802.3dj D2.0 Comment Resolution Common Track

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Introduction

- This slide package was assembled by the 802.3dj editorial team to provide background and detailed resolutions to aid in comment resolution.
- Specifically, these slides are for the various common-track comments.

174A – Subclause hierarchy Comment #403

Cl **174A** *SC* **174A.8.1** *P* **679** *L* **38** # 403

Mi, Guangcan — Huawei Technologies Co., Ltd

Comment Type **ER** *Comment Status* **D** *subclause hierarchy (bucket)*

There is only one sub-clause under 174A.8, which is 174A.8.1, no need to have this level in the hierachy.

SuggestedRemedy

remove the hierachy of 174A.8.1, make its sub-clauses 174A.8.x

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
The subclause hierarchy could indeed be improved. See related slides in the following editorial contribution:
<URL>/brown_3dj_03_2507

Also the hierarchy 174A.9.1 and 174A.10.1 are unnecessary. These can be removed, the underlying headings promoted. Some rewording is necessary.

Current hierarchy:

174A.8 Error ratio tests for 200 Gb/s per lane ISLs <reword this one>
174A.8.1 Block error ratio test methods using PMA-based measurements <delete this one>
174A.8.1.1 PMA block error ratio test configurations <promote heading level>
174A.8.1.2 PMA block error counters <promote heading level>
174A.8.1.3 PMA error histogram measurement <promote heading level>
174A.8.1.4 Convolution of error histograms <promote heading level>
174A.8.1.5 Error mask test method using PMA-based measurements <promote heading level>
174A.8.1.6 Block error ratio method for all lanes using PMA-based measurements <promote heading level>
174A.8.1.7 Block error ratio method for a single lane using PMA-based measurements <promote heading level>
174A.9 Error ratio tests for 800GBASE-LR1 ISLs <reword this one>
174A.9.1 Block error ratio test methods using Inner FEC measurements <delete this one>
174A.10 Error ratio tests for a PHY <reword this one>
174A.10.1 Block error ratio method using PCS-based measurements <delete this one>

Proposed hierarchy:

174A.8 Error ratio tests for 200 Gb/s per lane ISLs using PMA measurements
174A.8.1 PMA block error ratio test configurations
174A.8.2 PMA block error counters
174A.8.3 PMA error histogram measurement
174A.8.4 Convolution of error histograms
174A.8.5 Error mask test method using PMA measurements
174A.8.6 Block error ratio method for all lanes using PMA measurements
174A.8.7 Block error ratio method for a single lane using PMA measurements
174A.9 Error ratio tests for 800GBASE-LR1 ISLs using Inner FEC measurements
174A.9.1 Block error ratio test methods using Inner FEC measurements
174A.10 Error ratio tests for a PHY
174A.10.1 Block error ratio method using PCS measurements

174A — Error ratio figures Comment #106, 292

Cl **174A** SC **174A** P **677** L **21** # 292

Brown, Matt — Alphawave Semi

Comment Type **TR** *Comment Status* **D** *(Common) Error ratio figure*

Diagrams showing the various paths or domains described in 174A.3 through 174A.7 would be very helpful to the reader of the annex.

SuggestedRemedy

Add a diagrams illustrating the paths described in 174A.3 through 174A.7.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Bruckman, Leon — Nvidia

Comment Type **TR** *Comment Status* **D** *(Common) Error ratio figure*

A figure will make this much more clear

SuggestedRemedy

Add a figure to show the link in 174A.5, 174A.6 and 174A.7

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the repsonse to comment #292.

#292 and #106 propose adding figures to help understand the context for each of the error ratio allocations.
Note also, that #590 (in bucket #1) proposes to rename “network path” to “mac-to-mac path”.

Cl **174A** SC **174A.3** P **677** L **35** # 590

Shrikhande, Kapil — Marvell

Comment Type **T** *Comment Status* **D** *(Common) (bucket)*

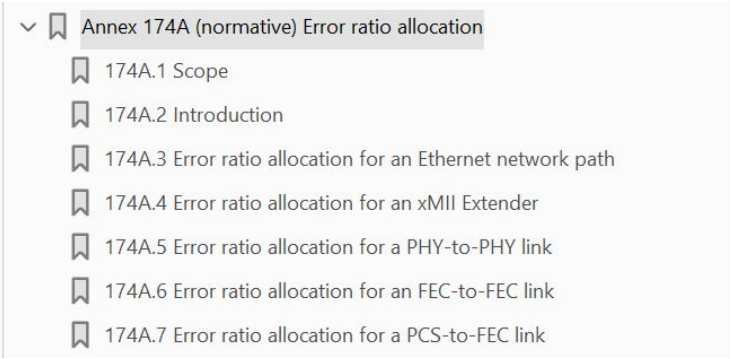
In the subclause title "Error ratio allocation for an Ethernet network path", the term "network path" is a bit vague. Network path may mean a multi-hop network path (e.g. End Host to Switch to End host). Should search for a more descriptive term to use instead of "network path". Since the error allocation is from the PLS service interface of one RS to the PLS service interface of the other RS, suggest using "RS-to-RS" ? or MAC-to-MAC ? This is similar to PHY-to-PHY, PCS-to-FEC, etc. terminology used in other sections of this annex.

SuggestedRemedy

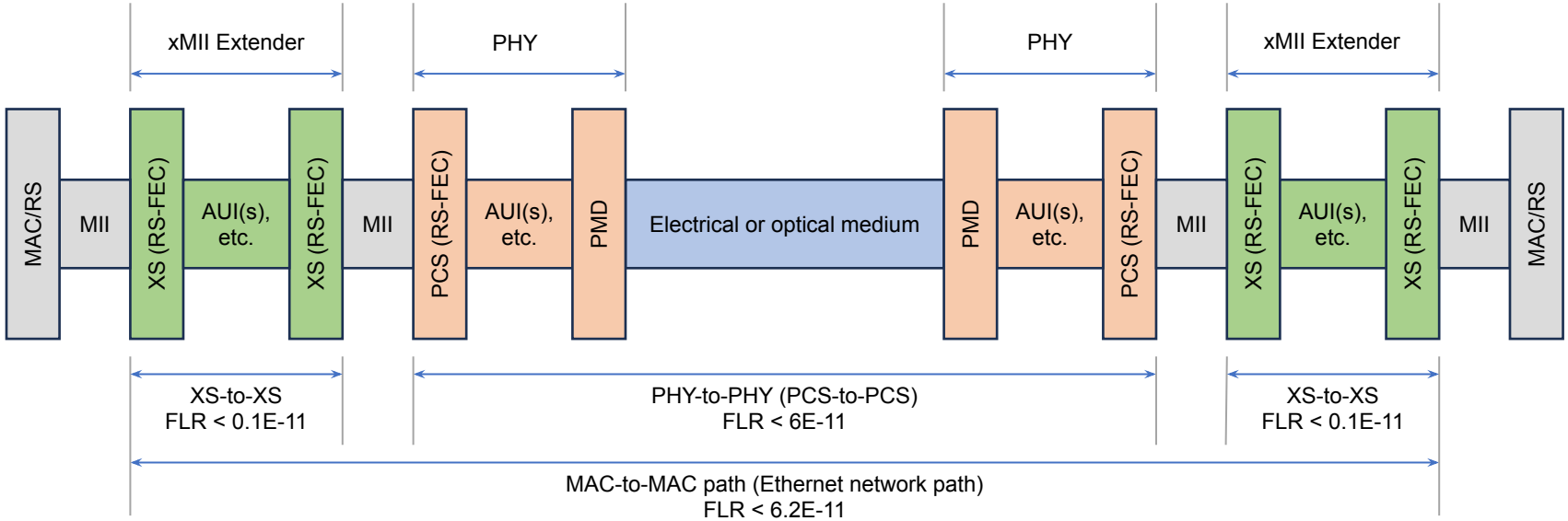
Replace "network path" in the subclause title with "RS-to-RS".

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Ultimate the path is from MAC to MAC. Also, RS can easily be misinterpreted as meaning RS-FEC.
Change "network path" to MAC-to-MAC path.

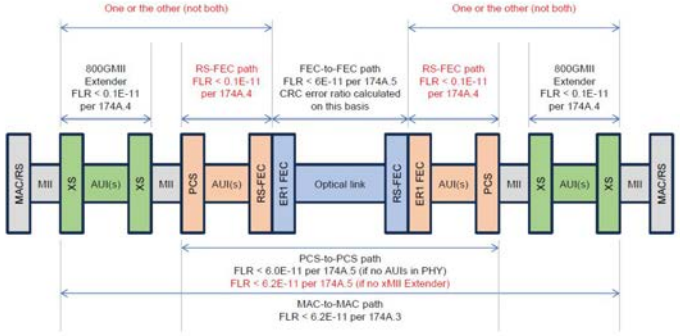


174A — Error ratio figures
Proposed generalized figure for MAC-to-MAC path
Relevant to 174A.3, 174A.4, 174A.5 (excluding 800GBASE-ER1/ER1-20)



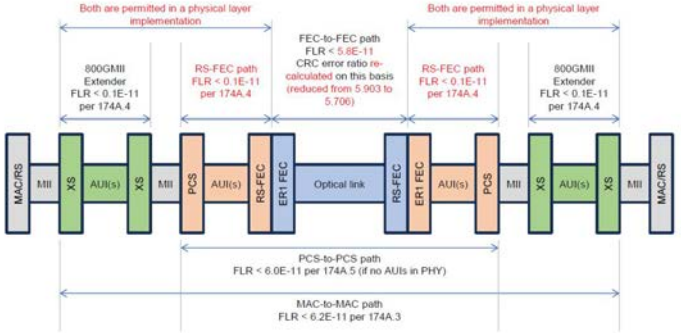
174A — Error ratio figures
Proposed generalized figure for MAC-to-MAC path
Relevant to 174A.3, 174A.4, 174A.5 (for 800GBASE-ER1/ER1-20)

Option #2: Allow either AUIs in the PHY or Extender, but not both



March 2025 IEEE 802.3dj Task Force

Option #3: Reduce FLR option for ER1 FEC path



March 2025 IEEE 802.3dj Task Force 19

For 800GBASE-ER1/ER1-20…
Option #2 (above) was adopted in Draft 1.5.
- Requires different figure

D2.0 comment #xxx proposes to adopt option # (right)
- Can use same figure as previous slide, if adopted

These options were proposed in the following contribution:
https://www.ieee802.org/3/dj/public/25_03/brown_3dj_04a_2503.pdf

174A — Error ratio figures
Comment #585

Cl 174A SC 174A.6 P678 L28 # 585

Nicholl, Gary Cisco Systems

Comment Type TR *Comment Status* D *(Common) FLR allocation*

FLR allocation for 800GBASE-ER1/ER1-20.

During the March plenary the consensus was to adopt option# 2 of https://www.ieee802.org/3/dj/public/25_03/brown_3dj_04a_2503.pdf, for the FLR allocation for 800GBASE-ER1/ER1-20.

Also, see the final response to comment #16 in https://www.ieee802.org/3/dj/comments/D1p4/8023dj_D1p4_comments_final_clause.pdf.

An implication of this decision is that 800GBASE-ER1/ER1-20 PHYs are different from other 802.3dj PHYs, in that you are only allowed to have AUIs in the PHY or Extender, but not both (see slide 18 of brown_3dj_04a_2503). For other 802.3dj PHYs you are allowed to have AUIs in both the PHY and the Extender.

This means it is possible to have a host design that contains two AUIs (one in an Extender and one in the PHY) that would not support an 800GBASE-ER1/ER1-20 PHY, but would support all other 802.3dj PHYs.

I don't tihnk that an 800GBASE-ER1/ER1-20 PHY should be treated as a special case.

I propose changing the FLR allocation for the 800GBASE-ER1/ER1-20 PHY to be consistent with all other 802.3dj PHYs, such that there are no restriction on which hosts an 800GBASE-ER1/ER1-20 PHY can be deployed in.

This is essentially option #3 in brown_3dj_04a_2503, where the FLR of a 800GBASE-ER1/ER1-20 PHY, with or without an AUI, is defined as 6 x 10-11 (consistent with all other 802.3dj PHYs). This in turn means reducing the FLR for the ER1-to-ER1 FEC link from 6 x 10-11 to 5.8 x 10-11.

SuggestedRemedy

Change the FLR allocation for 800GBASE-ER1/ER1-20 to implement option #3 in https://www.ieee802.org/3/dj/public/25_03/brown_3dj_04a_2503.pdf.

Make the necessary changes in clauses 187 and 174A.

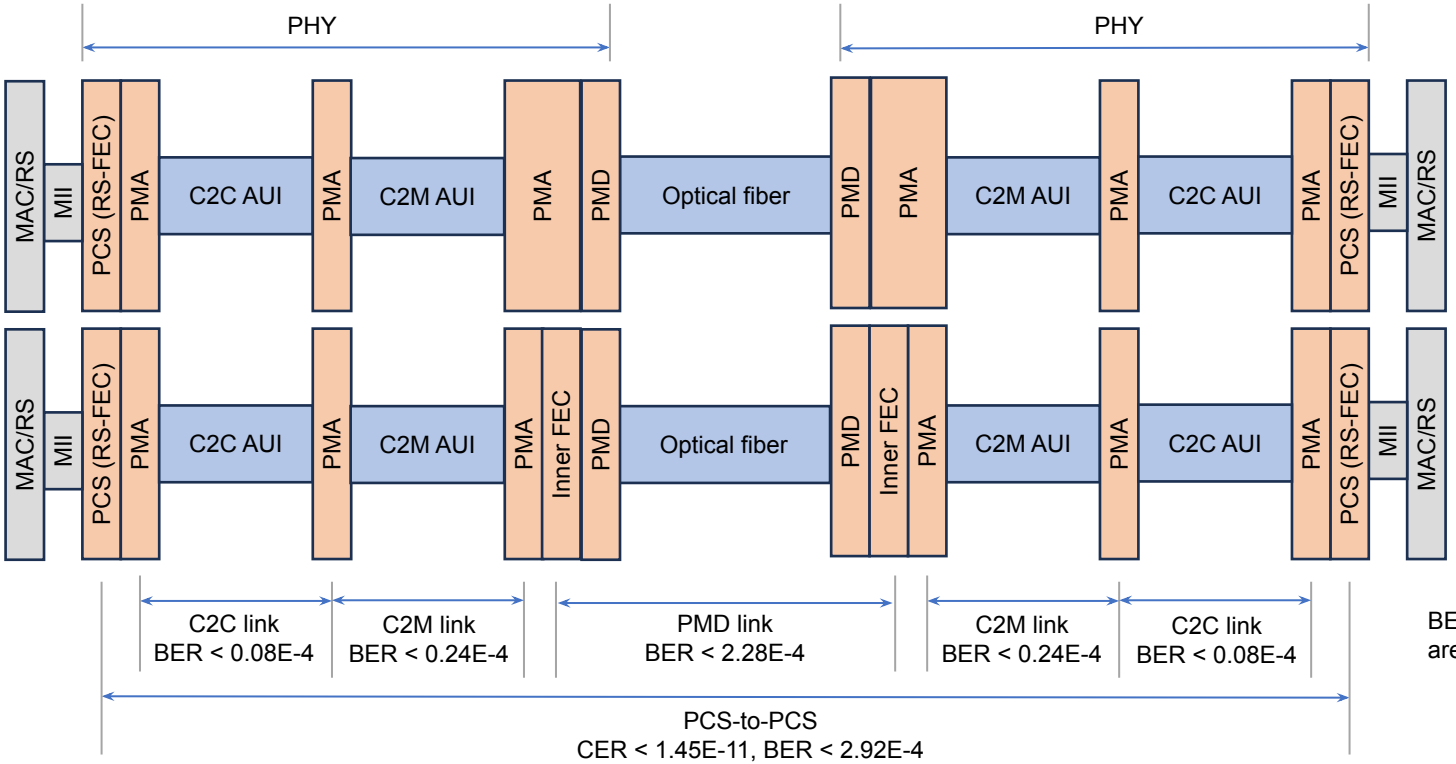
A suuporting presentation will be provided.

Proposed Response *Response Status* W

PROPOSED REJECT.
The comment proposes to change a decision made by the CRG as detailed in the comment. However, the comment makes a good case and a proposal is forthcoming. Pending task force review of the supporting contribution.

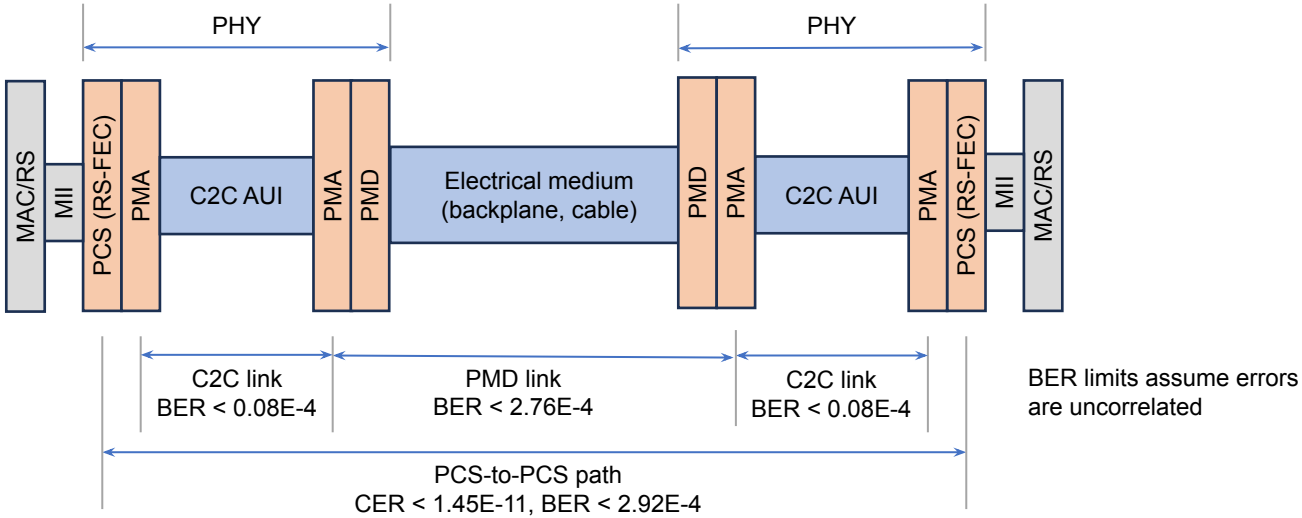
Comment #585 proposes to change the FLR budgeting for 800GBASE-LR1.
The appropriate diagram can be used once that decision is made.
Shown here for reference.

174A — Error ratio figures
Proposed figure for optical PHY types



BER limits assume errors are uncorrelated

174A — Error ratio figures
Proposed figure for electrical PHY types



BER limits assume errors are uncorrelated

ILT 178B — Adjacent service interface Comment #123, 448

CI 178B SC 178B.14.2.1 P 803 L 46 # 123

Mascitto, Marco Nokia

Comment Type E *Comment Status* D *(Common) ILT adjecency*

This is not very clear. I would suggest adding the definition of "adjacent service interface" in subclause 178B.3.

SuggestedRemedy

I would suggest adding the definition of "adjacent service interface" to subclause 178B.3 and referencing a diagram, like the one on Slide 3 of "Making Sense out of ILT" (J. D'Ambrosia, M. Brown, 802.3dj Joint Ad hoc Mtg - 05 Jun 2025).

Adjacent service interface
The service interface adjoining a PMD or AUI component to a PMA.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

The term "adjacent service interface" is not clearly defined.

Editorial slides will be provided to address this.

Resolve along with comment #448.

803 L 47 # 448

Ran, Adee Cisco Systems

Comment Type T *Comment Status* D *(Common) ILT adjecency*

The second case in the NOTE says: "For ILT in an AUI component above a PMA, the adjacent service interface is the interface below the AUI component". That is the PMA's service interface. It may be easier to understand if it is stated.
Also, a figure illustrating the two cases would be helpful.

SuggestedRemedy

Change "the adjacent service interface is the interface below the AUI component" to "the adjacent service interface is the PMA service interface (below the AUI component)".
Add a figure, with editorial license.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

Clarification of the term "adjacent service interface" is not clearly defined.

Editorial slides will be provided to address this.

Resolve along with comment #123.

178B.14.2.1 Variables

adjacent_signal_ok

Enumerated variable derived from the value of the SIGNAL_OK parameter on the adjacent service interface. It takes one of the following values: IN_PROGRESS, READY, OK, FAIL.

NOTE — For ILT in a PMD or an AUI component below a PMA, the adjacent service interface is the service interface of the PMD or AUI component, and SIGNAL_OK is received via the IS_SIGNAL.request primitive. For ILT in an AUI component above a PMA, the adjacent service interface is the interface below the AUI component, and SIGNAL_OK is received via the IS_SIGNAL.indication primitive.

adjacent_remote_rts

Boolean variable that indicates the value of remote_rts on the adjacent service interface. It is true if adjacent_signal_ok is OK and false otherwise.

Proposal…

Add definition to 178B.3…

"Adjacent service interface – The inter-sublayer service interface between the PMD or AUI component and the adjacent sublayer within the same device."

Change the note in 178B.14.2.1 to:

NOTE — For ILT in a PMD or an AUI component below a PMA SIGNAL_OK is received via the IS_SIGNAL.request primitive of the adjacent service interface (see 178B.3). For ILT in an AUI component above a PMA, the SIGNAL_OK is received via the IS_SIGNAL.indication primitive of the adjacent service interface (see 178B.3).

DATA/TRAINING mode
Comments 191, 190, 192, 193, 195, 196, 198

Cl 179 SC 179.8.2 P 391 L 31 # 191

Huber, Thomas Nokia

Comment Type T *Comment Status* D *mon) DATA/TRAINING mode*

While it is clear what "DATA mode" is intended to mean here in the context of ILT, that term has specific meaning for 1000BASE-T PHYs that differs from what is intended here (see 1.4.278) Annex 178B.5 indicates that in the context of ILT, "data mode" means the variable tx_mode has the value 'data', which is associated with being in the PATH_UP state per figure 178B-8. As such, it would be more clear if the text in 179.8.2 referred to the PATH_UP state.

SuggestedRemedy

Change "When operating in DATA mode, ..." to "When operating in the PATH_UP state (see Figure 178B-8),..."

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.
The two modes of the PMD transmit function are explicitly defined in the first paragraph of 179.8.2: "The PMD transmit function has two operating modes: DATA and TRAINING. The operating mode is controlled by the ILT function (see 179.8.9)". These modes are referenced in multiple places in the draft (although they are not currently defined by all PMDs).

The suggested remedy refers to a state of the training state diagram, but there is a variable, tx_mode, that explicitly controls the "DATA mode" behavior. This variable can be referenced to improve clarity.
Also, DATA and TRAINING modes of the transmit function should be defined for all PMDs that include an ILT function, and all references to these modes should be linked to the transmit function.

In the first pragraph of 179.8.2, change "The operating mode is controlled by the ILT function (see 179.8.9)" to "The operating mode is controlled by the tx_mode variable of the ILT function (see 179.8.9): it is DATA when tx_mode=data, and TRAINING otherwise".
Add similar paragraphs in 180.5.2, 181.5.2, 182.5.2, and 183.5.2 (possibly also 185.5.2 and 187.5.2 if ILT is added to these clauses).
Add an explicit reference to the transmit function in all instances of "DATA mode" and "TRAINING mode" across the draft, where appropriate.

Implement with editorial license.

179.8.2 PMD transmit function

The PMD transmit function has two operating modes: DATA and TRAINING. The operating mode is controlled by the ILT function (see 179.8.9).

When operating in DATA mode, the PMD transmit function shall convert the tx_symbol parameters of the PMD service interface message PMD:IS_UNITDATA_*i*.request on each lane into a stream of PAM4 symbols for transmission as electrical signals on the corresponding contacts of the MDI (see 179.12). The PAM4 symbol values 0, 1, 2, and 3 correspond to the tx_symbol values zero, one, two, and three, respectively. When operating in TRAINING mode, the PAM4 symbol stream on each lane is taken from the output of the training pattern generator in the PMD control function (see Figure 178B–4).

DATA/TRAINING mode
Comments 191, 190, 192, 193, 195, 196, 198, 163, 166, 177

Suggested change in 179.8.2

179.8.2 PMD transmit function

The PMD transmit function has two operating modes: DATA and TRAINING. The operating mode is controlled by the tx_mode variable of the ILT function (see 179.8.9): it is DATA when tx_mode = data, and TRAINING otherwise.

Similar paragraphs should be added in other "PMD transmit function" subclauses 180.5.2, 181.5.2, 182.5.2, and 183.5.2.
Example in 180.5.2:

180.5.2 PMD transmit function

The PMD transmit function has two operating modes: DATA and TRAINING. The operating mode is controlled by the tx_mode variable of the ILT function (see 180.5.12): it is DATA when tx_mode = data, and TRAINING otherwise.

~~The~~ When operating in DATA mode, the PMD Transmit function shall convert the *n* symbol streams requested by the PMD service interface messages PMD:IS_UNITDATA_0.request to PMD:IS_UNITDATA_*n*–1.request into *n* separate optical signals. The *n* optical signals shall then be delivered to the MDI, which contains *n* parallel light paths for transmit, according to the transmit optical specifications in this clause. The highest optical power level in each signal shall correspond to tx_symbol = three and the lowest shall correspond to tx_symbol = zero.

When operating in TRAINING mode, the PAM4 symbol stream on each lane is taken from the output of the training pattern generator in the PMD control function (see Figure 178B–4).

If ILT is added to coherent PMDs (175 and 187) then changes should be applied in 185.5.2 and 187.5.2 too.

Note that, in these PMDs, TRAINING mode does not use a PAM4 symbol stream; it has a different effect (send local_pattern). Appropriate modifications should be made.

Suggested change in 179.8.9

179.8.9 Inter-sublayer link training (ILT) function

A PMD shall provide the inter-sublayer link training (ILT) function for a Type E1 interface, specified in Annex 178B. When the variable mr_training_enable is true, the ILT function is used to request changes to the peer transmitter state (modulation, training pattern, and precoder state), control the transmitter output on each lane of the MDI, indicate the receiver state, and coordinate the transition of the PMD transmit function to DATA mode.

Similar changes should be made in all instances of "DATA mode".

ILT state diagrams
Comments 459, 626

Cl **178B** *SC* **178B.14.2.1** *P* **804** *L* **32** # 459

Slavick, Jeff — Broadcom

Comment Type **TR** *Comment Status* **D** *(Common) ILT state diagrams*

Training status can not be both a AUI component variable and a per-lane training variable. Local_rts is an equivalent status to it and is mapped to a MDIO register bit.

SuggestedRemedy

Move the definition of training_status to 178B14.3.1
Remove the enumeration of "READY" from its definition.
Delete training_status <= READY from Figyre 178B-7

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
training_status is used by the PMDs and AUIs (see 178.4, 179.4, 180.3, 181.3, 182.3, 183.3, 176C.6 and 176D.4) so it shall be assigned a value by ILT.
It is a per-interface variable that is assigned to all lanes of the interface.
Define a new variable in 178B.14.3.1: lane_training_status. Defined as: Enumerated variable that indicates the status of the per-lane ILT function. This variable may be assigned one of the following values: IN_PROGRESS, OK, FAIL.
Use this new variable in the per-lane state diagrams instead of training_status.
Change the definition of the variable training_status to: Enumerated variable that indicates the status of the per-interface ILT function. This variable may be assigned one of the following values: IN_PROGRESS, READY, OK, FAIL. The value READY is assigned by the RTS update state diagram (Figure 178B-8) and other values are assigned according to the lane_training_status variable (see 178B.14.3.1):
IN_PROGRESS - lane_training_status variable = IN_PROGRESS for any lane assigned to the interface
OK - lane_training_status variable = OK for all lanes assigned to the interface
FAIL - lane_training_status variable = FAIL for any lane assigned to the interface
Implement with editorial license.

Cl **178B** *SC* **178B.14.3.5** *P* **810** *L* **7** # 626

Law, David — HPE

Comment Type **TR** *Comment Status* **D** *(Common) ILT state diagrams*

The variable training_status is used by the 'Training control state diagram' in subclause 178B.14.3.5 'State diagram figures' but is not defined in the associated subclause 178B.14.3.1 'Variables'.

In addition, it appears that the training_status is a per-interface variable based on the definition found in 178B.14.2.1 'Variables', yet it appears to be driven by both the per-interface 'RTS update state diagram' (Figure 178B–7) and the per-lane 'Training control state diagram' (Figure 178B–8). I'm not sure how this would operate.

As an example, if the Training control state diagram on one lane in an interface enters the FAIL state, it would set training_status for the interface to FAIL. If, however, the Training control state diagram on another lane in the same interface enters the PATH_UP state immediately afterwards, training_status for the interface would then be set to OK. This doesn't seem to be correct.

SuggestedRemedy

Provide a definition for the training_status variable used in Figure 178B–8 'Training control state diagram' in its associated subclause 178B.14.3.1 'Variables'. In addition, clarify the operation of training_status regarding it being driven by both the per-interface 'RTS update state diagram' (Figure 178B–7) and the per-lane 'Training control state diagram'.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT IN PRINCIPLE.
Resolve using the response to comment #459.

ILT state diagrams
Comments 459, 626

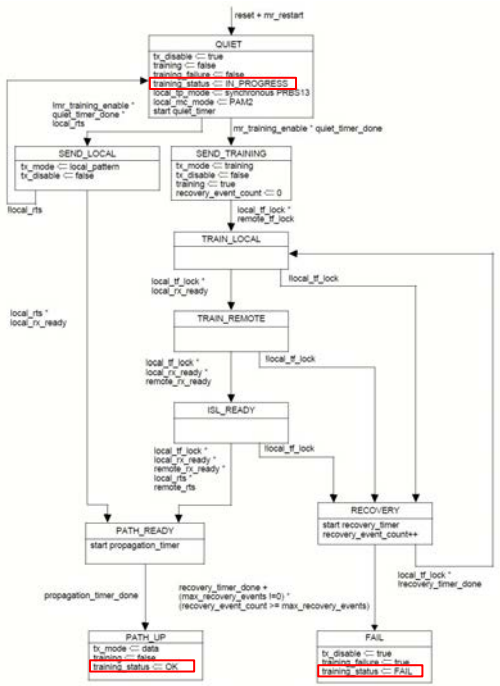


Figure 178B–8—Training control state diagram

Per-lane state diagram

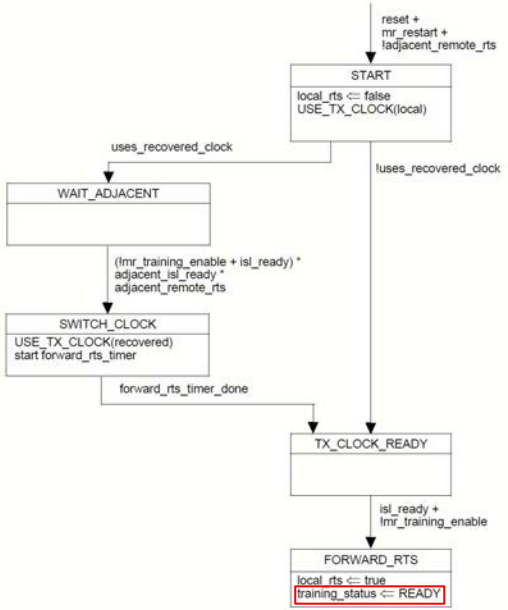


Figure 178B–7—RTS update state diagram

Per-interface state diagram

training_status

Enumerated variable that indicates the status of the ILT function. This variable may be assigned one of the following values: IN_PROGRESS, READY, OK, FAIL.

Problem:

training_status is defined as a per-interface variable (in 178B.14.2.1), but it appears in both per-lane and per-interface state diagrams. Formally there needs to be more than one variable.

Note that the value READY is assigned only be the per-interface state diagram; READY is equivalent to (all lanes are IN_PROGRESS) and (local_rts is true).

ILT state diagrams
Comments 459, 626

Proposed changes:

Define a new variable in 178B.14.3.1 (Per-lane variables): lane_training_status

lane_training_status

Enumerated variable that indicates the status of the training control state diagram. This variable may be assigned one of the following values: IN_PROGRESS, OK, FAIL.

Use this new variable in the per-lane state diagrams instead of training_status.

For the per-interface variable training_status:

Option A: keep it as a state diagram variable and change its definition as follows:

training_status

Enumerated variable that indicates the status of the ILT function. This variable may be assigned one of the following values: IN_PROGRESS, READY, OK, FAIL. Assignment to this variable occurs both by the RTS update state diagram (Figure 178B-8) and by changes to the lane_training_status variables of the lanes in the interface, as follows:

- IN_PROGRESS: assigned when lane_training_status = IN_PROGRESS on all lanes.
- READY: assigned by the RTS update state diagram.
- OK: assigned when lane_training_status variable = OK on all lanes
- FAIL: assigned with lane_training_status variable = FAIL on any lane

Option B: delete its assignment from the per-interface state diagram (Figure 178B-8), making it a non-state-diagram variable, and use the following definition:

training_status

Enumerated variable that indicates the status of the ILT function. This variable may be assigned one of the following values: IN_PROGRESS, READY, OK, FAIL. This variable is assigned as follows:

- IN_PROGRESS: if lane_training_status = IN_PROGRESS on all lanes and local_rts = false
- READY: if lane_training_status = IN_PROGRESS on all lanes and local_rts = true
- OK: if lane_training_status = OK on all lanes
- FAIL: if lane_training_status = FAIL on any lane

174A – terminology Comment #52

CI 178B SC 178B.3 P 786 L 33 # 52

D'Ambrosia, John Futurewei, U.S. Subsidiary of Huawei

Comment Type E *Comment Status* D *(Common) ILT scope*

Given the introduction of inter-sublayer link training to the Ethernet world, it would be helpful if the term inter-sublayer link (ISL) was displayed graphically for the reader.

SuggestedRemedy

Implement figure on Page 3 of https://www.ieee802.org/3/dj/public/adhoc/electrical/25_0605/dambrosia_3dj_elec_02_250605.pdf with editorial license

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.
Pending review of the following presentation and CRG discussion.
<URL of presentation>

A related presentation has not been requested (yet).
However, this slide provides an figure, update since presented to the ad hoc.
The diagram captures the various entities as defined for ILT in D2.0.
Provided to the editorial team by John D'Ambrosia.
This diagram is provided as a reference for discussion and as a proposed diagram to add into Annex 178B.

As shown, the diagram includes two path types: XS-to-XS in an xMII extender and PCS-to-PCS across a pair of PHYs and the medium between.