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.

**Proposed Response**

ReinBesten, Gerrit NXP Semiconductors

---

**Comment**

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

**Suggested Remedy**

Change: Value always 0, writes ignored

To: Value always 0

**Proposed Response**

Wienckowski, Natalie General Motors

---

**Comment**

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

**Suggested Remedy**

Change: Reed-Solomon interleave setting

To: Reed-Solomon receiver interleave setting

**Proposed Response**

Lo, William Axonne Inc.

---

**Comment**

Incorrect font

**Suggested Remedy**

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

**Proposed Response**

Wienckowski, Natalie General Motors

---

**Comment**

Missing Abreviation expansion

**Suggested Remedy**

Add MAC = MEDIA ACCESS CONTROL

**Proposed Response**

Wienckowski, Natalie General Motors

---

**Comment**

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

**Suggested Remedy**

Change: Value always 0, writes ignored

To: Value always 0

**Proposed Response**

Wienckowski, Natalie General Motors

---

**Comment**

Missing Abreviation expansion

**Suggested Remedy**

Add MAC = MEDIA ACCESS CONTROL

**Proposed Response**

Wienckowski, Natalie General Motors
Comment Type: T  Comment Status: X

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.

Proposed Response  Response Status: O

Comment Type: T  Comment Status: X

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

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

Proposed Response  Response Status: O

Comment Type: T  Comment Status: X

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

Proposed Response  Response Status: O
P802.3 D1p2

:al Layer Specifications and Management Parameters for Greater Than 1 Gb/s Automotive Ethernet 3rd Ti:

den Besten, Gerrit
NXP Semiconductors

Comment Type: T    Comment Status: X

"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.

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

Proposed Response:    Response Status: O

---

Wienckowski, Natalie
General Motors

Comment Type: E    Comment Status: X

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

Suggested Remedy
Delete Editor's note.

Proposed Response:    Response Status: O

---

LEE, JUHO
Hanyang University and Hyundai Motor Company

Comment Type: T    Comment Status: X

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.

Suggested Remedy
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.

Proposed Response:    Response Status: O

---

TYPE: TR/technical required    ER/editorial required    GR/general required    T/technical    E/editorial    G/general
COMMENT STATUS: D/dispatched    A/accepted    R/rejected    RESPONSE STATUS: O/open    W/written    C/closed    Z/withdrawn
SORT ORDER: Clause, Subclause, page, line
### Comment #3

**Comment Type**: E  
**Comment Status**: X  

**Suggested Remedy**  
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.

**Proposed Response**  
Response Status O

### Comment #4

**Comment Type**: E  
**Comment Status**: X  

**Suggested Remedy**  
Add PMA = PHYSICAL MEDIUM ATTACHMENT

**Proposed Response**  
Response Status O

### Comment #5

**Comment Type**: E  
**Comment Status**: X  

**Suggested Remedy**  
Add XGMII = 10 GIGABIT MEDIA INDEPENDENT INTERFACE

**Proposed Response**  
Response Status O

### Comment #8

**Comment Type**: E  
**Comment Status**: X  

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

**Proposed Response**  
Response Status O

### Comment #47

**Comment Type**: TR  
**Comment Status**: X  

**Suggested Remedy**  
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".

**Proposed Response**  
Response Status O

### Comment #48

**Comment Type**: TR  
**Comment Status**: X  

**Suggested Remedy**  
In Figure 149-2, "pcs_data_mode" is missing

**Proposed Response**  
Response Status O

---

**Type**: TR/technical required  
**ER/editorial required**: G/general required  
**T/technical**: E/editorial  
**G/general**: 

**Comment Status**: D/dispatched A/accepted R/rejected  
**Response Status**: O/open W/written C/closed Z/withdrawn  

**Sort Order**: Clause, Subclause, page, line
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<th>Line</th>
<th>#</th>
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<th>Response Status</th>
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<tr>
<td>149</td>
<td>149.1.3.1</td>
<td>68</td>
<td>28</td>
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<td>Lo, William Axonne Inc.</td>
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<td><strong>SuggestedRemedy</strong> Change 320 ns to L x 320 ns</td>
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<tr>
<td>149</td>
<td>149.1.3.3</td>
<td>69</td>
<td>15</td>
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<td>Graba, Jim Broadcom</td>
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<td></td>
<td></td>
<td><strong>Comment Type</strong> TR <strong>Comment Status</strong> X 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.</td>
<td></td>
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<td><strong>SuggestedRemedy</strong> Clarify the Sleep alignment in 149.1.3.3. Replace &quot;Following this event a sleep signal is transmitted by the PMA&quot; with &quot;Following this event the PMA transmits the sleep signal starting at the beginning of the next superframe.&quot;</td>
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<td><strong>Comment Type</strong> TR <strong>Comment Status</strong> X Alert isn't low frequency. See 149.4.2.2, page 135, lines 19-20.</td>
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<td></td>
<td><strong>SuggestedRemedy</strong> Replace &quot;low frequency&quot; with &quot;PN sequence&quot;.</td>
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<td><strong>Proposed Response</strong> Response Status O</td>
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</tr>
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<td>74</td>
<td>22</td>
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<td>Tu, Mike Broadcom</td>
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<td></td>
<td><strong>Comment Type</strong> TR <strong>Comment Status</strong> X PMA_PCSDATAMODE should be added</td>
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<td></td>
<td><strong>SuggestedRemedy</strong> If we make &quot;pcs_data_mode&quot; available even without EEE, then insert &quot;PMA_PCSDATAMODE.indication (pcs_data_mode)&quot; at line 22. Otherwise insert it at line 30.</td>
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<td><strong>Proposed Response</strong> Response Status O</td>
<td></td>
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</table>
Comment Type: TR/technical required
Comment Status: X

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.

Proposed Response

Response Status: O

---

Comment Type: T
Comment Status: X

Benyamin, Saied Aquantia

Changes submitted in Vanouver 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

\[\{1, -1/3, +1/3, +1\}\]

in normal operation
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.

Proposed Response

Response Status: O

---

Wienckowski, Natalie General Motors

Comment Type: E
Comment Status: X

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.

Proposed Response

Response Status: O

---

Wienckowski, Natalie General Motors

Comment Type: TR/technical required
Comment Status: X

149.2.2.9 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.

Proposed Response

Response Status: O

---

TYPE: TR/technical required  ER/editorial required  GR/general required  T/technical  E/editorial  G/general
COMMENT STATUS: D/dispatched  A/accepted  R/rejected     RESPONSE STATUS: O/open  W/written  C/closed  Z/withdrawn
SORT ORDER: Clause, Subclause, page, line
In Figure 149-4, "pcs_data_mode" is missing.

Suggested Remedy:
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.

Comment Status: X
Response Status: O

Proposed Response:

Equation 149-1 is cut off at top.

Suggested Remedy:
Equation 149-1 -> Unwrap then shrink wrap equation.

Comment Status: X
Response Status: O

Proposed Response:

"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).

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

Comment Status: X
Response Status: O

Proposed Response:

The sentence seems to be missing some words.

Suggested Remedy:
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.

Comment Status: X
Response Status: O

Proposed Response:
## P802.3 D1p2

### Comment 149 SC 149.3.5.1 P100 L16

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<tr>
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</tbody>
</table>

Benjamin, Saied  
Aquantia

**Comment:** 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`.

**Suggested Remedy:**
See Presentation Benyamin_3ch_02_041619 slide 2

**Proposed Response**
Response Status: O

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Benjamin, Saied  
Aquantia

**Comment:** 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`.

**Suggested Remedy:**
See Presentation Benyamin_3ch_02_041619 slide 2

**Proposed Response**
Response Status: O

<table>
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<td>Cl 149 SC 149.3.6.2.2 P102 L23 # 57</td>
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</table>

McClellan, Brett  
Marvell

**Comment Type:** T  
**Comment Status:** X

**Suggested Remedy:**
Mechanism to prevent partial refresh is not necessary since refresh is only one frame long.

**Proposed Response**
Response Status: O

<table>
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<td>Cl 149 SC 149.3.6.2.2 P102 L8 # 16</td>
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</table>

Wienckowski, Natalie  
General Motors

**Comment Type:** E  
**Comment Status:** X

**Suggested Remedy:**
Add period after `rx_raw<71:40>`

**Proposed Response**
Response Status: O

<table>
<thead>
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</table>

Benjamin, Saied  
Aquantia

**Comment Type:** TR  
**Comment Status:** X

**Suggested Remedy:**
Mechanism to prevent partial refresh is not necessary since refresh is only one frame long.

**Proposed Response**
Response Status: O
Comment Type: TR  Comment Status: X

Suggested Remedy:
Delete line 37 to line 41.

Proposed Response
Response Status: O

---

Comment Type: TR  Comment Status: X

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

Proposed Response
Response Status: O

---

Comment Type: TR  Comment Status: X

Suggested Remedy:
Take out definition of tx_lpi_initial_quiet.

Proposed Response
Response Status: O

---

Comment Type: E  Comment Status: X

Suggested Remedy:
Add period after rfer_timer_done = TRUE.

Proposed Response
Response Status: O
"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.

Suggested Remedy

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."

Proposed Response

Response Status O

Reorder references to be in numerical order.

Suggested Remedy

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

Proposed Response

Response Status O
In Figure 149-26, "pcs_data_mode" is missing.

Suggested Remedy
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.

Comment Type: TR
Comment Status: X

In Figure 149-26, partial 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.

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

Comment Type: TR
Comment Status: X

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).

Suggested Remedy
Adopt changes in Zimmerman_3ch_01_0419.pdf.

Comment Type: T
Comment Status: X

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

Suggested Remedy
1. Delete line 20.
2. Delete the last sentence, 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."

Comment Type: TR
Comment Status: X

In the absence of the optional EEE capability, the PHY operates as if the value of this variable is TRUE.
Comment Type TR Comment Status X

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.

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

Proposed Response Response Status O

Comment Type TR Comment Status X

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.

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

Proposed Response Response Status O

Comment Type T Comment Status X

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

Suggested Remedy
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.

Proposed Response Response Status O

Comment Type TR Comment Status X

Modify Test mode 2 to include total DJ and EOJ spec

Suggested Remedy
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

Proposed Response Response Status O

Comment Type T Comment Status X

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.

Suggested Remedy
Propose to change test mode 2 for measuring master transmit jitter on MDI at full speed, using a toggling (+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.

Proposed Response Response Status O
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.

**Suggested Remedy**

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)"

**Proposed Response**

"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.

**Suggested Remedy**

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.

**Proposed Response**

"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."

**Suggested Remedy**

Propose to change transmit PSD mask according to the attached presentation.
The coefficient of Frequency which is "S" should be defined.

Suggested Remedy
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.

Proposed Response

Like the above

Suggested Remedy
Like the above

Proposed Response

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 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
unnecessarily burden the transceiver.

Suggested Remedy
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.

Proposed Response

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." This 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 achievable 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 than 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.

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

Proposed Response
Response Status O

Maximum specified frequency for coupling 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.

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

Proposed Response
Response Status O

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 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.

Suggested Remedy
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.

Proposed Response
Response Status O

"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.

Suggested Remedy
delete "Annex 149A and" on P161 L41

Proposed Response
Response Status O
### Comment Type: T  Comment Status: X

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.

**Suggested Remedy**
- Make equation 149-25 (PSANEXT) loss, and text below it (lines 10 & 11) with:
  
  \[ \text{PSANEXT loss}(f) \geq \min(75, 80 - 15 \log_{10}(f/100) \text{ dB}, 1 \leq f \leq F_{\text{Max}}) \hspace{1cm} (149-25) \]
- Replace equation 149-26 (PSAACR-F loss), with "PSAACR-F loss \((f) \geq \min(75, 86 - 20 \log_{10}(f/100)) \text{ dB}, 1 \leq f \leq F_{\text{Max}})" (text already has \(f\) is the frequency in MHz).

**Proposed Response**

**Response Status:** O

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### Comment Type: E  Comment Status: X

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.

**Suggested Remedy**
- 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 calculated using Equation 149-26" (figure will be autonumbered).
- Delete all references to "type A" (currently 2 occurrences on page 162)

**Proposed Response**

**Response Status:** O

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### Comment Type: T  Comment Status: X

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.

**Suggested Remedy**
- Change:
  
  \[ 10 \rightarrow 10S \]
  
  \[ 500 \rightarrow 500S \]
  
  \[ 3000 \rightarrow 3000S \]
  
  \[ 4000 \rightarrow F_{\text{Max}} \]

**Proposed Response**

**Response Status:** O

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### Comment Type: T  Comment Status: X

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.

**Suggested Remedy**
- Formula 12-10log\(f/3000\) change into 10-10*log\((f/3000S)\) for \(300S<f<3000S\)
- Formula 12-20log\(f/3000\) change into 10-20*log\((f/3000S)\) for \(3000S<f<F_{\text{Max}}\)

**Proposed Response**

**Response Status:** O
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 down to 1MHz.

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

Proposed Response Response Status O

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

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

Proposed Response Response Status O

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.

Suggested Remedy
Delete Editor's note.

Proposed Response Response Status O