Cl **45** *SC* **45.2.1.192** *P* **34** *L* **10** # 1

Wienckowski, Natalie General Motors

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

Inconsistent text - it is not necessary to say "writes ignored" for RO bits

SuggestedRemedy

Change: Value always 0, writes ignored
To: Value always 0

Response *Response Status* **C**

ACCEPT.

Cl **104** *SC* **104.1** *P* **57** *L* **8** # 2

Wienckowski, Natalie General Motors

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

Editor's note that is to be removed for D1.2 that is still in the spec.

SuggestedRemedy

Delete Editor's note.

Response *Response Status* **C**

ACCEPT.

Cl **125** *SC* **125.1.2** *P* **61** *L* **8** # 3

Wienckowski, Natalie General Motors

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

Editor's instruction should only be for text change.

SuggestedRemedy

Move: Replace Figure 125-1 (as modified by IEEE Std 802.3cb-2018) with the figure found below, which adds 2.5GBASE-T1 and 5GBASE-T1. to be just before Figure 125-1.
Also, move the Figure to be after 125.1.3 text.

Response *Response Status* **C**

ACCEPT.

Cl **125** *SC* **125.1.2** *P* **62** *L* **44** # 4

Wienckowski, Natalie General Motors

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

Missing Abreviation expansion

SuggestedRemedy

Add PMA = PHYSICAL MEDIUM ATTACHMENT

Response *Response Status* **C**

ACCEPT.

Cl **125** *SC* **125.1.2** *P* **62** *L* **46** # 5

Wienckowski, Natalie General Motors

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

Missing Abreviation expansion

SuggestedRemedy

Add XGMII = 10 GIGABIT MEDIA INDEPENDENT INTERFACE

Response *Response Status* **C**

ACCEPT.

Cl **44** *SC* **44.1.3** *P* **27** *L* **48** # 6

Wienckowski, Natalie General Motors

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

Missing Abreviation expansion

SuggestedRemedy

Add MAC = MEDIA ACCESS CONTROL

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

MAC doesn’t need expanding because it is spelled out in the block on lines 12 & 32, but editorial license to clean up the figure, remove the floating “WIS” definition at line 42 and make labels consistent with existing clause 44.

Cl **44** *SC* **44.1.3** *P* **27** *L* **50** # 7

Wienckowski, Natalie General Motors

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

Incorrect font

SuggestedRemedy

Change: AUTO-NEGOTIATION IS OPTIONAL to the same font as the rest of the text.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Changes Notes to NOTE style here and anywhere else needed in the Figures.

Cl **125** *SC* **125.3** *P* **65** *L* **31** # 8

Wienckowski, Natalie General Motors

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

The bit time is based on the data rate, not the PHY type.

SuggestedRemedy

Remove highlighting from text in notes a and b below table 125-3.

Response *Response Status* **C**

ACCEPT.

Cl **45** *SC* **45.5** *P* **51** *L* **6** # 9

Wienckowski, Natalie General Motors

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

Editor's note to be removed prior to draft 2.0. Remove now so it isn't a change in D1.4 when WG ballot requested.

SuggestedRemedy

Delete Editor's note.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Delete Editor's note.

The PICS editor will add necessary PICS to be included in D1.3.

Cl **149** *SC* **149.3.8.2.5** *P* **117** *L* **5** # 10

Wienckowski, Natalie General Motors

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

Editor's note to be removed prior to draft 1.3.

SuggestedRemedy

Delete Editor's note.

Response *Response Status* **C**

ACCEPT.

Cl **149** *SC* **149.4.2.4.6** *P* **138** *L* **52** # 11

Wienckowski, Natalie General Motors

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

Editor's note to be removed prior to draft 1.3.

SuggestedRemedy

Delete Editor's note.

Response *Response Status* **C**

ACCEPT.

Cl **149** *SC* **149.5.3.2** *P* **156** *L* **9** # 12

Wienckowski, Natalie General Motors

Comment Type **E** *Comment Status* **A** *Link Segment*

Editor's note to be removed prior to draft 1.3.

SuggestedRemedy

Delete Editor's note.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Review at end of comment resolution and determine whether work on the Alien Crosstalk spec is still needed.

Cl **149** SC **149.10** P **165** L **41** # 13

Wienckowski, Natalie General Motors

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

Editor's note to be removed prior to draft 2.0. Remove now so it isn't a change in D1.4 when WG ballot requested.

SuggestedRemedy

Delete Editor's note.

Response *Response Status* **C**

ACCEPT.

Cl **149** SC **149.2.2.3.1** P **76** L **46** # 14

Wienckowski, Natalie General Motors

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

There is no space between the number and the text.

SuggestedRemedy

Add a tab in the paragraph format to space the text over from the number.

Response *Response Status* **C**

ACCEPT.

Cl **149** SC **149.3.2.2.15** P **89** L **38** # 15

Wienckowski, Natalie General Motors

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

Equation is cut off at top.

SuggestedRemedy

Equation 149-1 -> Unwrap then shrink wrap equation.

Response *Response Status* **C**

ACCEPT.

Cl **149** SC **149.3.6.2.2** P **102** L **8** # 16

Wienckowski, Natalie General Motors

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

Missing period at end of sentence.

SuggestedRemedy

Add period after rx_raw<71:40>

Response *Response Status* **C**

ACCEPT.

Cl **149** SC **149.3.6.2.3** P **103** L **30** # 17

Wienckowski, Natalie General Motors

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

Missing period at end of sentence.

SuggestedRemedy

Add period after rfer_timer_done = TRUE

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Delete sentence "When the timer reaches its terminal count rfer_timer_done = TRUE".

Cl **149** SC **149.3.8.3** P **120** L **53** # 18

Wienckowski, Natalie General Motors

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

Reorder references to be in numerical order.

SuggestedRemedy

Swap references to Figure 149-23 and Figure 149-22.

Response *Response Status* **C**

ACCEPT.

Cl **149** SC **149.3.8.4.6** P **133** L **1** # 19

Wienckowski, Natalie General Motors

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

Correct Clear REC state diagram. It will continuously loop as drawn in D1.2.

SuggestedRemedy

See wienckowski_3ch_01_0419.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement proposal in wienckowski_3ch_01a_0419.pdf.

Cl **149** *SC* **149.3.8.4.3** *P* **126** *L* **16** # 20

Wienckowski, Natalie General Motors

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

Move all REC associated content to 149B. Currently, some of the definition is in 149.3.8.4 and some is in 149B.

SuggestedRemedy

See wienckowski_3ch_02_0419.

Response *Response Status* **C**

ACCEPT.

Cl **149** *SC* **149.5.2.3** *P* **154** *L* **21** # 21

Farjadrad, Ramin Aquantia

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

Modify transmit timing jitter in Master mode to include EOJ and DJ spec

SuggestedRemedy

Refer to page 5 of ad hoc presentation (farjadrad_3ch_adhoc01b_0419)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Move last paragraph of existing 149.5.2.3 text to 149.5.2.3.1 with the title "Transmit MDI Random Jitter in Master mode".

Add section 149.5.2.3.2 on slide 5 of farjadrad_3ch_adhoc01b_0419.pdf.

Cl **149** *SC* **149.5.1** *P* **151** *L* **40** # 22

Farjadrad, Ramin Aquantia

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

Modify Test mode 2 to include total DJ and EOJ spec

SuggestedRemedy

Test mode 2 is for transmitter jitter testing on MDI when transmitter is in MASTER timing mode. When test mode 2 is enabled, the PHY shall transmit a continuous pattern of 16*S {+1} symbols followed by 16*S {–1} symbols for Random jitter measurement (RJ), a continuous pattern of JP03A (as specified in Clause 94.2.9.1) for Deterministic jitter measurement (DJ), and JP03B (as specified in Clause 94.2.9.2) for even-odd jitter measurement (EOJ) with the transmitted symbols timed from its local clock source

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace current definition of Test mode 2, page 151 lines 41-43 with - Test mode 2 is for transmitter jitter testing on MDI when transmitter is in MASTER timing mode. When test mode 2 is enabled, the PHY shall transmit a continuous pattern of JP03A (as specified in Clause 94.2.9.1) or JP03B (as specified in Clause 94.2.9.2) with the transmitted symbols timed from its local clock source.

Cl **149** *SC* **149.5.2.4** *P* **173** *L* **48** # 23

Kumada, Taketo Yazaki Corporation

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

The coefficient of Frequency which is "S"
should be defined.

SuggestedRemedy

The definition of "S" is the below.

S = 0.25 for 2.5GBASE-T1
S = 0.5 for 5GBASE-T1
S = 1 for 10GBASE-T1

It is like the BROADCOM presentation below.
Tile :Transmitter PSD Masks
Speaker :Kadir Dinc, Tom Souvignier
Date :November 2018

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

S is defined in 149.1.1. Change this definition into a table at this location.

Editoral license to add references to this table througout document.

Cl **149** *SC* **149.5.2.4** *P* **174** *L* **1** # 24

Kumada, Taketo Yazaki Corporation

Comment Type **T** *Comment Status* **R** *Variables*

Like the above

SuggestedRemedy

Like the above

Response *Response Status* **C**

REJECT.

The comment is not clear on its own.

Cl **149** *SC* **149.7.1.1** *P* **177** *L* **29** # 25

Kumada, Taketo Yazaki Corporation

Comment Type **T** *Comment Status* **R** *Variables*

Like the above

SuggestedRemedy

Like the above

Response *Response Status* **C**

REJECT.

The comment is not clear on its own.

Cl **149** *SC* **149.10** *P* **166** *L* **11** # 26

Lo, William Axonne Inc.

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

Adding delay constraints
Also applies to clause 44 and 125

SuggestedRemedy

Implement Lo_3ch_01_0419.pdf slides 2, 3, 4 per sections indicated.
Remove yellow highlights in the relevant sections in 44, 125, 149.10.
Remove editor's note in 149.10

Response *Response Status* **C**

ACCEPT.

Cl **149** *SC* **149.3.4.1** *P* **98** *L* **35** # 27

Lo, William Axonne Inc.

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

This is a bunch of changes in many differnt sections that are related to partial frames. This is clarifying text, table, and figure that makes no technical changes other than one on slide 10.

See Lo_3ch_02_0419.pdf for all the justification and remedy.

SuggestedRemedy

Implement Lo_3ch_02_0419.pdf slides 3, 5, 7, 9, 10, 11, 12, 13

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Slide 3: No consensus to make the change.
Slide 5: P68, L32: Change "PAM2 training sequences" to "PAM2 training frames".
P96, L27 as proposed
P97, L1&2: Change "It obtains block lock to the PHY frames during the PAM2 training pattern using synchronization bits provided in the training sequence." to "It obtains block lock to the PHY frames during PAM2 training using synchronization bits provided in the training frames.".
P98, L28: Change: "training pattern is" to "training frames are".
P98, L30 as proposed

149.3.4.1 => 149.3.5 and Rename to "PMA training frame".

Slide 7: Page 98, L 30: partners. (Insert new text and figure here). <CR> PMA

Slide 9: Add labels where "(tx_rsfc)" is proposed, but make the labels "RS-FEC frame count".

Slide 10: P99, L50 - no change, instead remove tx_rsfc from the draft.
P99, L52 - no change
P100, L13 - delete "(tx_rsfc)"
P100, L18 - change: "u=tx_rsfc" to "Condition (where u = RS-FEC frame count)"
P100, L31 - change: "v=tx_rsfc" to "Condition (where v = RS-FEC frame count)"
Make all spaces on either side of "=" be non-breaking spaces.

Slide 11: Insert table, but change "RS-FEC Frame Time" to "RS-FEC frame count".

Add a row to the table before alert_period: alert_length; 4
P100, L8 Change: "ALERT, a four RS-FEC frame, shall" to "ALERT, a four RS-FEC frame long sequence (alert_length), shall".

Slide 12: Implement as proposed, except:
Page 99 line 11: Insert after first sentence the following sentence:
"The LPI timing parameters are shown in Table 149-XXX."

Slide 13: Insert new paragraph "PFC24 continues to run uninterrupted for the duration of the link. The resolution of PFC24 is large enough that it does not rollover during the allotted training time. However, it will rollover if allowed to run indefinitely. PFC24 is defined to rollover to 0 after it reaches 16776959 to align with EEE QR cycle."

Cl **149** *SC* **149.1.3.1** *P* **68** *L* **28** # 28

Lo, William Axonne Inc.

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

Duration missing the L term

SuggestedRemedy

Change 320 ns to L x 320 ns

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change: bits (duration 320 ns at 10 Gb/s).
To: bits. (The duration of the superframe is L x 320 x S ns.)

Cl **45** *SC* **45.2.1.194.1** *P* **36** *L* **52** # 29

Lo, William Axonne Inc.

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

Clarify that is it the receiver and not the transmitter that is being configured.

SuggestedRemedy

Change:
Reed-Solomon interleave setting
To:
Reed-Solomon receiver interleave setting

Response *Response Status* **C**

ACCEPT.

Cl **45** *SC* **45.2.1.194.3** *P* **37** *L* **35** # 30

Lo, William Axonne Inc.

Comment Type **T** *Comment Status* **R** *Registers*

Clarify that is it the receiver and not the transmitter that is being configured.

SuggestedRemedy

Change:
precoder setting requested by
To:
receiver precoder setting of

Response *Response Status* **C**

REJECT.

The receiver doesn't have a precoder. The receiver isn't being configured. The device requests this setting of the link partner's transmitter. The text is clear.

Cl **45** *SC* **45.2.1.195.1** *P* **38** *L* **35** # 31

Lo, William Axonne Inc.

Comment Type **T** *Comment Status* **R** *Registers*

Clarify that is it the transmitter and not the receiver that is being configured.

SuggestedRemedy

Insert after first sentence the following clarifying clause:
To:
, and controls the Reed-Solomon transmitter interleave setting of the PHY

Response *Response Status* **C**

REJECT.

Only the transmitter interleaver can be configured so this description is not needed.

Cl **45** *SC* **45.2.1.195.3** *P* **38** *L* **45** # 32

Lo, William Axonne Inc.

Comment Type **T** *Comment Status* **R** *Registers*

Clarify that is it the transmitter and not the receiver that is being configured.

SuggestedRemedy

Insert after first sentence the following clarifying clause:
To:
, and controls the transmitter precoder setting of the PHY

Response *Response Status* **C**

REJECT.

Clause 149 makes it clear that only the transmitter implements a precoder. This is unneccessary text.

Cl **45** *SC* **45.2.1.194.2** *P* **37** *L* **29** # 33

Lo, William Axonne Inc.

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

The 7 bit user field does not exist.
This is a holdover from 1000BASE-T1.
Looking at figure 149-10 octet 10 bits 7 to 1 were not used in 1000BASE-T1
but 4 of the 7 bits are now used for interleave and precode.

SuggestedRemedy

This is the general description what to do and editor has editorial license to make other changes to make the text consistent.
1) Move register 1.2311.12:11 to 1.2311.5:4. Search the document to make the register move consistent.
2) 1.2311.8:6 is the 3-bit user defined field
3) 1.2311.15:9 is Reserved
4) Update table 45-155c to match and any other titles/headings.
5) Change the 3 reserved bits in Table 149-10 (page 138) to User Defined Field
It should be a single box and not 3 separate boxes.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Page 37, Line 13
For 1.2311.10:4
Change: "User field" to "Reserved",
Change: "7-bit user defined field to send to the link partner" to "Value always 0", and
Change: "R/W" to "RO".

Also delete 45.2.1.194.2.

Cl **45** *SC* **45.2.1.195.2** *P* **38** *L* **39** # 34

Lo, William Axonne Inc.

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

The 7 bit user field does not exist.
This is a holdover from 1000BASE-T1.
Looking at figure 149-10 octet 10 bits 7 to 1 were not used in 1000BASE-T1
but 4 of the 7 bits are now used for interleave and precode.

SuggestedRemedy

This is the general description what to do and editor has editorial license to make other changes to make the text consistent.
1) Move register 1.2312.12:11 to 1.2312.5:4. Search the document to make the register move consistent.
2) 1.2312.8:6 is the 3-bit user defined field from the link partner
3) 1.2312.15:9 is Reserved
4) Update table 45-155d to match and any other titles/headings.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Page 38, Line 19

For 1.2312.10:4
Change: "Link partner user field" to "Reserved" and
Change: "7-bit user defined field from the link partner" to "Value always 0".

Also delete 45.2.1.195.2.

Cl **149** *SC* **149.3.8.4.6** *P* **133** *L* **9** # 35

Lo, William Axonne Inc.

Comment Type **T** *Comment Status* **R** *OAM*

The loops around figure 149-24 are running at infinite speed and is not paced.
I think the intention is to check the loop once per RS Frame.
If we don't do this then tx_rec will keep incrementing once
rf_valid is false.

SuggestedRemedy

Change all 3 instances of UCT to RX_FRAME

Response *Response Status* **C**

REJECT.

These are corrected in the solution for Comment #19.

Cl **149** *SC* **149.5.1** *P* **151** *L* **39** # 36

Lo, William Axonne Inc.

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

To avoid the possibility of TX_TCLK_175 being interpreted as divide by 32 for all speeds, add a clarifying statement.

SuggestedRemedy

Change TX_TCLK_175 is equal to 5625 MHz divided by 32 to
the symbol baud rate divided by 32, 16, and 8 for 10GBASE-T1, 5GBASE-T1, and 2.5GBASE-T1 respectively.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change: TX_TCLK_175 is equal to 5625 MHz divided by 32

To: TX_TCLK_175 is equal to 175.78125 MHz.

Cl **149** *SC* **149.3.6.2.2** *P* **102** *L* **23** # 37

McClellan, Brett Marvell

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

alert_detect is defined as primitive from the PMA,
PMA_ALERTDETECT.indication(alert_detect). However,
PMA_ALERTDETECT.indication(alert_detect) isn't actually a defined PMA primitive.

SuggestedRemedy

on page 80 line 26, insert
"149.2.2.11 PMA_ALERTDETECT.indication
This primitive is generated by PMA Receive to indicate the status of the receive link at the local PHY when rx_lpi_active is TRUE. The parameter alert_detect conveys to the PCS receive function information regarding the detection of the LPI alert signal by the PMA receive function. The criterion for setting the parameter alert_detect is left to the implementer.
149.2.2.11.1 Semantics of the primitive
PMA_ALERTDETECT.indication (alert_detect)
The alert_detect parameter can take on one of two values of the form:
TRUE The alert signal has been reliably detected at the local receiver.
FALSE The alert signal at the local receiver has not been detected.
149.2.2.11.2 When generated
The PMA generates PMA_ALERTDETECT.indication messages to indicate a change in the alert_detect
status.
149.2.2.11.3 Effect of receipt
The effect of receipt of this primitive is specified in 149.3.2.3, Figure 149-17."

Response *Response Status* **C**

ACCEPT.

Cl **149** *SC* **149.3.8.2.5** *P* **117** *L* **6** # 38

McClellan, Brett Marvell

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

"Editor's note to be removed in draft 1.3: The OAM request to exit LPI is unneeded. Commenters are requested to provide text and edits necessary to cleanly remove this function and describe the local fault mechanism for the RS to signal exit from LPI."
This function was added in Clause 97 (1000BASE-T1) to cause the local device to exit low power idle when the link partner receiver is having trouble tracking the low power idle refresh signaling. However this function may not be necessary in an XGMII based system. Also the mechanism of exiting LPI is not described. An XGMII based PHY could generate Local Fault signals toward the Reconciliation Sublayer in a low SNR condition. The RS would respond by sending Remote Faults to the link partner, causing the link partner to stop sending LPI and start sending Idle until the fault condition is cleared. The downside to this mechanism is that the data link is interrupted in the path from the link partner to the local device.
I propose we keep the current mechanism of exiting LPI based on the OAM SNR indication but clarify how the LPI is exited.

SuggestedRemedy

on page 69 line 42
Change: "When the PHY Health status received from the link partner indicates that LPI is insufficient to maintain PHY SNR, the PHY may temporarily exit LPI mode and send idles."
To: "When the PHY Health status received from the link partner indicates that LPI is insufficient to maintain PHY SNR, the PHY shall temporarily exit LPI mode and send idles by replacing an LPI symbol group received at the XGMII with Idle symbols until the link partner no longer indicates insufficient SNR."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement changes in mcclellan_3ch_01_0419.pdf on slide 4.
NOTE: The depiction of this change in the state machine on slide 5 containts a typo.

Cl **149** SC **149.4.2.4.6** P **138** L **51** # 39

Zimmerman, George CME Consulting/ADI, APL Group, Aquantia, BMW, Ci

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

Editor's note flags need for consistent usage of send_s. In most cases send_s is a signal. Confusion comes from the way the input to the PMA transmit comes from the link synchronization machine, and the definition of sync_tx_mode, which appears that it should be using the message sync_tx_symb (which is not set anywhere).

SuggestedRemedy

Adopt changes in zimmerman_3ch_01_0419.pdf

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Adopt changes in zimmerman_3ch_01a_0419.pdf slides 7 - 10 with editorial license to fix any other instances that may have been missed.

Cl **149** SC **149.3.2.2.18** P **93** L **17** # 40

Zimmerman, George CME Consulting/ADI, APL Group, Aquantia, BMW, Ci

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

"For output symbols the PMA transmit process shall map" - the gray mapping is described as a PCS function. Also, the selectable precoder and PAM4 encoding both say PMA when described as a PCS function. (149.3.2.2.19, page 93, line 47 and 149.3.2.2.20 page 94 line 24).

SuggestedRemedy

Change "PMA transmit" to "PCS transmit" on page 93, lines 17 and 47, and page 94 line 24.

Response *Response Status* **C**

ACCEPT.

Cl **149** SC **149.7.2** P **161** L **41** # 41

Zimmerman, George CME Consulting/ADI, APL Group, Aquantia, BMW, Ci

Comment Type **T** *Comment Status* **A** *Link Segment*

"The test methodologies are specified in Annex 149A and Annex 97B."
Annex 149A relates to coupling attenuation, not to test setups for coupling between link segments.

SuggestedRemedy

delete "Annex 149A and" on P161 L41

Response *Response Status* **C**

ACCEPT.

Cl **149** SC **149.7.2.1** P **161** L **51** # 42

Zimmerman, George CME Consulting/ADI, APL Group, Aquantia, BMW, Ci

Comment Type **E** *Comment Status* **A** *Link Segment*

This subclause which is supposed to define PSANEXT stops short and is intertwined with the subclause for PSAACR-F. There are also references to the "type A" link segment of clause 97 which need to be removed, and there should be 2 figures, one for PSANEXT and one for PSAACR-F, where there is currently only one figure - referenced in the text as for PSANEXT, and entitled as for PSAACR-F.
(NOTE - THIS COMMENT DOES NOT ASSIGN THE VALUES FOR ALIEN CROSSTALK, BUT JUST FIXES THE EDITORIAL ISSUES)

SuggestedRemedy

Move P162 lines 1 through 12 to be after "PSANEXT is illustrated in Figure 149-45." (P 162 line 26), changing the reference to "NEXT" currently on lines 3 and 7 (equation 149-25) to "ACR-F".
Change title of Figure 149-45 from "PSAACR-F calculated using Equation (149-26)" to "PSANEXT loss calculated using Equation 149-25"
At the end of the (new) PSAACR-F) description, add "PSAACR-F is illustrated in Figure 149-46." and insert new figure "PSAACR-F loss loss calculated using Equation 149-26" (figure will be autonumbered)
Delete all references to "type A" (currently 2 occurences on page 162)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with Editorial license to implement with the correct format and style.

Cl **149** *SC* **149.7.2.1** *P* **161** *L* **7** # 43

Zimmerman, George CME Consulting/ADI, APL Group, Aquantia, BMW, Ci

Comment Type **T** *Comment Status* **A** *Link Segment*

PSANEXT and PSAFEXT need to be set. Levels based both on phy analysis and 10 dB margin from cabling measurements in mueller_3ch_05_0319.pdf are proposed.
Models for PSANEXT and PSAFEXT are based on clause 113, the closest model for PSANEXT and PSAFEXT in IEEE STd 802.3, which go out to 2 GHz.
Measurement limits of 75 dB loss are incorporated to allow for repeatable measurements
PHY noise impacts are to be presented in and sederat_3ch_01_0419.pdf, and zimmerman_3ch_02_0419 along with a spreadsheet for computations.

SuggestedRemedy

Make equation 149-25 (PSANEXT) loss, and text below it (lines 10 & 11) with:
"PSANEXTloss(f) >= min (75, 80-15log10(f/100) dB, 1 <= f <= FMax (149-25)
, where f is the frequency in MHz.
Replace equation 149-26 (PSAACRF loss), with "PSAACR-F loss (f) >= min(75, 86-20log10(f/100)) dB, 1<=f<=FMax (149-26)"
(text already has f is the frequency in MHz)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the suggested remedy with Editorial license to implement with the correct format and style.

Cl **98** *SC* **98** *P* **56** *L* **1** # 44

LEE, JUHO Hanyang University and Hyundai Motor Company

Comment Type **T** *Comment Status* **R** *EEE*

The latest asymmetric transmission proposals have following problems. 1. The EEE mode should be used for low speed transmission. 2. Even if data traffic at low speed have to increase, the data traffic should be transmitted only in a predetermined period. This may cause a buffer overflow. 3. There is a delay time when sleep mode is switched on. During this delay time, PHY can not cover the traffic coming from the MAC layer. In this situation, frame loss or collision problems can occur.

SuggestedRemedy

We would like to suggest a way to use AN(Auto-negotiation) for asymmetric transmission. Generally, traditional AN is self-configuring to use the highest speed that can be supported by the common links between end devices. For asymmetric transmission, a new AN mode is proposed, which supports the lowest common link speed (or a specific link rate like 10 Mbps) between end devices. This can reduce the BER and increase the energy saving and the reliability of low-speed data. In order to add the new AN mode, providing either one of the uplink and downlink directions at a low speed in AN for asymmetric data transmission mode. And power saving in some cases while using AN. Because the AN can exchange information with the MAC layer, the MAC measures the queue characteristics and frequency of use to determine the trigger for the asymmetric transmission and instructs the AN to set the asymmetric uplink / downlink rate. As the queue changes, it can be switched to a symmetric or asymmetric transmission, and this decision is made entirely by the MAC.

Response *Response Status* **C**

REJECT.

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

Cl **149** *SC* **149.1.3.3** *P* **69** *L* **37** # 45

Kim, Taehyoung Hanyang University and Hyundai Motor Company

Comment Type **T** *Comment Status* **R** *EEE*

The LPI mode is a method for implementing EEE. However, when small data is periodically transmitted with a gap, the PHY repeatedly enters and leaves the LPI mode, resulting in energy loss. Also, the refresh signal in LPI mode only maintains a connection between the sender and the receiver, but does not transmit any data. In order to solve this frequent LPI transition problem, part of the unused OAM fields can be used to adjust the transmission speed depending on the change of data amount in buffers. If PHY transmit quiet time block after the our proposed OAM field, PHY can transmit PAM4 data block with information and operate various speeds. Therefore we propose OAM transmission for various speed transmission.

SuggestedRemedy

Our proposed solution uses the D9 bit field of the previously transmitted OAM frame (figure 149-17) to monitor the buffer accumulated in the PHY and adjust the transmission rate. When D9 = 0, this defines no change in the amount of data to be transmitted and the PHY transmits at the same rate at the next data transmission. When D9 = 1, this indicates that there is a change in the amount of data and that the PHY immediately transmits OAM symbol 0 after parity bit transmission. OAM symbol 0 is determined to configure the link speed at either 5 Gbps or 2.5 Gbps speed on 10 Gbps link based on the bit combinations of D4 and D5.
1. <D4, D5> = <0, 0> 10 Gbps
2. <D4, D5> = <0, 1> 5 Gbps
3. <D4, D5> = <1, 0> 2.5 Gbps
In case of 5 Gbps, the link mode of PHY will be on the quiet time of 64 bits, which is equal in bit length one PAM4 data block. The quiet time is a time period with no data transmission.
In case of 2.5 Gbps, the link mode of PHY will be on the quiet time of 192 (64 x 3) bits, which is equal to one data block. And the length and frequency of quiet time and PAM4 data blocks are equal for both cases.

Response *Response Status* **C**

REJECT.

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

Cl **149** *SC* **149.3.2.2.21** *P* **95** *L* **9** # 46

Tu, Mike Broadcom

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

There is no "PCS_Data" state. It probably meant the "SEND_DATA" state. However "PCS_Data" might be a better name for this state.

SuggestedRemedy

Option 1. Replace this "PCS_Data" by "SEND_DATA"
Option 2. Replace all "SEND_DATA" and "SEND DATA" by "PCS_Data" and "PCS DATA" respectively throughout D1.2

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace "SEND*DATA" and "PCS_Data" with "PCS_DATA" in all locations.
Make this consistent througout Clause 149 in all state diagrams and references to states.

Cl **149** *SC* **149.1.3** *P* **68** *L* **4** # 47

Tu, Mike Broadcom

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

The OAM capability is advertises via InfoField in 149.4.2.4.5

SuggestedRemedy

Change from: "...PHY advertises its MultiGBASE-T1 OAM capability as described in 149.3.8."
To: "...PHY advertises its MultiGBASE-T1 OAM capability as described in 149.4.2.4.5".

Response *Response Status* **C**

ACCEPT.

Cl **149** *SC* **149.1.3** *P* **71** *L* **12** # 48

Tu, Mike Broadcom

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

In Figure 149-2, "pcs_data_mode" is missing

SuggestedRemedy

In Figure 149-2:
1. Add an arrowed line for "pcs_data_mode", coming out of the "PHY CONTROL" block, and going into the "PCS_TRANSMIT" block.
2. If proposal in "tu_3ch_02_0419.pdf" to make pcs_data_mode available even without EEE is adopted, then make this a SOLID line. Otherwise make this a DASHED line.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the propossed change with solid lines.

Cl **149** *SC* **149.2.2** *P* **74** *L* **22** # 49

Tu, Mike Broadcom

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

PMA_PCSDATAMODE should be added

SuggestedRemedy

If we make "pcs_data_mode" available even without EEE, then insert "PMA_PCSDATAMODE.indication (pcs_data_mode)" at line 22. Otherwise insert it at line 30.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Insert proposed text at line 22.

Cl **149** *SC* **149.2.2** *P* **75** *L* **23** # 50

Tu, Mike Broadcom

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

PMA_PCSDATAMODE.indication should be added

SuggestedRemedy

In Figure 149-3:
1. Add an arrowed line for "PMA_PCSDATAMODE.indication" from the PMA block into the PCS block.
2. If pcs_data_mode is made available for non-EEE mode as well, then make this a SOLID line. Otherwise make this a DASHED line.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the propossed change with solid lines.

Cl **149** *SC* **149.2.2.9** *P* **79** *L* **22** # 51

Tu, Mike Broadcom

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

Insert PMA_PCSDATAMODE.indication before 149.2.2.9

SuggestedRemedy

Before 149.2.2.9, insert the following (based on 55.2.2.11):

149.2.2.8a PMA_PCSDATAMODE.indication
–This primitive indicates whether or not the PCS state diagrams are able to transition from their initialization states. The pcs_data_mode variable is generated by the PMA PHY Control function. It is passed to the PCS Control function via the PMA_PCSDATAMODE.indication primitive.

–149.2.2.8a.1 Semantics of the primitive
–PMA_PCSDATAMODE.indication (pcs_data_mode)

–149.2.2.8a.2 When generated
–The PMA PHY Control function generates PMA_PCSDATAMODE.indication messages continuously.

–149.2.2.8a.3 Effect of receipt
–Upon receipt of this primitive, the PCS performs its transmit function as described in 149.3.2.2.

Response *Response Status* **C**

ACCEPT.

Cl **149** *SC* **149.3.2** *P* **81** *L* **27** # 52

Tu, Mike Broadcom

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

In Figure 149-4, "pcs_data_mode" is missing

SuggestedRemedy

In Figure 149-4:
1. Add an arrowed line coming in from below the "PMA SERVICE INTERFACE" into the PCS TRANSMIT block.
2. If pcs_data_mode is made available for non-EEE mode as well, then make this a SOLID line. Otherwise make this a DASHED line.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the propossed change with solid lines.

Cl **149** *SC* **149.3.6.2.2** *P* **102** *L* **37** # 53

Tu, Mike Broadcom

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

pcs_data_mode already defined in 149.4.4.1

SuggestedRemedy

Delete line 37 to line 41.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Delete page 102 lines 37 to 41.

Add to page 101 line 49:
Variable set by the PMA PHY Control function. See 149.4.4.1.

Cl **149** *SC* **149.4.2** *P* **134** *L* **19** # 54

Tu, Mike Broadcom

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

In Figure 149-26, "pcs_data_mode" is missing

SuggestedRemedy

In Figure 149-26:
1. Add an arrowed line coming out of the PHY CONTROL block, going up toward the PMA SERVICE INTERFACE.
2. If pcs_data_mode is made available for non-EEE mode as well, then make this a SOLID line. Otherwise make this a DASHED line.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the propossed change with solid lines.

Cl **149** *SC* **149.4.4.1** *P* **147** *L* **20** # 55

Tu, Mike Broadcom

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

Make "pcs_data_mode" available even without optional EEE. See "tu_3ch_02_0419.pdf" for the motivation.

SuggestedRemedy

1. Delete line 20.
2. Delete the last senstence, starting at the end of line 24: "In the absence of the optional EEE capability, the PHY operates as if the value of this variable is TRUE."

Response *Response Status* **C**

ACCEPT.

Cl **149** *SC* **149.3.7.1** *P* **106** *L* **23** # 56

Tu, Mike Broadcom

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

Make sure "pcs_status" is only set to TRUE after entering data mode.

SuggestedRemedy

Change the second sentence to: "It is only true if pcs_data_mode is true, block_lock is true, and hi_rfer is false."

Response *Response Status* **C**

ACCEPT.

Cl **149** *SC* **149.4.5** *P* **149** *L* **6** # 57

Tu, Mike Broadcom

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

The PHY Control state diagram and the Link Monitor state diagram will result in conflicted state machines. Also if the link is interrupted after entering the SEND_DATA state, the PHY will falsely report the link status=OK for 100msec while the data connection had already been lost.

SuggestedRemedy

Adopt the changes as proposed in ""tu_3ch_02_0419.pdf"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the changes on slides 11, 12, & 14 of tu_3ch_02_0419.pdf.

Cl **149** *SC* **149.4.5.** *P* **150** *L* **18** # 58

Tu, Mike Broadcom

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

The PHY Control state diagram and the Link Monitor state diagram will result in conflicted state machines. Also if the link is interrupted after entering the SEND_DATA state, the PHY will falsely report the link status=OK for 100msec while the data connection had already been lost.

SuggestedRemedy

Adopt the changes as proposed in ""tu_3ch_02_0419.pdf"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement the changes on slides 11, 12, & 14 of tu_3ch_02_0419.pdf.

Cl **149** *SC* **149.5.2.4** *P* **154** *L* **24** # 59

Tu, Mike Broadcom

Comment Type **T** *Comment Status* **A** *Transmit power*

The minimum transmit power should be reduce to -2 dBm, in order to account for potential implementation losses.

SuggestedRemedy

Change from: "the transmit power shall be in the range of -1 dBm to 2 dBm ..."
To: "the transmit power shall be in the range of -2 dBm to 2 dBm ..."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Straw poll: Change to -1.5 dBm to +1.5 dBm

Y - 11, N - 1, A - 6

Vote: Change to -1.5 dBm to +1.5 dBm - no one opposed.

Change from: "the transmit power shall be in the range of -1 dBm to 2 dBm ..."
To: "the transmit power shall be in the range of -1.5 dBm to 1.5 dBm ..."

TFTD. Needs to have the same solution as comment #73.

Cl **149** *SC* **149.1.3.3** *P* **69** *L* **25** # 60

Graba, Jim Broadcom

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

Alert isn't low frequency. See 149.4.2.2, page 135, lines 19-20.

SuggestedRemedy

Replace "low frequency" with "PN sequence".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Delete: The Alert signal is a low frequency PAM2 signal.

Cl **149** *SC* **149.1.3.3** *P* **69** *L* **15** # 61

Graba, Jim Broadcom

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

It isn't clear in this line that Sleep is aligned with a super frame. In 149.3.2.2.21, page 94, line 49-53 the alignment is clear.

SuggestedRemedy

Clarify the Sleep alignment in 149.1.3.3. Replace "Following this event a sleep signal is transmitted by the PMA" with "Following this event the PMA transmits the sleep signal starting at the beginning of the next superframe."

Response *Response Status* **C**

ACCEPT.

Cl **149** *SC* **149.4.2.6** *P* **141** *L* **29** # 62

Benyamin, Saied Aquantia

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

Alert Sequence generator can start at a random PN sequence seed when alert starts. This can add a random delay to the correlator trigger. I propose that we reset the sequence to a known value at the start of alert

SuggestedRemedy

Change from:
The PN sequence generator shift registers shall be reset to a non-zero value upon entering into the TRANSMIT_DISABLE state (see Figure 149–31).
to:
The PN sequence generator shift registers shall be reset to a value of S[7:0]=0000001 upon entering into the TRANSMIT_DISABLE state (see Figure 149–31) or on the transmission of first symbol of alert sequence. The receiver may not necessarily receive a continuous PN sequence between separate periods of SEND_S.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change: The PN sequence generator shift registers shall be reset to a non-zero value upon entering into the TRANSMIT_DISABLE state (see Figure 149–31).
To: The PN sequence generator shift registers shall be reset to a value of S[7:0]=0000001 upon entering into the TRANSMIT_DISABLE state (see Figure 149–31) or on the transmission of first symbol of alert sequence.

Cl **149** *SC* **149.4.2.4.3** *P* **137** *L* **19** # 63

Benyamin, Saied Aquantia

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

Pratial phy frame count (PFC24) rolls over after 2^24. Because the EEE uses 96*4 partial phy frames per QR cycle, we have to make sure that the PFC24 rolls over at a multiple of this count.

SuggestedRemedy

Add the following paragraph:
The PFC24 count must roll over to 0 after the count of 16776959 to align with EEE QR cycle.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

"PFC24 continues to run uninterrupted for the duration of the link. The resolution of PFC24 is large enough that it does not rollover during the allotted training time. However, it will rollover if allowed to run indefinitely. PFC24 is defined to rollover to 0 after it reaches 16776959 to align with EEE QR cycle."

Cl **149** *SC* **149.3.5.1** *P* **100** *L* **8** # 64

Benyamin, Saied Aquantia

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

The sentence seems to be missing some words

SuggestedRemedy

Change from:
ALERT, a four RS-FEC frame, shall start at the beginning of any eighth PHY frame boundary starting at the beginning of the frame following a refresh PHY frame.
To:
ALERT, a four RS-FEC frame long sequence, shall start at the beginning of any eighth PHY frame boundary starting at the beginning of the frame following a refresh PHY frame.

Response *Response Status* **C**

ACCEPT.

Cl **149** *SC* **149.3.5.1** *P* **100** *L* **16** # 65

Benyamin, Saied Aquantia

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

We use tx_alert_start to indicate the frame numbers where alert should start, it is more aligned with other variables to use tx_alert_active

SuggestedRemedy

See Presentation Benyamin_3ch_02_041619 slide 2

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement Benyamin_3ch_03b_041619.pdf slides:

3; however, tx_lpi_alert_start_next is tx_alert_start_next

5; with changes from other comments

6; however, alert_start_next is tx_alert_start_next

Cl **149** *SC* **149.3.5.1** *P* **100** *L* **16** # 66

Benyamin, Saied Aquantia

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

Mechanism to prevent partial refresh is not necessary since refresh is only one frame long.

SuggestedRemedy

See presentation Benyamin_3ch_02_041619 slide 4 for changes to table 149-4 and 149-5 where calculations of tx_lpi_full_refresh are taken out

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement changes from Benyamin_3ch_02c_041619.pdf on slides 4, 5, & 6.

Cl **149** *SC* **149.3.6.2.2** *P* **103** *L* **8** # 67

Benyamin, Saied Aquantia

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

Mechanism to prevent partial refresh is not necessary since refresh is only one frame long.

SuggestedRemedy

Take out definition of tx_lpi_full_refresh

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implemented by comment #66.

Cl **149** *SC* **149.3.6.2.2** *P* **103** *L* **10** # 68

Benyamin, Saied Aquantia

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

Mechanism to prevent partial refresh is not necessary since refresh is only one frame long.

SuggestedRemedy

Take out definition of tx_lpi_initial_quiet

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implemented by comment #66.

Cl **149** *SC* **149.3.6.2.2** *P* **102** *L* **35** # 69

Benyamin, Saied Aquantia

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

Mechanism to prevent partial refresh is not necessary since refresh is only one frame long.

SuggestedRemedy

change lpi_tx_mode from:
The variable is set to QUIET when (tx_lpi_qr_active * (!tx_refresh_active + tx_lpi_initial_quiet))
to:
The variable is set to QUIET when (tx_lpi_qr_active * !tx_refresh_active)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implemented by comment #66.

Cl **149** *SC* **149.3.7.2** *P* **113** *L* **2** # 70

Benyamin, Saied Aquantia

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

Mechanism to prevent partial refresh is not necessary since refresh is only one frame long.

SuggestedRemedy

See Benyamin_3ch_02_041619 slide 6 for changes to EEE state machine figure 149-18

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implemented as solution to comment #66.

Cl **149** *SC* **149.2.2.3.1** *P* **76** *L* **35** # 71

Benyamin, Saied Aquantia

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

Changes submitted in VanCouver modified the text so that link synchronization PN sequence for Alert is sent directly to PMA rather than via tx_symb, as such we need to remove ALERT from this primitive

SuggestedRemedy

Change definition of PMA_UNITDATA.request(tx_symb) to the following:
During transmission, the PMA_UNITDATA.request simultaneously conveys to the PMA via the parameter
tx_symb the value of the symbols to be sent over the MDI. The tx_symb may take on one of the following values:
{-1, -1/3, +1/3, +1} in normal operation
0 when zeros are to be transmitted in the following two cases:
1)when PMA_TXMODE.indication is SEND_Z during PMA training, and
2)after data mode is reached, the transmit function is in the LPI transmit mode, and lpi_tx_mode is QUIET.

Response *Response Status* **C**

ACCEPT.

Cl **45** *SC* **45.2.1.197** *P* **39** *L* **43** # 72

den Besten, Gerrit NXP Semiconductors

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

"The number is in offset two's complement notation, with 0.0 dB represented by 0x8000." I'm not aware of a format called 'offset two's complement'. I know "two's complement" and "offset binary". From the context it is clear that the latter is meant.

SuggestedRemedy

Propose to replace "offset two's complement" with "offset binary"

Response *Response Status* **C**

ACCEPT.

Cl **149** *SC* **149.5.2.4** *P* **154** *L* **24** # 73

den Besten, Gerrit NXP Semiconductors

Comment Type **T** *Comment Status* **A** *Transmit power*

Transmit power limits are currently by accident set to -1 to 2dBm. My proposal during the last F2F was -0.5 to 2.5dBm, with support from multiple silicon suppliers. Mike indicated that he prefered to keep a +/-2dB range instead of a +/-1.5dB range, but nobody intended to shift the nominal power level

SuggestedRemedy

Change range into -0.5 to 2.5dBm

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Resolved by comment #59.

Cl **149** *SC* **149.8.2.1** *P* **163** *L* **20** # 74

den Besten, Gerrit NXP Semiconductors

Comment Type **T** *Comment Status* **R** *MDI*

There is currently only one MDI return loss template for all speeds. I think we should differentiate requirements for different speeds to allow looser spec for 2.5Gbps and 5Gbps. The easiest way to achieve this is by scaling all frequency values by S except for the 1MHz lower bound.

SuggestedRemedy

Change:
10 --> 10S
500 --> 500S
3000 --> 3000S
4000 --> Fmax

Remove:
For 2.5GBASE-T1, 5GBASE-T1, and 10GBASE-T1, the maximum applicable frequency for the MDI return loss is 4000 × S MHz.

Response *Response Status* **C**

REJECT.

Most PHYs don't scale the return loss template with speed. It's a function of the cable's insertion loss.

Cl **149** *SC* **149.8.2.1** *P* **163** *L* **23** # 75

den Besten, Gerrit NXP Semiconductors

Comment Type **T** *Comment Status* **R** *MDI*

The MDI curve is discontinous at 500: 20dB versus 19.78dB.

SuggestedRemedy

Implicitly fixed by proposal to relax MDI return loss a bit. See next item.

Response *Response Status* **C**

REJECT.

It is not necessary for the limit line to be continuous.

Cl **149** *SC* **149.8.2.1** *P* **163** *L* **20** # 76

den Besten, Gerrit NXP Semiconductors

Comment Type **T** *Comment Status* **R** *MDI*

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

SuggestedRemedy

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

Response *Response Status* **C**

REJECT.

Need data to show this, not opinion.
The commenter may choose to provide a presentation at a future meeting with data to support this and may choose to submit a comment at WG ballot.

Cl **149** *SC* **149.5.2.1** *P* **153** *L* **38** # 77

den Besten, Gerrit NXP Semiconductors

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

Current the droop requirement is specified as "the magnitude of both the positive and negative droop shall be less than 15%, measured with respect to an initial value at 4 ns after the zero crossing and a final value at 16 ns after the zero crossing (12 ns period)". This spec is currently independent of the speed, which makes this period contain 4x more symbols at 10Gbps than at 2.5Gbps. This implies a significantly larger BLW at 2.5Gbps which increases the peak differential amplitude. If the measurement period is made a fixed number of symbols or a period length scaling by 1/S, the signal impact of droop is equivalent for all rates.

SuggestedRemedy

Propose to scale the droop measurement period with the speed, so replace 4, 16 and 12, by 4/S ns to 16/S ns (12/S ns period). Alternatively, this measurement period can be specified as "initial value 24 symbol periods after the zero-crossing and a final value 96 symbol periods after a zero-crossing (72 symbol periods)"

Response *Response Status* **C**

REJECT.

No consensus in the room to make the change.

Cl **149** *SC* **149.7.1.4** *P* **160** *L* **42** # 78

den Besten, Gerrit NXP Semiconductors

Comment Type **T** *Comment Status* **R** *Link Segment*

Maximum specified frequency for coupling attenuation has been adapted to Fmax, which make perfect sense for a single-speed transceiver. For multi-speed transceivers, it might not be desirable to mandate the need for frequency-scaling anti-aliasing filters in the design. In order to circumvent that and not overspecify channels generally, a good solution could be to require that the link segment shall meet the requirements of the highest supported rate at that port.

SuggestedRemedy

Insert after line 42:
For multi-speed transceivers the link segment shall meet the coupling attenuation requirements for highest supported rate on the MDI.

Response *Response Status* **C**

REJECT.

IEEE802.3 does not specify implementation requirements or multi-speed PHYs.

Cl **149** *SC* **149.7.1.4** *P* **160** *L* **36** # 79

den Besten, Gerrit NXP Semiconductors

Comment Type **T** *Comment Status* **R** *Link Segment*

The current coupling attenuation spec,originating from contribution mueller_3ch_02a_0518.pdf might be insufficient to ensure signal integrity. On slide 4 it states that "With existing cables and connectors an introduced differential noise level of a few mV (4mV or less) is achievable in a BCI test with 200mA interfering current." which seems based on ... Note that the suggested templates in that ppt don't seem to have a 6dB/octave slope. Which BCI level is assumed achievably by these transceivers? And is this 4mV safeguarded by the coupling attenuation template or is this just these actual cables showed that result? Note that these cables are apparently better then the specified template. The differential signal magnitude at Nyquist can be about the same level of a few mV. I think we should ensure that the injected interfering differential signal component (due to coupling attenuation) should be at least 6dB below the signal level. Therefore it seems that the coupling attenuation spec needs to be tightened. Looking at the more recently measured coupling attenuation curves the corner can be shifted without problem to 1GHz, but that might not yet be sufficient.

SuggestedRemedy

Replace:
750 MHz --> 1000 MHz
70 dB for f<1000 MHz
70-20*log(f/1000) for 1000<f<Fmax Mhz

Response *Response Status* **C**

REJECT.

The commenter may choose to provide a presentation at a future meeting or ad hoc with data to support this and may choose to submit a comment at WG ballot.

The group would like additional information on how BCI impacts this since it only tests to 400 MHz.

The group would like to see test data on multiple cables and connectors.

Cl **149** *SC* **149.7.1.5** *P* **161** *L* **28** # 80

den Besten, Gerrit NXP Semiconductors

Comment Type **T** *Comment Status* **R** *Link Segment*

Maximum specified frequency for screening attenuation has been adapted to Fmax, which make sense for a single-speed transceiver. However, for multi-speed transceivers, it might not be desirable to implicitly mandate the need for frequency-scaling anti-aliasing filters in the design. In order to circumvent that and not overspecify channels generally, a good solution could be to require that the link segment shall meet the requirements of the highest supported rate at that port.

SuggestedRemedy

Insert after first sentence in this sub-section:
For multi-speed transceivers the link segment shall meet the screening attenuation requirements up to Fmax for the highest supported rate on the MDI.

Response *Response Status* **C**

REJECT.

IEEE802.3 does not specify implementation requirements or multi-speed PHYs.

Cl **149** *SC* **149.7.1.3** *P* **159** *L* **22** # 81

den Besten, Gerrit NXP Semiconductors

Comment Type **T** *Comment Status* **R** *Link Segment*

For 10Gbps operation the worst-case link segment IL and RL, combined with module-internal losses, driver level tolerance, and termination impedance range, makes that echo magnitude at Nyquist can be >40x the received the signal magnitude. Scanning through previously presented RL data, the main reasons for the fairly loose link segment RL specs are the issues towards 5.5GHz (which are eliminated now as Fmax is always 4GHz or less) and the inclusion of a 'first connector profile'. All cases with the second and third connector profiles (DiBiaso_3ch_01_0518.pdf) pass with much margin. I think we should consider to tighten the link segment return loss spec for 10Gbps at high attenuation and not unnecessarilly burden the transceiver.

SuggestedRemedy

Propose to add an extra limit curve to 10Gbps_RL:
N=-1 for IL>24dB
(brings first corner to 960MHz and HF plateau to 15dB)

Note that this situation does not occurs for cables <12m.

Response *Response Status* **C**

REJECT.

The commenter may choose to provide a presentation at a future meeting with data to support this and may choose to submit a comment at WG ballot.

Cl **149** *SC* **149.8.2.1** *P* **163** *L* **20** # 82

den Besten, Gerrit NXP Semiconductors

Comment Type **T** *Comment Status* **R** *MDI*

I would like to make explicit that the low-frequency roll-up is there to enable PoDL, and that without PoDL the RL extends at 20dB downto 1MHz.

SuggestedRemedy

Split the low-frequency spec in two options:
with PoDL: 20-20*log(f/10S) dB
without PoDL: 20dB

Response *Response Status* **C**

REJECT.

The equation seems to be incorrect and is not what is currently in the spec.

There is no reason to have a tighter requirement on the MDI RL when PoDL is not used.

Cl **149** *SC* **149.1.3** *P* **68** *L* **10** # 83

den Besten, Gerrit NXP Semiconductors

Comment Type **T** *Comment Status* **R** *MDI*

In reality there is a piece of the channel between the MDI connector and the transceiver which is not accounted for in link segment IL & RL. Although the IEEE PHYs set mandatory specs for the MDI reference point, which makes a lot of sense, I think it would be useful to add informative specs for IL and RL for the part of the channel behind the MDI. IMO, the assumptions for IL & RL for this module-internal channel part, used to define the spec, should be mentioned.

SuggestedRemedy

Response *Response Status* **C**

REJECT.

The commenter does not provide any suggested remedy.
This has been done as an informative annex which defines test points and loss budgets for some of the high-speed SERDES specs.
The commenter may choose to submit a comment at WG ballot with a proposal to add an Annex, with the suggested content.

Cl **149** *SC* **149.5.1** *P* **151** *L* **41** # 84

den Besten, Gerrit NXP Semiconductors

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

Clock jitter specifications are currently defined on a divided clocks. For higher data rates it is strongly recommendable to measure jitter at speed directly from the transmit path and not via a divided pattern or separate test clock as these might mask effects that are important to meet performance.

SuggestedRemedy

Propose to change test mode 2 for measuring master transmit jitter on MDI at full speed, using a togging {+1} {-1} symbol pattern.
This is technically a divide-by-two clock where both rising and falling zero crossings are taken into account for measurements.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Accommodated by comment #22.

Cl **149** *SC* **149.5.2.3** *P* **154** *L* **17** # 85

den Besten, Gerrit NXP Semiconductors

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

"The band-pass bandwidth of the measurement device shall be larger than 200 MHz." This is probably based on a divide-by-32 clock, that would run at 5625/32=175.8MHz, so 200MHz wouldn't be limiting in that case. Note that higher frequency jitter is partly masked in this case.

SuggestedRemedy

Propose to adapt test mode 2 to a symbol rate toggling {+1} {-1} pattern and measure jitter with a bandwidth of the measurement device of at least Fmax.

Response *Response Status* **C**

REJECT.

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

Cl **149** *SC* **149.5.2.4** *P* **154** *L* **30** # 86

den Besten, Gerrit NXP Semiconductors

Comment Type **T** *Comment Status* **R** *Transmit PSD*

Transmit PSD mask. During the Vancouver meeting I've presented modifications to the Transmit PSD mask. There have been interactive discussion on this with some modifications to the material. The decision on this topic was postponed to the next meeting to give people time to review internally.

SuggestedRemedy

Propose to change transmit PSD mask according to the attached presentation.

Response *Response Status* **C**

REJECT.

No consensus to make change in DenBesten_3ch_01_0419.pdf.

This presentation was based on transmit power of -0.5 dBm to 2.5 dBm; however, the group changed this range to -1.5 dBm to 1.5 dBm, reducing the low frequency dBm. It may be desirable to repeat this analysis with these new approved transmit power limits. The graphs on slide 3 appear to be in error as these represent a transmit power range of 6 dB, not 3 dB as indicated on slide 2.

It was decided not to scale the droop measurement with PHY speed, so scaling the low frequency of the lower mask seems unnecessary.

Cl **149** *SC* **149.5.3.2** *P* **156** *L* **12** # 87

Zimmerman, George CME Consulting/ADI, APL Group, Aquantia, BMW, Ci

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

Comment 228 from draft 1.1 was implemented incorrectly. Accepted resolution specified the noise level is at the MDI of the DUT. Language also needs editorial clean up. The proposed response is aligned with accepted language in 802.3cg D3p0.

SuggestedRemedy

Change: "The test is performed with a noise source consisting of a signal generator with Gaussian distribution, bandwidth of TBD MHz and magnitude of TBD dBm/Hz."
to: "The test is performed with a noise source such that noise with a Gaussian distribution, bandwidth of TBD MHz, and magnitude of TBD dBm/Hz is present at the MDI of the DUT."
Editorial license to fill in the TBDs based on other comments.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

TBDs and minor rewording are in Comment #88.

Cl **149** *SC* **149.5.3.2** *P* **156** *L* **12** # 88

Zimmerman, George CME Consulting/ADI, APL Group, Aquantia, BMW, Ci

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

The TBDs need to be filled in, and when doing so, the structure of the sentence needs to be changed to reflect that with a constant alien crosstalk coupling the noise level will shift. Suggest the numbers for 10GBASE-T1 in sederat_3ch_0419.pdf, adjusted for 2.5G and 5GBASE-T based purely on the difference in disturbing PSD levels, not on receiver noise tolerance, which would require more work on cabling and different cable specs for these technologies.

SuggestedRemedy

Replace "bandwidth of TBD MHz, and magnitude of TBD dBm/Hz" with "bandwidths and magnitudes shown in Table 149-xx"
Insert Table 149-xx (autonumbered) after Figure 149-41, with entries (commas between columns, semicolons for rows)
Header row: "PHY Type", "Noise Bandwidth (MHz)", "Added Noise at MDI (dBm/Hz)";
and body rows:
10GBASE-T1, 3000 MHz, -152 dBm/Hz;
5GBASE-T1, 1500 MHz, -149 dBm/Hz;
2.5GBASE-T1, 750 MHz, -146 dBm/Hz;

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Implement Suggested Remedy, but change the frequencies to 3500; 1750; 875