence (tx_mode = SEND_Z) will follow. This implies that:

1. Adaptive filter coefficient and timing updates may need to be aborted since the link partner's transmission may cease at any time during the update.

2. Since there is currently no constraint on how the power management agent asserts and de-asserts LP_IDLE, one can envision pathological timing scenarios where LP_IDLE is asserted at the GMII such that the PHY transitions to the UPDATE state, and then the LP_IDLE is de-asserted forcing the update of timing and adaptive filter coefficients to be aborted, and then LP_IDLE is asserted again such that the PHY returns to the update state. Repetitions of this timing cycle can starve the PHY of essential update degrading link performance.

While constraints regarding how the power management agent uses LP_IDLE could address this issue, a guaranteed minumum period of transmission from the link parnter facilities timing and filter coefficient updates and makes PHY layer performance independent of higher layer behaviors. This may be accomplished with simple modifications to the PHY Control state diagram.

SuggestedRemedy

PHY Control state diagram changes will be submitted as a presentation to the Task Force.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.4.6.1** *P* **103** *L* **23** # 87

Michael, Grimwood Broadcom Corporation

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

In reference to the PHY Control State Diagram in Figure 40-15b, a corner-case, out-of-sync condition can occur when loc_lpi_req changes to FALSE and the local link partner is near the end of its WAKE_TRAINING state and the remote link partner has transitioned from WAKE_TRAINING to UPDATE.

SuggestedRemedy

Setting loc_lpi_mode to OFF during WAKE_TRAINING avoids this out-of-sync condition since detection of rem_lpi_mode = OFF initiates a transition from UPDATE to active. However, this changes the original intent of lpi_mode since it is also used for the transitioning into and out of the LP_IDLE state in the PCS Receive State Diagram (Figure 40-10a). Instead, in Figure 40-15b, replace loc_lpi_mode with a new signaling variable, loc_sleep_mode, and use its PCS-encoded signaling, rem_sleep_mode, to replace rem_lpi_mode. Also, set loc_sleep_mode <= ON in the UPDATE state and loc_sleep_mode <= OFF in the WAKE_TRAINING state. In Figure 40-15a, in the SEND IDLE OR DATA state, set loc_sleep_mode <= OFF . In Section 40.3.1.3.4, for the generation of cext_errn, replace loc_lpi_mode with loc_sleep_mode. Make other necessary changes in order to introduce the new state variables and associated PMA service primitives.

A presentation will be submitted detailing the resolution to this issue.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.4.6.1** *P* **103** *L* **5** # 177

Law, David 3Com

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

Figure 40-3 and 40-5 both show rem_lpi_req as an output of the PCS Receive state diagram and the definition of rem_lpi_req in 40.3.3.1 states it is generated by the PCS Receive function. I however can't find where it is generated, only where it is used on entry and exit to the LP_IDLE state.

SuggestedRemedy

Add the generation of the rem_lpi_req variable to this, or another, state diagram.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.4.6.1** *P* **103** *L* **9** # 12

McIntosh, James Vitesse

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

I believe we need an error-handling <B> arc from UPDATE to SLAVE SILENT when rem_lpi_mode=OFF * (lpi_update_timer_done + signal_detect=FALSE). Otherwise, we could get stuck in the UPDATE state.

I plan to have a brief presentation on this as "mcintosh_01_0109.pdf".

SuggestedRemedy

Add error-handling <B> arc from UPDATE to SLAVE SILENT when rem_lpi_mode=OFF * (lpi_update_timer_done + signal_detect=FALSE).

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.5.1.1** *P* **105** *L* **22** # 86

Michael, Grimwood Broadcom Corporation

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

Register 7.20 is already allocated in IEEE802.3an Table 45-125, "AN LP base page ability register." EEE capability register is 3.20 as defined in 45.2.3.

SuggestedRemedy

Change "7.20" to "3.20".
Change "7.20.2" to "3.20.2".

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.5.1.1** *P* **105** *L* **24** # 8

McIntosh, James Vitesse

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

Register 7.21, Bit 7.21.2 (shown in 45.2.3.9b, Table 45–88b, p. 115, line 42) is missing from Table 40-3.

SuggestedRemedy

Please add a row in Table 40-3 for Register 7.21, Bit 7.21.2 below Register 7.20, Bit 7.20.2 as seen in Table 45-88b and defined in 45.2.3.9b.5.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.5.1.1** *P* **105** *L* **25** # 4

McIntosh, James Vitesse

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

Register 7.60, Bit 7.60.2 uses same name as Register 7.20, Bit 7.20.2, "1000BASE-T EEE supported". This is confusing.

SuggestedRemedy

Change Register 7.60, Bit 7.60.2 name to "1000BASE-T EEE advertised" (or similar.

Proposed Response *Response Status* **O**

Cl **40** *SC* **40.5.1.1** *P* **105** *L* **28** # 5

McIntosh, James Vitesse

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

Register 7.61, Bit 7.61.2 uses same name as Register 7.20, Bit 7.20.2, "1000BASE-T EEE supported". This is confusing. Additionally, this is the status of the link partner.

SuggestedRemedy

Change Register 7.61, Bit 7.61.2 name to "LP 1000BASE-T EEE advertised" (or similar.

Proposed Response *Response Status* **O**

Cl **40** *SC* **46.6.1.2.6** *P* **106** *L* **31** # 9

McIntosh, James Vitesse

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

There are many new subclauses in clause 40 begining with 46.6.1.2.6 that I believe should actually start with 40.

SuggestedRemedy

Please change all the 46.x.x subclauses to 40.x.x. I assume the references will be corrected automatically, but please check that they do (e.g., p. 106, line 51).

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.1** *P* **112** *L* **26** # 77

Michael, Grimwood Broadcom Corporation

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

Add transmit clock stoppable bit.

SuggestedRemedy

Change 3.0.10 to "Receive clock stoppable".

Add 3.0.9 and name it "Transmit clock stoppable".

Change Reserved to bits 3.0.8:7

Correspondingly, change subclause heading 45.2.3.1.3a to Receive clock stoppable and introduce a new subclause 45.2.3.1.3b called Transmit clock stoppable.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.1.3a** *P* **112** *L* **47** # 63

Pillai, Velu Broadcom

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

Clock stoppable is applicable to transmit clock for GMII and XGMII. Hence that needs to be mentioned in the description.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.1.3a** *P* **112** *L* **52** # 76

Michael, Grimwood Broadcom Corporation

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

Typo.

SuggestedRemedy

Change "signaing" to "signaling".

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.2** *P* **113** *L* **16** # 51
Rick, Tidstrom Broadcom

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

Table 45-84

Reserved bits are referenced as 1.1.15:12.

SuggestedRemedy

They should be referenced as 3.1.15:12.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.9a** *P* **114** *L* **21** # 84
Michael, Grimwood Broadcom Corporation

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

Register 7.20 is already allocated in IEEE802.3an Table 45-125, "AN LP base page ability register." EEE capability register is 3.20 as defined in 45.2.3.

SuggestedRemedy

Change "7.20" to "3.20" throughout section 45.2.3.9a.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.9b** *P* **115** *L* **21** # 85
Michael, Grimwood Broadcom Corporation

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

Register 7.21 is already allocated in IEEE802.3an Table 45-125, "AN LP base page ability register." EEE reduced energy capability register is 3.21 as defined in 45.2.3.

SuggestedRemedy

Change "7.21" to "3.21" throughout section 45.2.3.9a.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.9b** *P* **115** *L* **23** # 139
Dietz, Bryan Alcatel-Lucent

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

The term "reduced energy EEE modes" is unclear. If the rest of the specification uses LPI to stand for reduced energy, then LPI should be used here. If "reduced energy" is an important phrase, then it should be defined.

If changed here, please change table 45-88b also.

SuggestedRemedy

Change "reduced energy" to "LPI" or "reduced energy/LPI". ALso change table 45-88b.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.3.9b** *P* **115** *L* **39** # 19
Rick, Tidstrom Broadcom

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

Table 45-88b

Bit 7.21.3

Choices reduced energy EEE supported or not supported make no sense for 10GBASE-T. 10GBASE-T has four refresh choices. I believe this will be true for other types of ethernet technologies as well.

SuggestedRemedy

Remove register 7.21 from the PCS layer if it does not provide value.
or
If some of the bit defintions are correct, keep them, while removing definitions that do not have any meaning.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.7.15a** *P* **118** *L* **23** # 41
Rick, Tidstrom Broadcom

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

When discussing how the EEE mode control register will map into extended next pages, it references register bits 7.60.10 to 7.60.0.

SuggestedRemedy

The register bits referenced should be 7.62.10 to 7.62.0.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.7.15a** *P* **118** *L* **33** # 6

McIntosh, James Vitesse

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

1000BASE-T wake time is now fixed. We no longer need bits 7.62.9:5 in Table 45-146.

SuggestedRemedy

Change 7.62.15:10 to 7.62.15:5 on the line above and remove the row with 7.62.9:5. Delete the corresponding text, currently 45.2.7.15a.1.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.7.15a** *P* **118** *L* **42** # 23

Rick, Tidstrom Broadcom

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

Table 45-146

The table defines bit 7.62.1 as reduced energy refresh or normal energy refresh, which is not supported for 10GBase-T. This does not map into 10GBase-T autoneg capabilities, which are:

Refresh Times of 4,8,16, or 32 frames
Wake Times of 1,3,5,7,9 frames.

In the editors note, is states that this register is a placeholder pending firm definitions.

SuggestedRemedy

Since each technology is allocated one bit, and the 10GBASE-T needs 2-bits for refresh and 3-bit for Wake, multiple registers will be needed to define EEE auto-negotiation controls. These registers need to be defined, and the placeholder register need to be removed.

Proposed Response *Response Status* **O**

Cl **45** *SC* **table 45-84** *P* **113** *L* **16** # 64

Pillai, Velu Broadcom

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

Under Bits: 1.1.15:12 It should be as suggested.

SuggestedRemedy

3.1.15:12

Proposed Response *Response Status* **O**

Cl **45** *SC* **Table 45-84** *P* **113** *L* **18** # 65

Pillai, Velu Broadcom

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

Table 45-84 is a PCS status register. Hence the description for bits 11 to 8 should say "PCS", instead of "PMA/PMD". If this comment is accepted, then the bit description on 45.2.3.2.1a - 1d should also change all the reference to "PMA/PMD" to "PCS".

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **46** *SC* **46.3.1.2** *P* **123** *L* **14** # 24

Rick, Tidstrom Broadcom

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

Table 46-3

For TXC = 1, TXD = 06, the description is:

assert low power (only valid in lane 0)

It does not describe what is sent on XGMII lanes 1,2, and 3. Does that mean that RS layer is free to tranmit whatever it wants, including data on lanes 1-3, and the PHY will completley ignore what is on those lanes, or are IDLE characters expected on lanes 1-3.

Is there some reason that TXD = 06 is not sent on all four lanes?

SuggestedRemedy

Define what characters may be transmitted on lanes 1-3 when lane 0 is low power idle.

Proposed Response *Response Status* **O**

Cl **46** *SC* **46.3.1.5a** *P* **123** *L* **49** # 79

Michael, Grimwood Broadcom Corporation

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

Section 45.2.3.1.3a points to the Receive clock stoppable bit but this section deals with the transmit clock.

SuggestedRemedy

Change "clock stoppable" to "transmit clock stoppable"

Change 45.2.3.1.3a to the appropriate new section with the transmit clock stoppable bit (45.2.3.1.3b proposed in another comment).

Proposed Response *Response Status* **O**

Cl **46** *SC* **46.3.1.5a** *P* **123** *L* **52** # 190

Pillai, Velu Broadcom

Comment Type **TR** *Comment Status* **D** *late*

"The MAC device should not present a start code for valid transmit data until after the wake up time specified"

For MII and GMII showing the TXD as "zero" was valid, but in XGMII an idle is "07".

SuggestedRemedy

Add a line:

The MAC device should be setting TXD<7:0> to 07 during the wake time.

Fig 46-7a needs to be corrected accordingly

Proposed Response *Response Status* **O**

Cl **46** *SC* **46.3.1.5a** *P* **124** *L* **9** # 81

Michael, Grimwood Broadcom Corporation

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

Figure 46-7a shows the wrong value for TXD<7:0> during wake time.

SuggestedRemedy

Show TXD<7:0> = 0x07 during the period shown as "wake time".

Proposed Response *Response Status* **O**

Cl **46** *SC* **46.3.2.2** *P* **125** *L* **10** # 25

Rick, Tidstrom Broadcom

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

Table 46-4

For RXC = 1, RXD = 06, the description is:

assert low power (only valid in lane 0)

It does not describe what is sent on XGMII lanes 1,2, and 3. Does that mean that RS layer is free to tranmit whatever it wants, including data on lanes 1-3, and the PHY will completley ignore on what is on those lanes, or are Idle characters expected on lanes 1-3.

Is there some reason that RXD = 06 is not sent on all four lanes?

SuggestedRemedy

Define what charaters are valid on lanes 1-3 while LPI character is on lane 0.

Proposed Response *Response Status* **O**

Cl **46** *SC* **46.3.2.4a** *P* **126** *L* **11** # 66

Pillai, Velu Broadcom

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

The diagram or the description does not mention RX_CLK stopping after 128 clock cycles.

SuggestedRemedy

The MAC device may halt RX_CLK at any time more than 128 clock cycles after the start of the low power

Also show it in Fig 46-8a

Proposed Response *Response Status* **O**

Cl **46** *SC* **46.3.2.4a** *P* **126** *L* **11** # 26

Rick, Tidstrom Broadcom

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

The sentence does not specify the condtions for RX_CLK to be halted by the PHY.

"The PHY may halt RX_CLK at any during the low power idle state as shown in Figure 46-8a if and only if the clock stoppable bit is asserted".

SuggestedRemedy

Define requirements to halt RX_CLK.

For the TX_CLK, it may be halted at any time more than 128 clock cylces after the start of low power idle.

Proposed Response *Response Status* **O**

Cl **46** *SC* **46.3.2.4a** *P* **126** *L* **20** # 82

Michael, Grimwood Broadcom Corporation

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

Figure 46-8a shows the wrong value for RXD<7:0> during wake time.

SuggestedRemedy

Show RXD<7:0> = 0x07 during the period shown as "wake time".

Proposed Response *Response Status* **O**

Cl **46** *SC* **46.3.2.4a** *P* **126** *L* **9** # 191

Pillai, Velu Broadcom

Comment Type **TR** *Comment Status* **D** *late*

deasserting RXC<0> and returning to a normal inter-frame state.

For MII and GMII showing the RXD as "zero" was valid, but in XGMII an idle is "07".

SuggestedRemedy

Hence it should be:

deasserting RXC<0> and asserting RXD<7:0> to 07 during the wake time.

Proposed Response *Response Status* **O**

Cl **48** *SC* **48.2.4.2** *P* **131** *L* **7** # 83

Michael, Grimwood Broadcom Corporation

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

Clarify the ordered set rules for the detection of LP_IDLE.

SuggestedRemedy

Change:

"All other !|||| 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 a row which will result in all columns reporting LP_IDLE."

To:

"All other !|||| 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/ or /R/, results in all rows reporting LP_IDLE.

Proposed Response *Response Status* **O**

Cl **48** *SC* **48.2.4.2.f** *P* **131** *L* **9** # 192

Pillai, Velu Broadcom

Comment Type **TR** *Comment Status* **D** *late*

Idle) being detected in a row which will result in all columns reporting LP_IDLE.

SuggestedRemedy

Idle) being detected in any row and the rest of the rows in the same column being detected /K/ or /R/, will result in reporting LP_IDLE in lane 0 and IDLE in lane 1 to 3

Proposed Response *Response Status* **O**

Cl **48** *SC* **48.2.6.2.2** *P* **134** *L* **31** # 204

Barrass, Hugh Cisco

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

align_status is no longer controlled solely by align state machine.

SuggestedRemedy

Change 48.2.6.2.2 Synchronization

change align_status flag is set to FAIL to deskew_align_status flag is set to FAIL

Proposed Response *Response Status* **O**

Cl **48** *SC* **48.2.6.2.3** *P* **134** *L* **32** # 205

Barrass, Hugh Cisco

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

align_status is no longer controlled solely by align state machine.

SuggestedRemedy

Add variable deskew_align_status into 48.2.6.1.3

Change align_status > deskew_align_status in 48-8.

Change 48.2.6.2.3 Deskew

The PCS shall implement the Deskew process as depicted in Figure 48–8 including compliance with the associated state variables as specified in 48.2.6.1. The Deskew process is responsible for determining whether the underlying receive channel is capable of presenting coherent data to the XGMII. The Deskew
process asserts the deskew_align_status flag to indicate that the PCS has successfully deskewed and aligned code-groups on all lanes. The Deskew process attempts deskew and alignment whenever the deskew_align_status flag is de-asserted. The Deskew process is otherwise idle. If the optional Low Power Idle function is not implemented then align_status is identical to deskew_align_status. Otherwise the relationship between align_status and deskew_align_status is given by 48-9b the LPI receive state diagram. Whenever the align_status flag is set to FAIL the condition is indicated as a link_status=FAIL condition in the status register bit 4.1.2 or 5.1.2.

Proposed Response *Response Status* **O**

Cl **48** *SC* **48.2.6.2.5** *P* **135** *L* **11** # 206

Barrass, Hugh Cisco

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

State TX_ACTIVE needs to set tx_quiet = false

SuggestedRemedy

Add a term tx_quiet <= false

Proposed Response *Response Status* **O**

Cl **48** *SC* **48.2.6.2.5** *P* **136** *L* **32** # 209

Barrass, Hugh Cisco

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

Transition from RX_WAKE needs to include align status and no timeout.

SuggestedRemedy

Change transition out of RX_WAKE from ||LPIDLE||

to !rx_tw_timer_done * deskew_align_status=OK * ||LPIDLE||

Proposed Response *Response Status* **O**

Cl **48** *SC* **48.2.6.2.5** *P* **136** *L* **34** # 193

Pillai, Velu Broadcom

Comment Type **TR** *Comment Status* **D** *late*

There is no exit condition from RX_LINK_FAIL state other than "reset=TRUE".

SuggestedRemedy

Will come up with a suggestion.

Proposed Response *Response Status* **O**

Cl **48** *SC* **48.2.6.2.5** *P* **136** *L* **36** # 210
Barrass, Hugh Cisco

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

Transition from RX_WAKE needs to include align status and no timeout.

SuggestedRemedy

Change transition out of RX_WAKE from ||IDLE||

to !rx_tw_timer_done * deskew_align_status=OK * ||IDLE||

Proposed Response *Response Status* **O**

Cl **48** *SC* **48.2.6.2.5** *P* **136** *L* **37** # 211
Barrass, Hugh Cisco

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

align_status is no longer controlled solely by align state machine.

SuggestedRemedy

In state RX_LINK_FAIL, add a term align_status <= FAIL

Proposed Response *Response Status* **O**

Cl **48** *SC* **48.2.6.2.5** *P* **136** *L* **6** # 207
Barrass, Hugh Cisco

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

align_status is no longer controlled solely by align state machine.

SuggestedRemedy

In state RX_ACTIVE, add a term align_status <= deskew_align_status

Proposed Response *Response Status* **O**

Cl **48** *SC* **48.2.6.2.5** *P* **136** *L* **8** # 208
Barrass, Hugh Cisco

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

align_status is no longer controlled solely by align state machine.

SuggestedRemedy

Change transition out of state RX_ACTIVE from ||IDLE||

to ||IDLE|| + align_status != deskew_align_status

Proposed Response *Response Status* **O**

Cl **48** *SC* **48.2.6.2.6** *P* **137** *L* **22** # 212
Barrass, Hugh Cisco

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

The MDIO status variables need to be here (not Clause 71)

SuggestedRemedy

Add a new section 48.2.6.2.6, with the information currently in Table 71-3

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.2.2** *P* **142** *L* **16** # 214
Barrass, Hugh Cisco

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

block lock is no longer controlled solely by lock state machine.

SuggestedRemedy

Add rx_block_lock

Description same as block_lock - from the lock state diagram. used to generate block_lock, may be overridden by the optional LPI receive state machine

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.2.2** *P* **142** *L* **32** # 215

Barrass, Hugh Cisco

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

For 10GBASE-KR, tx_quiet needs to indicate refresh & wake states (i.e. 4 values).

SuggestedRemedy

change tx_quiet definition to

An enumerated variable set to TRUE when the transmitter is in the TX_QUIET state, set to REFRESH when the transmitter is to send refresh signaling, set to WAKE when the transmitter is to send wake signaling and set to FALSE otherwise. When set to TRUE, the PMD will disable the transmitter as described in 71.6.6. When set to REFRESH or WAKE the PMD will send training signals as described in 71.6.12.

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.2.5** *P* **143** *L* **15** # 216

Barrass, Hugh Cisco

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

Need a wake timer

SuggestedRemedy

add

tx_tw_timer

This timer is started when the PMD's receiver enters the TX_WAKE state. The timer terminal count is set to TWL. When the timer reaches terminal count it will set the tx_tw_timer_done = TRUE.

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.2.6** *P* **143** *L* **23** # 217

Barrass, Hugh Cisco

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

tx_quiet definition has changed.

SuggestedRemedy

change PMD_TXQUIET message definition to

A signal sent by the PCS/PMA LPI transmit state machine to the PMD. When TRUE this indicates that the transmitter is in a quiet state and may cease to transmit a signal on the medium. When REFRESH or WAKE this indicates that the transmitter must send specific signals to support LPI operation.

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.3** *P* **143** *L* **37** # 218

Barrass, Hugh Cisco

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

block lock is no longer controlled solely by lock state machine.

SuggestedRemedy

Change fig 49-12 Lock state diagram

block_lock -> rx_block_lock
6 instances

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.3.1** *P* **146** *L* **11** # 219

Barrass, Hugh Cisco

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

State TX_ACTIVE needs to set tx_quiet = false

SuggestedRemedy

Add a term tx_quiet <= false

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.3.1** *P* **146** *L* **17** # 220

Barrass, Hugh Cisco

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

A new state is required to control sending extra training frames during a wake cycle for 10GBASE-KR

SuggestedRemedy

Add a state TX_WAKE.

includes term tx_quiet <= wake

Transitions from TX_QUIET & TX_REFRESH with T_TYPE(tx_raw) != LI go into new state.

After tx_tw_timer expires, transition to TX_ACTIVE.

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.3.1** *P* **146** *L* **38** # 221

Barrass, Hugh Cisco

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

tx_quiet indicates that the tx state machine is in state TX_REFRESH.

SuggestedRemedy

In state TX_REFRESH change tx_quiet <= false to tx_quiet <= refresh

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.3.1** *P* **147** *L* **32** # 224

Barrass, Hugh Cisco

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

Transition from RX_WAKE needs to include lock status and no timeout.

SuggestedRemedy

Change transition out of RX_WAKE from R_TYPE(rx_raw) = LI

to !rx_tw_timer_done * rx_block_lock=OK * R_TYPE(rx_raw) = LI

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.3.1** *P* **147** *L* **36** # 226

Barrass, Hugh Cisco

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

block lock is no longer controlled solely by lock state machine.

SuggestedRemedy

In state RX_LINK_FAIL add a term block_lock <= false

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.3.1** *P* **147** *L* **38** # 225

Barrass, Hugh Cisco

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

Transition from RX_WAKE needs to include lock status and no timeout.

SuggestedRemedy

Change transition out of RX_WAKE from R_TYPE(rx_raw) != LI

to !rx_tw_timer_done * rx_block_lock=OK * R_TYPE(rx_raw) != LI

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.3.1** *P* **147** *L* **6** # 222

Barrass, Hugh Cisco

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

block lock is no longer controlled solely by lock state machine.

SuggestedRemedy

In state RX_ACTIVE add a term block_lock <= rx_block_lock

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.3.1** *P* **147** *L* **8** # 223
Barrass, Hugh Cisco

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

block lock is no longer controlled solely by lock state machine.

SuggestedRemedy

Change transition out of RX_ACTIVE from

R_TYPE(rx_raw) != LI

to

R_TYPE(rx_raw) != LI + block_lock != rx_block_lock

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.13.3.1** *P* **148** *L* **7** # 227
Barrass, Hugh Cisco

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

A new parameter is needed for wake time

SuggestedRemedy

add

TWL Local Wake Time from LPI deasserted to TX_ACTIVE state 10 us

also change Tsl and Tul to 5 us

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.14.1** *P* **148** *L* **22** # 228
Barrass, Hugh Cisco

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

The MDIO status variables need to be here (not Clause 72)

SuggestedRemedy

Change section 49.2.14.1, with the information currently in Table 72-3

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.2.9** *P* **140** *L* **38** # 213
Barrass, Hugh Cisco

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

block lock is no longer controlled solely by lock state machine.

SuggestedRemedy

Change 49.2.9 Block synchronization

Add a paragraph

If the optional Low Power Idle function is not implemented then block_lock is identical to rx_block_lock. Otherwise the relationship between block_lock and rx_block_lock is given by 49-15 the LPI receive state diagram.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55** *P* *L* # 162
Taich, Dimitry Teranetics

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

Replace "Low Power Mode" and all variation of this term by "Low Power Idle mode"

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.1.3** *P* **151** *L* **41** # 179
Law, David 3Com

Comment Type **ER** *Comment Status* **D** *late*

The Low power idle state isn't requested by the MAC - see model shown in Figure 22-20a (page 33).

SuggestedRemedy

Change the text '.. either the MAC or the link partner requests low power operation ..' to read '.. either the local or link system requests low power operation ..'.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.1.3** *P* **151** *L* **43** # 180

Law, David 3Com

Comment Type **ER** *Comment Status* **D** *late*

'Maintian link quality' is very broad and really what is happening is a tracking of the changes in the channel characteristics. Suggest text parallel to that used in 1000BASE-T would be better.

SuggestedRemedy

Suggest 'While the link is in the lower power mode a periodic refresh signal is used to maintain link quality.' be changed to read 'While the PHY is in lower power mode the PHY periodically transmits a refresh signal to allow the remote PHY to refresh its receiver state (e.g. timing recovery, adaptive filter coefficients) and thereby track long term variation in the timing of the link or the underlying channel characteristics.'.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.1.3** *P* **151** *L* **44** # 181

Law, David 3Com

Comment Type **E** *Comment Status* **D** *late*

I believe we are using the term wake rather than alert.

SuggestedRemedy

Suggest 'An alert signal ..' is changed to read 'A wake signal ..'.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.1.3** *P* **151** *L* **44** # 163

Taich, Dimitry Teranetics

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

full data rate mode is not a good term. In fact, we don't adjust data rate mode at any stage.

SuggestedRemedy

Replace "full data rate mode" to "Normal operational mode"

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.1.3.3** *P* **153** *L* **21** # 105

Barrass, Hugh Cisco

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

"asynchronously" is not the right word in this context.

SuggestedRemedy

not asynchronously, independently

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.1.3.3** *P* **153** *L* **26** # 27

Rick, Tidstrom Broadcom

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

The sub-clause states that "In the transmit direction the transition to low power transmit mode begins when the PCS transmit function detects a 64B/65B block composed of LP_IDLE codewords".

The PCS transmit function does not detect 64B/65B blocks, it generates them.

SuggestedRemedy

Change sentence like shown below:

In the transmit direction the transition to low power transmit mode begins when the PCS transmit function detects an LPI control character in Lane 0 of two consectutive trannsfers of TXD[31:0] that will be mapped into a single 64B/65B. block.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.1.3.3** *P* **153** *L* **29** # 42

Rick, Tidstrom Broadcom

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

"The sleep signal is composed of repeated LP_IDLE codewords".

The word "codeword" is currently not used in clause-55.

SuggestedRemedy

Replace codewords with 64B/65B blocks.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.1.3.3** *P* **153** *L* **34** # 43

Rick, Tidstrom Broadcom

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

The quiet-refresh cycle continues until the PCS function detects IDLE codewords on the XGMII interface. The word "codeword" is not currently used in clause 55.

SuggestedRemedy

Replace codewords with characters.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.1.3.3** *P* **153** *L* **34** # 28

Rick, Tidstrom Broadcom

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

"The quiet-refresh cycle continues until the PCS function detects IDLE codewords on the XGMII interface."

This statement is vague as to what is required to exit low power idle.

Is a single IDLE character sufficient, or is two consecutive transfers of TXD[31:0] that map into a single 64B/65B block, with all lanes containing IDLE characters required to exit low power idle?

SuggestedRemedy

Change to a more specific sentence to define the exit criteria.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.1.3.3** *P* **153** *L* **39** # 164

Taich, Dimitry Teranetics

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

We don't modify data rate - it is always 10Gb/s. We only force device to be operated in Normal mode or Low Power Idle mode.

SuggestedRemedy

Replace "link again supports the full 10Gb/s data rate" by "Normal operational mode is resumed"

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.1.3.3** *P* **153** *L* **39** # 44

Rick, Tidstrom Broadcom

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

Line 43
Line 51

The word "codewords" is not currently used in clause 55.

SuggestedRemedy

Replace codewords with 64B/65B blocks.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.1.3.3** *P* **153** *L* **51** # 165

Taich, Dimitry Teranetics

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

We don't modify data rate - it is always 10Gb/s. We only force device to be operated in Normal mode or Low Power Idle mode.

SuggestedRemedy

Replace "link again supports the full 10Gb/s data rate" by "Normal operational mode is resumed"

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.2.2.3.1** *P* **156** *L* **3** # 169

Taich, Dimitry Teranetics

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

In addition to two listed cases, "SYMB_4D" primitive should take value of SEND_Z during last 128 symbols of the Alert pattern

SuggestedRemedy

Update 55.2.2.3.1 accordingly

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.14** *P* **158** *L* **45** # 133
Parnaby, Gavin Solarflare Communica

Comment Type **E** *Comment Status* **D**
The reference to Figure 55-14 is incorrect.

SuggestedRemedy
Change reference to Figures 55-15 and 55-16

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **13** # 91
Michael, Grimwood Broadcom Corporation

Comment Type **E** *Comment Status* **D**
Typo, "...during while..."

SuggestedRemedy
Elminate the word "during".

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **13** # 135
Parnaby, Gavin Solarflare Communica

Comment Type **E** *Comment Status* **D**
'during while' should be while.

[also the formatting of these two paragraphs looks wrong].

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **16** # 45
Rick, Tidstrom Broadcom

Comment Type **E** *Comment Status* **D**
Codewords is not currently used in clause 55.

SuggestedRemedy
Replace LPI codewords with LPI characters.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **16** # 30
Rick, Tidstrom Broadcom

Comment Type **TR** *Comment Status* **D**
The sentence states:

After a complete 64B/65B block of LPI codewords is detected at the XGMII,

The PCS transmit function does not detect 64B/65B blocks, it generates them.

SuggestedRemedy
Change sentence to:

After a complete 64B/65B block of LPI characters is generated by the PCS transmit function,

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **18** # 46
Rick, Tidstrom Broadcom

Comment Type **E** *Comment Status* **D**
Line 19

The word codeword is not currently used in clause 55.

SuggestedRemedy
Change from: LP_IDLE XGMII codewords.

to: LP_IDLE 64B/65B blocks.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **22** # 31

Rick, Tidstrom Broadcom

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

The sentence below is not correct:

The quiet-refresh is repeated until IDLE or LF codewords are detected at the XGMII.

The current standard does not support the MAC sending a LF to wake-up the PHY. Only IDLE characters should be used to wake-up the PHY. If the MAC wants to send a LF, it needs to send IDLE characters to wake-up the PHY. Then after the PHY is awake, it can send the LF.

SuggestedRemedy

Change sentence to:

The quiet-refresh is repeated until IDLE codewords are detected at the XGMII.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **28** # 32

Rick, Tidstrom Broadcom

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

The following sentence is not true:

IDLE codewords can be presented at the XGMII at any time after the time period specified by the lpi_wake_timer for the selected lpi_tx_wake_time parmater.

There is not any restriction on when an IDLE character may be sent. IDLE characters are required to wake up the PHY.

SuggestedRemedy

Delete the sentence, or make note that only IDLE characters or LP_IDLE characters may be transmitted within the lpi_wake_timer period.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **3** # 68

Dietz, Bryan Alcatel-Lucent

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

The three paragraphs titled "LPI Capability" are confusing and could be edited to be easier for implementors to understand. Suggest that the information be reorganized and broken into shorter paragraphs.

SuggestedRemedy

Replace the three paragraphs with the following edited version:

The optional LPI 10GBASE-T capability allows compliant PHYs to transition to LPI mode of operation when link utilization is low. The EEE transmit state diagram, Figure 55-19, shows how the link enters and leaves LPI mode.

When PCS_Reset is asserted the state diagram enters the TX_NORMAL state.

The PCS initiates a transition to the lower power transmit mode when it detects LP_IDLE codewords on the XGMII interface.

After a complete 64B/65B block of LPI codewords is detected at the XGMII, the PHY transmits the Sleep signal to indicate to the link partner that it is transitioning to the lower power transmit mode.

The Sleep signal comprises 9 full LDPC frames composed of LP_IDLE XGMII codewords encoded using the 65B-LDPC coding technique. The 9 full frames may be preceded by a partial frame of LP_IDLE XGMII codewords.

The PCS turns off the transmit signal through the PMA_UNITDATA.request primitive using the lpi_tx_mode variable after the PMA asserts SEND_N.

After the Sleep signal is transmitted LP_IDLE symbols shall be input to the PCS scrambler continuously until the PCS Transmit Function exits the lower power transmit mode.

When the lpi_tx_mode variable takes the value QUIET the PCS shall pass zeros to the PMA through the PMA_UNITDATA.request primitive.

Following the transmission of the Sleep signal, quiet/refresh signaling begins, as described in Clause 55.3.5.

When the lpi_tx_mode variable takes the value REFRESH_A the PCS shall pass the PMA training signal to the PMA on pair A, to allow both the local and remote PHY to refresh adaptive filters and timing loops. The PCS passes zeros to all other pairs while lpi_tx_mode has the value REFRESH_A. REFRESH_B, REFRESH_C and REFRESH_D operate in a similar manner for the other pairs.

The quiet-refresh cycle is repeated until IDLE or LF codewords are detected at the XGMII.

/I/ codewords indicate to the PCS transmit function that the MAC is requesting a transition

back to the full data mode. /LF/ codewords indicate to the PCS transmit function that an error condition has occurred. Either of these events cause the PCS transmit function to set the PMA_UNITDATA.request message to the value ALERT.

The alert signal is not synchronized with respect to the refresh/quiet cycle but shall be synchronized so that the alert signal from the PMA begins on a LDPC frame boundary.

After the Alert message the PCS completes the transition from low power idle mode to normal mode by sending a Wake signal which is composed of lpi_wake_time repeated /I/ codewords encoded using the 65B-LDPC coding technique if an error condition is not detected, or lpi_wake_time repeated local fault characters if an error has been detected.

The PCS initiates return to normal mode by sending IDLE code words on the XGMII interface. IDLE codewords can be presented at the XGMII at any time after the time period specified by lpi_wake_timer for the selected lpi_tx_wake_time parameter.

The lpi_wake_time is a parameter that is resolved during Auto-Negotiation as described in 55.6.3. lpi_wake_time is an integer multiple of LDPC frames, chosen from the values shown in Table 55-2 below. The lpi_wake_timer value shown in the table is the maximum PHY wake time value equivalent to Tw_phy as defined by Clause 78).

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **31** # 47

Rick, Tidstrom Broadcom

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

The word codewords is not currently used in clause 55.

SuggestedRemedy

Change from:

/I/ codewords encoded using the 65B-LDPC coding technique.

to:

/I/ 64B/65B blocks.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **32** # 33

Rick, Tidstrom Broadcom

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

The following statement is vague with regard to error:

"or lpi_wake_time repeated local fault characters if an 'error' has been detected."

SuggestedRemedy

"Error" needs to be defined as any character that is received other than an IDLE or LP_IDLE character while the PHY is in low power mode.

Also, local fault characters should be changed to Local Fault blocks.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **33** # 106

Barrass, Hugh Cisco

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

(This is designated as a "TR" although it has no meaning in Task Force review)

The variable wake time in Table 55-2 and the variable refresh time in Table 55-3 create an inordinate number of PHY implementation permutations and create a test and interoperability nightmare.

For example if only one implementer chooses to use an aggressive wake time for the first generation and others choose a longer wake time, then that PHY will be released on the market without any interoperability testing that uses the faster wake time. Much later, after many devices are in the field, other implementers will make more aggressive wake times and suddenly we will have severe interoperability problems.

The implementers involved in this standard should agree on the fastest wake time that they can all support and stick to that one. Similarly, the implementers should agree on the shortest refresh time that they can all implement and stick to that one.

SuggestedRemedy

This commenter believes that the following two values are ideal:

lpi_tx_wake_time = 5 frames
lpi_refresh_time = 4 frames

Change the text, tables, variable definitions and control functions to match these numbers.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **39** # 20

Rick, Tidstrom Broadcom

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

Table 55-2

The LPI wake time list the maximum LPI time. However, once sleep has been completed, the lpi_wake_timer values will be reduced by 10 frames for each lpi_tx_wake_time.

SuggestedRemedy

The current column should be renamed lpi_wake_timer during Sleep.

Another column should be added that is titled lpi_wake_timer after Sleep.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **159** *L* **4** # 29

Rick, Tidstrom Broadcom

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

The word codewords is not currently used in clause 55. The sentence below is also vague as to what is required for the PCS to enter low power idle.

"The PCS initiates a transition to the lower power transmit mode when it detects LP_IDLE codewords on the XGMII interface."

SuggestedRemedy

Change sentence to:

The PCS initiates a transition to the lower power transmit mode when it detects two consectuive transfers across the XGMII that will map into a single 64B/65B block, each with Lane 0 containing an LP_IDLE character.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.2.21** *P* **161** *L* **22** # 104

Barrass, Hugh Cisco

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

Column headings are reversed.

SuggestedRemedy

Reverse the column headings.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.3** *P* **160** *L* **12** # 48

Rick, Tidstrom Broadcom

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

Line 13
Line 15
Line 22
Line 23
Line 24
Line 35

The word codeword is not currently used in clause 55.

SuggestedRemedy

Replace codewords with blocks.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.3** *P* **160** *L* **46** # 52

Rick, Tidstrom Broadcom

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

The values for quiet and refresh are reversed.

SuggestedRemedy

From: All EEE-capable PHY's shall support the lpi_quiet_time=32, lpi_refresh_time=96.

To: All EEE-capable PHY's shall support the lpi_quiet_time=96, lpi_refresh_time=32.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.2.3** *P* **160** *L* **7** # 136

Parnaby, Gavin Solarflare Communica

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

PCS_Status asserted okay is not described consistently on this page. See lines 7 and line 33.

SuggestedRemedy

Change both to PCS_status=OKAY

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.3.3.21** *P* **159** *L* **39** # 166
Taich, Dimitry Teranetics

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

this comment concerning table 55-2. While I agree with maximum PHY wake time, I suggest adding typical wake time. Max time is calculated assuming that MAC decided to activate local PHY immediately after LP_IDLE codeword is presented on XGMII I/O. While this is possible scenario it is also very rare case statistically and probably indicating not optimal resources management as well. Adding typical case - without counting SLEEP frames - should provide more realistic picture on the expected Wake time. Also explicit explanation what makes wake time to increase (requesting switching back to normal mode while PHY still transmits SLEEP frames) will be useful as well.
It is done - partially - in clause 78. We can chouse to update clause 78 rather then 55.

SuggestedRemedy

See comment's body

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5** *P* **160** *L* **33** # 158
Tellado, Jose Teranetics

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

Change "=OKAY" to "=OK"

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5** *P* **161** *L* **20** # 167
Taich, Dimitry Teranetics

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

Columns in Table 55-3 seem to be reversed

SuggestedRemedy

Fix table according to the comment

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5** *P* **161** *L* **22** # 17
Rick, Tidstrom Broadcom

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

Table 55-3

The values below the lpi_quiet_time header are for refresh.
The values below the lpi_refresh_time header are for quiet.

SuggestedRemedy

Reverse the column headers.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5** *P* **161** *L* **33** # 119
Parnaby, Gavin Solarflare Communica

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

'modee' should be mode

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5** *P* **161** *L* **33** # 49
Rick, Tidstrom Broadcom

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

The word "mode" is misspelled as "modee".

SuggestedRemedy

Change spelling to mode

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5** *P* **174** *L* **9** # 168

Taich, Dimitry Teranetics

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

Editors note includes reference to taich_01_1108.pdf regarding test modes. This presentation contains very specific recommendations as readers to new test modes definition. I believe it would be beneficial to update draft with proposed test modes definition and encourage readers to comment. Current form does not seem to do it successfully.

SuggestedRemedy

Update draft with test modes proposal as in taich_01_1108.pdf

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.1** *P* **161** *L* **50** # 120

Parnaby, Gavin Solarflare Communica

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

The text needs to clarify the way the slave signals the transition to PCS_Test (is any signaling necessary?).

SuggestedRemedy

Presentation to be made at the January meeting.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.1** *P* **162** *L* # 161

Tellado, Jose Teranetics

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

Table 55-4
Headings row is misleading. The variables master[slave]_ldpc_frame_cnt do not exist. This table refers to tx_ldcp_frame for the master and for the slave

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.1** *P* **162** *L* # 159

Tellado, Jose Teranetics

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

why isn't the "v=" column equal to the "u=" column offset by approx lpi_offset?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.1** *P* **162** *L* # 156

Tellado, Jose Teranetics

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

Is "." accepted as a multiplication symbols?

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.2** *P* **162** *L* **33** # 89

Michael, Grimwood Broadcom Corporation

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

Clarify the interval of the quiet period applicable to the maximum power specification.

SuggestedRemedy

Change:

Average Launch Power (as measured 28 LDPC frames after Refresh period and 28 LDPC frames before the next Refresh period on the same lane) for each Transmitter shall be less than -41dBm.

To:

Average Launch Power (as measured 28 LDPC frames or more after a Refresh period and up to 28 LDPC frames before the next Refresh period on the same lane) for each Transmitter shall be less than -41dBm.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.2.2** *P* **163** *L* **1** # 121

Parnaby, Gavin Solarflare Communica

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

The subclause number is incorrect.

SuggestedRemedy

Change 55.3.5.2.2 to 55.3.7.2 [assuming subclause 55.3.6 is renumbered to 55.3.7 due to the new 55.3.5 LPI clause].

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.2.2** *P* **163** *L* **40** # 170

Taich, Dimitry Teranetics

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

lpi_tx_mode variable definition should be determined by tx_active_pair value. Currently all four pairs active/quiet share same calculation formula - seems like copy-paste typo.

SuggestedRemedy

Fix lpi_tx_mode variable definition as below:
The variable is set to REFRESH_A when tx_lpi_active * (tx_active_pair==PAIR_A * tx_refresh active).

The variable is set to REFRESH_B when tx_lpi_active * (tx_active_pair==PAIR_B * tx_refresh active).

The variable is set to REFRESH_C when tx_lpi_active * (tx_active_pair==PAIR_C * tx_refresh active).

The variable is set to REFRESH_D when tx_lpi_active * (tx_active_pair==PAIR_D * tx_refresh active).

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.2.2** *P* **163** *L* **43** # 123

Parnaby, Gavin Solarflare Communica

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

Extra . in the sentence.

Also remove 'the' before tx_symb_vector on line 45.

SuggestedRemedy

remove .

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.2.2** *P* **163** *L* **5** # 122

Parnaby, Gavin Solarflare Communica

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

Several 'Sleep's on this page

SuggestedRemedy

Change to sleep to match 55.3.5

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.2.2** *P* **164** *L* **43** # 124

Parnaby, Gavin Solarflare Communica

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

The font is incorrect.

SuggestedRemedy

Use the correct font.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.2.2** *P* **169** *L* # 125
Parnaby, Gavin Solarflare Communica

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

A transition from SEND_SLEEP to SEND_QUIET is missing.

See Rick Tidstrom's presentation from Dallas

SuggestedRemedy

Add the transition back in.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.3** *P* **162** *L* **46** # 157
Tellado, Jose Teranetics

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

Change PAM-2 to PAM2. Multiple locations

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.3** *P* **162** *L* **51** # 18
Rick, Tidstrom Broadcom

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

The following senetence is not true:

"When the tx_symb_vector has the value ALERT the transmitter on pair A shall be active, and all other pairs shall be quiet".

The master transmits Alert on Channel A.
The slave transmits Alert on Channel C.

SuggestedRemedy

Fix sentence to address Master and Slave.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.3** *P* **163** *L* **36** # 140
Dietz, Bryan Alcatel-Lucent

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

Definition of lpi_tx_mode could be clarified by minor editing.

SuggestedRemedy

Please break up paragraph into a bullet list with entries like

"The variable is set to REFRESH_A if ...
"The variable is set to REFRESH_B if ...

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.4** *P* **166** *L* # 131
Parnaby, Gavin Solarflare Communica

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

This entire diagram needs dashed lines around it to indicate it is only required for EEE capable PHYs.

SuggestedRemedy

Add a dashed line around the entire diagram on this page

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.4** *P* **166** *L* **31** # 37
Rick, Tidstrom Broadcom

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

This comment is relative to comment 29 about the SEND_ERROR state of the EEE transmit state diagram.

Since it is recommended that the SEND_ERROR state transmit a Local Fault instead of an /ERROR/ character, the TX_WE state should not transition to the TX_E state.

SuggestedRemedy

Change transition from TX_WE to TX_C.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.4** *P* **168** *L* # 132

Parnaby, Gavin Solarflare Communica

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

This entire diagram needs dashed lines around it to indicate it is only required for EEE capable PHYs.

SuggestedRemedy

Add a dashed line around the entire diagram on this page

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.4** *P* **168** *L* **19** # 38

Rick, Tidstrom Broadcom

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

Line 20
Line 21

This comment is relative to the previous two comments about transmitting a Local Fault instead of an /ERROR/ character when exiting with Error from low power mode.

During Wake from LPI, the RX_W should only get IDLE characters or /LF/ characters.

Also if the lpi_rx_wake_timer_done = true happens without seeing an /I/ or a /LF/ means that all of the Wake Frames were bad. Instead of going to RX_C the FSM should transition to RX_E.

SuggestedRemedy

Change transition condition from RX_W to RX_C to be:

R_TYPE(rx_coded) = I + R_TYPE(rx_coded) = LF

Change transition condition from RX_W to RX_E to be
lpi_rx_wake_timer_done = true

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.4** *P* **169** *L* # 134

Parnaby, Gavin Solarflare Communica

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

The state diagram needs to make it clear that it is only for EEE capable PHYs.

SuggestedRemedy

Add a box saying the state diagram is only implemented for EEE capable PHYs.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.3.5.4** *P* **169** *L* **36** # 36

Rick, Tidstrom Broadcom

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

For the SEND_ERROR state, the value for tx_coded is shown as

tx_coded <= ERROR.

The SEND_ERROR state is entered when the PCS transmit function receives a character other than IDLE of LP_ILDE while in low power mode. The /E/ character is not the best charcater to send to indicate that the MAC has sent an invalid character.

SuggestedRemedy

The value should be changed to Local Fault.

tx_coded <= /LF/

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.4.2.2.1** *P* **171** *L* **27** # 34

Rick, Tidstrom Broadcom

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

The following sentence is not correct:

All other pairs shall transmit quiet or refresh as described in subclause 55.3.5.

Refresh is not transmitted while Alert is being transmitted.

SuggestedRemedy

Change sentence to:

"All other pairs shall transmit quiet as described in subclause 55.3.5."

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.4.2.2.1** *P* **171** *L* **27** # 171

Taich, Dimitry Teranetics

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

Text reads as following: "The alert signal shall be transmitted on pair A when the PHY operates as a MASTER. The Alert signal shall be transmitted on pair C when the PHY operates as a SLAVE. All other pairs shall transmit quiet or refresh as described in subclause 55.3.5." Last sentence is incorrect.

SuggestedRemedy

modify last sentence to read "All other pairs shall transmit quiet (SEND_Z symbols) as described 55.3.5."

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.4.2.4** *P* **172** *L* # 127

Parnaby, Gavin Solarflare Communica

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

There needs to be text added refering to Figure 55-24.

SuggestedRemedy

Add a line stating that Figure 55-24 is the EEE receive state diagram, which must be implemented in PHYs that support the EEE capability.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.4.2.4** *P* **172** *L* **41** # 126

Parnaby, Gavin Solarflare Communica

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

'Sleep'

SuggestedRemedy

sleep

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.5.3.5** *P* **174** *L* **14** # 90

Michael, Grimwood Broadcom Corporation

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

Clarify that the 10GBASE-T LPI Transmit Clock Frequency specification is related to the rate of change of the clock.

Remove "transmit" from mode and add punctuation.

SuggestedRemedy

Change:
In the lower power transmit mode the transmitter clock short term frequency variation shall be less than 0.1 ppm/second.

To:

In the lower-power mode, the transmitter clock short term rate of frequency variation shall be less than 0.1 ppm/second.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.5.3.5** *P* **174** *L* **15** # 13

Kasturia, Sanjay Teranetics

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

The text in the draft calls for a 0.1ppm/second limit on the short term frequency variation of the transmitter clock in the low power transmit mode.
The commenter has solicited input from several industry experts on this specification and expects to have some feedback on this requirement. Based on the feedback received, the commenter may provide a suggested remedy at or prior to the meeting.

SuggestedRemedy

See presentation

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.6.1** *P* **175** *L* **2** # 35

Rick, Tidstrom Broadcom

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

Table 55-10

Defines number of valid wake frames as 1-9.

SuggestedRemedy

Change to 1,3,5,7,9. Since the number of wake values has been reduced from 9 to 5, the extended bit-field can be changed from U26:U23 to U25:U23 or U26:24.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.6.1** *P* **175** *L* **2** # 130

Parnaby, Gavin Solarflare Communica

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

TBDs in this table can be updated

SuggestedRemedy

Change both the TBDs on line 2 and 6 to "55.3.5 and 55.6.3".

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.6.1** *P* **175** *L* **2** # 129

Parnaby, Gavin Solarflare Communica

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

Valid values were updated in Mike Grimwood's presentation. The description is out of date.

SuggestedRemedy

Change the valid values to match those in grimwood_03_1108.pdf.

Proposed Response *Response Status* **O**

Cl **55** *SC* **55.6.3** *P* **175** *L* **29** # 160

Tellado, Jose Teranetics

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

why not smallest advertised lpi_regresh_time_value? Largest will always be 32.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **70** *SC* **70.1** *P* **179** *L* **10** # 229

Barrass, Hugh Cisco

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

There is no enable for LPI

SuggestedRemedy

Delete "When this capability is enabled"

Proposed Response *Response Status* **O**

Cl **70** *SC* **70.3a** *P* **179** *L* # 231

Barrass, Hugh Cisco

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

Reference is TBD & uses poor terminology.

SuggestedRemedy

change PCS LPI modes described in 36.2.2.x.

to PCS LPI behavior described in 36.2.5.2.8.

Proposed Response *Response Status* **O**

Cl **70** *SC* **70.3a** *P* **179** *L* **32** # 232
Barrass, Hugh Cisco

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

Reference is TBD & uses poor terminology.

SuggestedRemedy

Change PMA LPI modes described in 36.2.2.x.

to PMD LPI messages described in 36.2.5.1.6.

Proposed Response *Response Status* **O**

Cl **70** *SC* **70.6** *P* **180** *L* **8** # 233
Barrass, Hugh Cisco

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

LPI status should come from PCS.

SuggestedRemedy

Move (new) LPI status to Clause 36.

Proposed Response *Response Status* **O**

Cl **70** *SC* **70.6.10** *P* **181** *L* **21** # 230
Barrass, Hugh Cisco

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

Typo

SuggestedRemedy

Change PDM to PMD

Proposed Response *Response Status* **O**

Cl **70** *SC* **70.6.4** *P* **178** *L* **52** # 155
Bennett, Michael LBNL

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

"For baseline operation, its definition is beyond the scope of this specification" makes no sense to me. In the previous sentence, baseline operation is specified as mandatory for Energy Efficient Ethernet, but the definition is beyond the scope of this specification.

SuggestedRemedy

Define baseline operation

Proposed Response *Response Status* **O**

Cl **71** *SC* **71.1** *P* **186** *L* **43** # 234
Barrass, Hugh Cisco

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

There is no enable for LPI

SuggestedRemedy

Delete "When this capability is enabled"

Proposed Response *Response Status* **O**

Cl **71** *SC* **71.5** *P* **188** *L* **9** # 236
Barrass, Hugh Cisco

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

LPI status should come from PCS.

SuggestedRemedy

Move (new) LPI status to Clause 48.

Proposed Response *Response Status* **O**

Cl **71** *SC* **71.6.12** *P* **189** *L* **19** # 235

Barrass, Hugh Cisco

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

Typo

SuggestedRemedy

Change PDM to PMD

Proposed Response *Response Status* **O**

Cl **72** *SC* **72.1** *P* **196** *L* **35** # 237

Barrass, Hugh Cisco

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

There is no enable for LPI

SuggestedRemedy

Delete "When this capability is enabled"

Proposed Response *Response Status* **O**

Cl **72** *SC* **72.3** *P* **197** *L* **40** # 238

Barrass, Hugh Cisco

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

LPI status should come from PCS.

SuggestedRemedy

Move (new) LPI status to Clause 49.

Proposed Response *Response Status* **O**

Cl **72** *SC* **72.6.10.2.3.3** *P* **199** *L* **27** # 239

Barrass, Hugh Cisco

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

refresh & wake are signaled from PCS.

SuggestedRemedy

Change the last sentence to read.

When tx_quiet has the values REFRESH or WAKE states the coefficient update fields shall be set to hold.

Proposed Response *Response Status* **O**

Cl **72** *SC* **72.6.10.2.4.5** *P* **200** *L* **51** # 240

Barrass, Hugh Cisco

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

refresh & wake are signaled from PCS.

SuggestedRemedy

Change the last sentence to read.

When tx_quiet has the values REFRESH or WAKE states the coefficient status shall not be updated.

Proposed Response *Response Status* **O**

Cl **72** *SC* **72.6.11** *P* **201** *L* **1** # 241

Barrass, Hugh Cisco

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

Having the stateful definition in this clause is redundant when it is already specified in clause 49. The signaling contained in the training frames during refresh & wake is defined above.

The LPI transmit state function adds no new information & can be deleted. 10 training frames (refresh) is approx. the same as 4.5uS, 20 frames is 9uS. Instead of defining a different state machine to send training frames during refresh & wake define that the transmitter sends training frames continuously when tx_quiet = REFRESH or WAKE.

SuggestedRemedy

Delete this whole section and replace with...

define that the transmitter sends training frames continuously when tx_quiet = REFRESH or WAKE.

Receiver function needs change to training state machine (fig 72-5):

SEND_DATA state : rx_quiet = true --> new state RX_SLEEP

RX_SLEEP new state (training <= TRUE, signal_detect <= false): rx_quiet = false --> new state RX_WAKE

RX_WAKE new state : frame_lock --> new state RX_TRAINING

RX_TRAINING new state: rx_trained --> SEND_DATA

Also note that local coefficient values should be frozen during state RX_SLEEP and RX_WAKE.

[editor's note: synchronization with FEC function is not defined. If support for FEC with LPI is required then this must be addressed] (same as we have now!)

Proposed Response *Response Status* **O**

Cl **72** *SC* **72.6.11.3** *P* **201** *L* **50** # 141

Dietz, Bryan Alcatel-Lucent

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

Twr min and max values are surprising Min > max.

SuggestedRemedy

Check values and edit table if needed.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1.1** *P* **214** *L* **12** # 182

Law, David 3Com

Comment Type **TR** *Comment Status* **D** *late*

Line 7 onwards defines EEE operation mode as operation in Low Power Idle that allows systems on both sides of the link to disable portions of functionality to save power.

10Mb/s operation does not support such a mode. This is further confirmed by the list of PHYs found on lines 13 through 20 which does not include any 10Mb/s PHYs.

SuggestedRemedy

Delete '10Mb/s,' from the list.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1.1** *P* **214** *L* **23** # 183

Law, David 3Com

Comment Type **TR** *Comment Status* **D** *late*

Class D is necessary but not sufficient to specify the cabling since this can be either Category 5 or category 5e dependant on the year of the ISO/IEC 11801 standard. ISO/IEC 11801:1995 Class D is equivalent to Category 5, ISO/IEC 11801:2002 Class D is equivalent to Category 5e. We should also make the reference to the TIA standard clearer.

SuggestedRemedy

Suggest that '.. of class D (Category 5) or better cabling.' be change to read '.. Class D, or better, cabling as specified in ISO/IEC 11801:1995. This requirements can also met by Category 5 cable and components as specified in ANSI/TIA/EIA-568-A-1995.'.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1.1** *P* **214** *L* **24** # 184

Law, David 3Com

Comment Type **ER** *Comment Status* **D** *late*

The 10BASE-Te PHY is somewhat orthogonal to EEE as it doesn't support disabling functionality in attached systems during periods of low link utilization. It should therefore appear in a separate paragraph from Auto-Negotiation.

In addition, while 10BASE-Te reduces power consumption, and enables a move to more modern geometries, which again saves power, it is not clear what is meant by 'power consumption saving schemes'.

SuggestedRemedy

Change the text '.. power consumption saving schemes to ..' to simply read '.. power consumption saving to ..', make the text starting 'EEE also ..' into a separate paragraph.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1.3** *P* **215** *L* **3** # 69

Dietz, Bryan Alcatel-Lucent

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

The conceptual description can be edited to clarify it for new readers.

SuggestedRemedy

Replace text in section 78.1.3 with the following. Retain figures in the same position as in current draft.

Low Power Idle mode is an optional mode that allows power saving by switching off part of the communication device functionality when no data needs to be transmitted or/and received. The decision on whether system should enter or exit Low Power Idle mode is done on the MAC level and communicated to PHY level in order to allow power saving. Figure 78-1 shows the decision flow and agents involved.

In the transmit direction, entrance to Low Power Idle mode of operation is triggered by the reception of LP_IDLE codewords on the MAC interface. The specific interface depends on the communication standard being used, therefore this interface is shown as xxMII in the diagram.

Following reception of LP_IDLE codeword, PHY transmits a special LP_Sleep signal to communicate to the link partner that the local system is entering Low Power Idle mode.

In 100BASE-T and 10GBASE-T EEE modes, the transmit function of the local PHY enters a quiet mode after the LP_Sleep signal transmission.

In 1000BASE-T Low Power Idle mode, the transmit function of the local PHY enters a quiet mode after the local PHY transmits LP_Sleep and receives LP_Sleep from the remote PHY.

The transmit function of the local PHY is enabled Periodically to transmit LP_Refresh signals that are used by the link partner to update adaptive filters and timing circuits in order to maintain link integrity.

This quiet-refresh cycle continues until local MAC signals to the PHY that Low Power Idle mode should end by sending IDLE codewords. The transmit function in the PHY communicates this to the link partner by sending a special LP_Wake signal for a pre-defined period of time. Then the PHY enters Active_st and resumes normal operation mode.

In the receive direction, entering Low Power Idle mode is triggered by the reception of LP_Sleep signal from the link partner. This signals that the link partner is about to enter Low Power Idle mode. After sending the LP_Sleep signal, the link partner ceases transmission and enters LP_Quiet_st state. While Link partner is in LP_Quiet state, the local receiver can disable some functionality to reduce power consumption.

The link partner periodically transmits LP_Refresh signals that are used by the local PHY to update adaptive coefficients and timing circuits. This quiet-refresh cycle continues until

the link partner initiates transition back to full data mode by transmitting LP_Wake signal for a pre-determined period of time. This allows the local receiver to prepare for the normal operation. After a system specified recovery time the link supports nominal operational data rate.

Figure 78-2 illustrates general principles of the EEE-compliant transmitter operation.

If both link partner enter and exit Low Power Idle mode simultaneously this mode of operation is called symmetric. If each link partner can entrance and exit Low Power Idle mode independently this mode of operation is called asymmetric.

No data frames are lost or corrupted during the transition to or from the Low Power Idle mode.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1.3** *P* **216** *L* **28** # 187

Law, David 3Com

Comment Type **TR** *Comment Status* **D** *late*

The penultimate paragraph of subclause 78.1.3 states 'If both link partner enter and exit Low Power Idle mode simultaneously this mode of operation is called symmetric. If each link partner can entrance and exit Low Power Idle mode independently this mode of operation is called asymmetric.'.

As far as I can see all PHYs, including 1000BASE-T, support system entry and exit to power saving mode asymmetrically. In the one case of 1000BASE-T, the PHYs enters and exits power saving mode symmetric, all other PHYs enter and exit asymmetrically. Further the 1000BASE-T PHY still signals Low Power Idle requests asymmetrically.

Since system entry and exit to power saving is the same for all PHY types, defining two modes just to describe one PHYs entry and exit to power saving seems like a slightly complex approach and it would be better to simply mention this exception in the particular PHY in question.

SuggestedRemedy

I would prefer that specific mention of the symmetric and asymmetric modes are removed and that it is simply noted in 1000BASE-T that the PHY doesn't enter power saving mode until both ends of the link are signaling Low Power Idle. It should be further noted that Low Power Idle requests are passed from one end of the link to the other regardless and the system energy savings can be achieved even if the PHY is not in that mode.

If the consensus is not to remove symmetric and asymmetric mode, make it clear that the only impact is on the power savings of the PHY, that Low Power Idle is always passed across the link, and that system energy savings are always asymmetric.

See law_2_0109.pdf.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.1.3** *P* **216** *L* **3** # 50

Rick, Tidstrom Broadcom

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

LP_Quiet_st state is a typo

SuggestedRemedy

Change to LP_Quiet state

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.2.3** *P* **217** *L* **43** # 128

Parnaby, Gavin Solarflare Communica

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

Tw_phy is described as 'Period of time between reception IDLE signal appearing on the xxMII interface and when first codewords are permitted on the xxMII interface'

The IDLE signal is a codeword. I think the second part of the sentence should say 'first data codewords'

SuggestedRemedy

Rewrite as

Period of time between the transition from LP_IDLE to IDLE signalling on the xxMII interface and when the first data codewords are permitted on the xxMII interface.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.3** *P* **217** *L* **54** # 75

Michael, Grimwood Broadcom Corporation

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

Define the behavior of the PHY when it doesn't support EEE but receives LP_IDLE .

SuggestedRemedy

Insert new text after the first paragraph of 78.3:

If a PHY does not support EEE, either through its own capabilities or through those negotiated with its link partner, then it shall ignore any LP_IDLE codewords it receives.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.3** *P* **218** *L* **12** # 154

Bennett, Michael LBNL

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

e.g., 100BASE-KX should be 1000-KX

SuggestedRemedy

change 100BASE-KX to 1000-KX

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.4.1** *P* **219** *L* **14** # 188

Law, David 3Com

Comment Type **TR** *Comment Status* **D** *late*

This paragraph states 'Implementations that support Energy Efficient Ethernet shall comply with all mandatory parts of IEEE Std 802.1AB and shall support the EEE Type, Length, Value (TLV) defined in 78.1.2.'

According to [http://www.ieee802.org/3/az/public/may08/hays_02_0508.pdf#Page=5], which was adopted in May 2008 as a baseline [http://www.ieee802.org/3/az/public/may08/802.3az-minutes-2008-05.pdf#Page=6 - Motion #1] the use of LLDP is optional. Based on this I would have expected that LLDP would not be mandated for EEE and while I may have missed it I can't find a motion to make LLDP mandatory for EE devices.

SuggestedRemedy

Update this subclause to make it clear that LLDP is optional for EEE.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.4.2** *P* **219** *L* **29** # 40

Rick, Tidstrom Broadcom

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

Figure 78-3

LLDP and EEE TLV are high level communication protocols between the MAC, and can be used to adjust system parameters. MACs do not care about refresh times. Refresh times should be handled PHY to PHY using auto-negotiation.

SuggestedRemedy

Remove Refresh Duty Cycle from TLV information string.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.4.2.4** *P* **220** *L* **9** # 39

Rick, Tidstrom Broadcom

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

LLDP and EEE TLV are high level communication protocols between the MAC, and can be used to adjust system parameters. MACs do not care about refresh times. Refresh times should be handled PHY to PHY using auto-negotiation.

SuggestedRemedy

Delete Sub-Clause 78.4.2.4

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.4.2.5** *P* **220** *L* **22** # 54

Diab, Wael Broadcom

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

The current scheme described for parameter changes using LLDP is not inline with the LLDP framework defined by 802.1ABC

SuggestedRemedy

The issues along with a detailed remedy that can serve as a starting point for this section is described in diab_01_0109.pdf.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.5** *P* **220** *L* **34** # 189

Law, David 3Com

Comment Type **ER** *Comment Status* **D** *late*

It is odd to see mention of Half Duplex mode here when EEE only supports Full Duplex mode.

SuggestedRemedy

remove first sentience, also suggest that 'On top of the above considerations, ..' be changed to read 'In addition, ..'.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.5** *P* **220** *L* **34** # 185

Law, David 3Com

Comment Type **TR** *Comment Status* **D** *late*

It isn't clear that Tw_phy has all possible delays included in it and it appears there may need to be a Tw_phy allocation from the transmit and receive PHY to insure interoperability.

In addition the symbol Tw_sys seems to be used for three different parameters, Transmit Tw (subclause 78.4.2.1), Receive Tw (subclause 78.4.2.2) and Resolved Transmit Tw_sys (subclause 78.4.2.3). Suggest for increased clarity different symbols should be used for each of these parameters.

SuggestedRemedy

Please see presentation law_1_0109.pdf

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.5** *P* **220** *L* **46** # 186

Law, David 3Com

Comment Type **ER** *Comment Status* **D** *late*

Not too sure where the term 'physical protocol' has come from, not aware of it being used elsewhere in IEEE Std 802.3. From the context I believe the correct IEEE Std 802.3 term is PHY.

SuggestedRemedy

Change '.. each physical protocol.' to read '.. each PHY.'. In addition change Table 78-2 (page 221) title from '.. across supported IEEE protocols' to read '.. for supported PHYs'.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.5** *P* **221** *L* **26** # 21

Rick, Tidstrom Broadcom

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

Table 78-2

The Table defines Minimum Tw_phy time as 4.8 usec for 10GBASE-T.

The minimum Tw_phy time does not include Sleep and should be defined as follows:

Tw_phy = (Alert time + min Wake Time = (4 + 1) = 1.6 usec.

SuggestedRemedy

Change minimum value for Ts for 10GBASE-T to 1.6 usec.

Proposed Response *Response Status* **O**

Cl **78** *SC* **78.5** *P* **221** *L* **26** # 22

Rick, Tidstrom Broadcom

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

Table 78-2

The table defines the Ts max as 2.88 usec. Sleep is defined as 9 full frames + 1 partial frame. 1 frame consists of 50 blocks, so a partial frame can consist of between 1 block and 49 blocks, which can be rounded up to 1 frame. Therefore, the max number of Sleep frames is 10.

Ts max = 10 frames * 320 nsec = 3.20 usec.

SuggestedRemedy

Change Ts max for 10GBASE-T from 2.88 usec to 3.20 usec.

Proposed Response *Response Status* **O**