P106, L23:

Replace “the PHY asserts the loc\_lpi\_req signal”

With “the PHY asserts the loc\_lpi signal”

P106, L26:

Replace “While the transmit function is in the LPI mode the PHY may disable data path and control logic to save additional power. Periodically, the transmit function of the local PHY transmits refresh frames that may be used by the link partner to update adaptive filters and timing circuits. The refresh cycle continues until the PCS function detects a condition that is not Assert Low Power Idle on the MII.”

With “While the transmit function is in the LPI mode, the PHY may cease transmission to save power and the link partner may disable receiver functions to save additional power. Periodically, the transmit function of the local PHY enters a refresh mode during which idle transmission resumes, and this may be used by the link partner to update adaptive filters and timing recovery circuits. Alternation between LPI quiet and refresh transmit modes proceeds according to a synchronized process between the PHYs, independent of data traffic patterns at the MII. The quiet-refresh cycling continues until the PCS function detects a condition that is not Assert Low Power Idle on the MII.”

P106, L31:

Replace “IDLE symbol stream with loc\_lpi\_req de-asserted”

With “IDLE symbol stream with loc\_lpi de-asserted”

P118, L26:

Replace “loc\_lpi\_req

The loc\_lpi\_req is set TRUE, if low power idle mode is requested.

Values: TRUE or FALSE.”

With “loc\_lpi

The variable loc\_lpi is set by the PHY Control function in the PMA to indicate that it has entered low power idle mode.

Values: TRUE or FALSE”

P121, L16, Figure 146-6

Replace “loc\_lpi\_req”

With “loc\_lpi”

P123, L12

Replace “loc\_lpi\_req”

With “loc\_lpi”

P126, L47

Replace “rem\_lpi\_req

The rem\_lpi\_req function provides reliable detection of the received loc\_lpi\_req information from the remote PHY within the IDLE data stream.

Values: TRUE or FALSE”

With “rem\_lpi

The rem\_lpi function provides reliable detection of the received loc\_lpi indication from the remote PHY within the IDLE data stream.

Values: TRUE or FALSE”

P128, L19, Figure 146-8

Replace “rem\_lpi\_req”

With “rem\_lpi”

P128, L30, Figure 146-8

Replace “!rem\_lpi\_req”

With “!rem\_lpi”

P132, Figure 146-11

Replace current Figure 146-11 – PMA functional block diagram with that from Slide 13 of <http://www.ieee802.org/3/cg/public/May2019/mccarthy_3cg_02b_0519.pdf>

P134, L34

Delete: “PHY Control shall comply with the state diagram shown in Figure 146–14 and Figure 146–15.”

P134, L42

Insert: “To maximize power savings, maintain link integrity, and ensure interoperability, EEE-capable PHYs shall synchronize refresh intervals during the low power idle (LPI) mode.

LPI synchronization is established by the PHY Control function, towards the end of link startup, using a handshake scheme initiated by the MASTER. This scheme initiates LPI quiet-refresh cycling at the same time as a transition from TRUE to FALSE of the loc\_lpi variable. As loc\_lpi is conveyed to the link partner PHY, the time of the start of LPI quiet-refresh cycling is also conveyed. LPI quiet-refresh cycling is defined in 146.4.7.

Thereafter, the LPI quiet-refresh cycling runs freely, with a cycle of fixed period, and, because the SLAVE maintains timing lock with the MASTER, the timing relationship between the quiet-refresh cycling in both PHYs remains fixed.

PHY Control shall comply with the state diagram shown in Figure 146–14, Figure 146-15 and Figure 146–16. Figure 146-14 describes link startup sequencing. Figure 146-15 describes LPI synchronization sequencing (only required to support EEE capability). Figure 146-16 describes entry and exit to LPI mode (also only required to support EEE capability).”

P135, L5

Replace “loc\_lpi\_req:

The variable loc\_lpi\_req is set TRUE if low power idle mode is requested by the PMA PHY control function.

Values: TRUE or FALSE”

With “loc\_lpi

The variable loc\_lpi is set by the PHY Control function to indicate that it has entered low power idle mode.

Values: TRUE or FALSE

loc\_lpi\_timer\_sync\_en

The variable loc\_lpi\_timer\_sync\_en is set by the PHY Control function to enable low power idle quiet-refresh cycling.

Values: TRUE: LPI quiet-refresh cycling is enabled.

FALSE: LPI quiet-refresh cycling is disabled.”

P136, L17

Replace “lpi\_sleep\_timer

A timer used to determine how long the SLEEP signal (IDLE symbols with loc\_lpi\_req set) is being sent, before the transmitter of the local PHY goes to sleep. The timer shall expire 205 s ± 5 s after being started.”

With “lpi\_sleep\_timer

A timer used to determine the duration of the SEND SLEEP state, where transmission comprises IDLE symbols with loc\_lpi set. The timer shall expire 20 μs (150 TX\_TCLK periods) after being started.”

P136, L22

Delete “lpi\_quiet\_timer

A timer used to determine how long the transmitter of the local PHY stays in QUIET mode, before a REFRESH is performed. The timer shall expire 6150 s ± 150 s after being started.

lpi\_refresh\_timer

A timer used to determine how long the REFRESH signal is being sent to the remote PHY. The timer shall expire 205 s ± 5 s after being started.”

P137, Figure 146-14

Replace current Figure 146-14 – PHY Control state diagram (part a) with that shown on Slide 4 of <http://www.ieee802.org/3/cg/public/May2019/mccarthy_3cg_02b_0519.pdf>

P138, Figure 146-15

Replace current Figure 146-15 – PHY Control state diagram (part b) with that shown on Slide 5 of <http://www.ieee802.org/3/cg/public/May2019/mccarthy_3cg_02b_0519.pdf>

Note to editor: as this relates to EEE capability, the dashed box is required.

P138, L40:

Insert new figure 146-16 with appropriate title: “Figure 146-16 – PHY Control state diagram (part c)” and note regarding EEE capability “Note – Transitions inside dashed boxes are only required for the EEE capability”, with associated dashed box from right hand side of Slide 9 of <http://www.ieee802.org/3/cg/public/May2019/mccarthy_3cg_02b_0519.pdf>

P139, L3

Replace “state diagram of Figure 146–16, shall”

With “state diagram of Figure 146–17, shall”

P139, L40

Renumber Figure 146-16 to 146-17.

P139, L47

Insert new clause 146.4.7 as follows:

**146.4.7 LPI quiet-refresh cycling**

LPI quiet-refresh cycling is initiated on direction from the PHY Control function using the LPI synchronization mechanism.

Once initiated, LPI quiet-refresh cycling runs freely for the lifetime of the link.

The SLAVE PHY is required to implement an initial offset delay, to ensure that refresh intervals of MASTER and SLAVE are not coincident.

The quiet-refresh cycle timing is defined in terms of transmit symbol periods (TX\_TCLK periods). As the SLAVE must maintain timing lock with the MASTER, the timing relationship between the LPI quiet-refresh cycling of the two PHYs must remain fixed for the lifetime of the link.

LPI quiet-refresh cycling shall comply with the state diagram of Figure 146-18.

**146.4.7.1 Variables**

loc\_lpi\_timer\_sync\_en

The variable loc\_lpi\_timer\_sync\_en is set by the PHY Control function to enable low power idle quiet-refresh cycling.

Values: TRUE: LPI quiet-refresh cycling is enabled.

FALSE: LPI quiet-refresh cycling is disabled.

loc\_lpi\_state

The variable loc\_lpi\_state sets the quiet/refresh state when the PHY is in low power idle mode.

Values: IDLE: LPI quiet-refresh cycling is not enabled.

REFRESH: The PHY is in the low power idle refresh phase.

QUIET: The PHY is in the low power idle quiet phase.

**146.4.7.2 Timers**

lpi\_init\_timer

A timer used to set the duration of the LPI TIMER INIT state, which is intended to introduce a fixed offset between LPI refresh phases of the MASTER and SLAVE PHYs.

If config = MASTER, this timer shall expire after 0 TX\_TCLK periods.

If config = SLAVE, this timer shall expire after 22500 TX\_TCLK periods (nominally 3000 μs).

lpi\_refresh\_timer

A timer used to set the duration of the LPI refresh phase.

This timer shall expire after 1875 TX\_TCLK periods (nominally 250 μs).

lpi\_quiet\_timer

A timer used to set the duration of the LPI quiet phase.

This timer shall expire after 45000 TX\_TCLK periods (nominally 6000 μs).

**146.4.7.2 State diagram**

**[ EDITOR NOTE: DIAGRAM is from Slide 7 of** [**http://www.ieee802.org/3/cg/public/May2019/mccarthy\_3cg\_02b\_0519.pdf**](http://www.ieee802.org/3/cg/public/May2019/mccarthy_3cg_02b_0519.pdf) **]**

**Figure 146-18 – LPI quiet-refresh cycling state diagram**