Cl **00** *SC* **0** *P* *L* # i-287

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **G** *Comment Status* **R** *Editorial*

It will be a good standard, but at the moment there are missing so many instances, even if they can be considert editorial, that the commenter this time has to cast a negative vote .

SuggestedRemedy

The proposed changes or additions are seen at each comment.

Response *Response Status* **C**

REJECT.

There is no specific issue identified and no suggested remedy to implement.

Cl **00** *SC* **0** *P* *L* # i-290

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **G** *Comment Status* **R** *Multidrop*

in clause 147.1 to 147.1.2 the new multidrop usage is described but the System interrelation and possible limitations description are missing. Questions are: 1- can multidrop segments be cascaded to form a tree and if yes how many. 2- How long can be a new link attached to a drop (after the phy not the stub). 3-How many electronics(e.g. switches) can be attached to each drop? 4- is energy efficiency an option? There may be additional questions!

SuggestedRemedy

Add a clause here or at an other place explaining the new multidrop advantages and limitations. The simplest example would be an automotive door.

Response *Response Status* **C**

REJECT.

The CRG disagrees with the commenter. The commenter did not provide a proposed resolution in sufficient detail to readily determine the specific wording of changes that will cause him to change his vote to approve (see SASB Ops Manual clause 5.4.3.2,b).

Comment is unclear as to whether it requests tutorial applications information or if specifications are missing. The specification provides the maximum insertion loss and delay associated with a mixing segment which defines the configuraions. Termination requirements are given. Which specifications may be missing is unclear.

If the commenter means for tutorial applications information, then the standard is not a tutorial.

Cl **00** *SC* **0** *P* *L* # i-26

Berger, Catherine

Comment Type **G** *Comment Status* **A** *Editorial*

This draft meets all editorial requirements.

SuggestedRemedy

Response *Response Status* **C**

ACCEPT.

Cl **30** *SC* **30.2.2.2.1** *P* **0** *L* **0** # i-205

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *PLCA*

As I think I understand PLCA the occurance of collision at any point during reception is an error. If that is the case, then collision (in the presence of PLCA operation) should be added to the list of error statistics in this clause.

SuggestedRemedy

See comment.

Response *Response Status* **U**

REJECT.

The CRG disagrees with the commenter. Collisions on the media in the presence of PLCA operation are already counted by the bits in register 3.2294.15:0 (see 45.2.3.68f.1). No change is required.

Cl **00** *SC* **0** *P* **1** *L* # i-27

Robinson, Gary RETIRED/unemployed

Comment Type **TR** *Comment Status* **R** *PLCA*

This standard is well written for its intended purpose but I do not believe it belongs as an amendment to 802.3 series.

This standard does not conform to the layer 1, 2, or 3 rules as the rest of 802.3.

Physical Layer Collision Avoidance (PLCA) when combined with CSMA/CD (which remains as an error handling function) constitutes a new Media Access Control (MAC) function and as such belongs in the MAC sublayer, not in the Physical Sublayer. Where such a function is appropriately placed is a matter of architecture, not implementation per clause 1.1.3 of the standard.

I would be satisfied if it was moved out of 802.3 and into 802.n or another series all together.

As the original contributor of CSMA/CD, 802.3 I have argued this issue before and I am sure it is not the last time.

SuggestedRemedy

I would be satisfied if it was moved out of 802.3 and into 802.n or another series all together.

Response *Response Status* **W**

REJECT.

The CRG disagrees with the commenter. The specification of PLCA is appropriately placed in the physical layer and carries out the operations delegated to the physical layer in the 802.3 architecture, providing mapping of PLS primitives to signalling for the PHY, and aligning the MAC data with the needs of the PHY. Nodes implementing the PLCA RS are interoperable on the same mixing segment with nodes without the PLCA RS implemented or enabled. The functions are located in the physical layer according to the definitions in ISO 7894-1:1994, which states that the physical layer provides "functional and procedural means to activate, maintain, and de-activate physical-connections for bit transmission between data-link-entities." (7.7.2), and that "functions may be provided by the (N)-layer to enhance the facilities offered to, and the quality of service seen by the (N+1)-entities over those which are offered to the (N)-layer by the (N-1)-layer" (5.3.3.1.2). The PLCA RS conforms to the Physical layer service specifications in IEEE 802.3 by interfacing with the MAC at the existing PLS_CARRIER, PLS_DATA_VALID, and PLS_SIGNAL primitives and providing the information necessary for the local MAC sublayer entity to perform media access functions. (IEEE Std 802.3-2018 6.2.3). The augmentation of the physical layer is consistent with prior augmentation of these primitives in IEEE Std 802.3 over its lifetime, but particularly the last 20 years. For further information, please see http://www.ieee802.org/3/cg/public/adhoc/brandt_020619_3cg_01a_adhoc.pdf

Move to accept the above proposed reject response to comment i-27:
M: C. Jones
S: V. Maguire

Y: 27
N: 4
A: 8

Cl **00** *SC* **0** *P* **2** *L* **3** # i-206

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **A** *PLCA*

There is no mention of the addition of a new half duplex shared media access method (PLCA) in the abstract.

SuggestedRemedy

If PLCA is to remain in the draft (no matter what layer) then it should be mentioned in the abstract. It is a major addition to 802.3.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Insert,
"These include two new 10 Mb/s PHY types and a new Reconciliation Sublayer for enhanced performance of half-duplex IEEE 802.3 networks on shared media."

after the sentence ending on page 1, line 3.

Cl **00** *SC* **0** *P* **11** *L* **15** # i-207

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **R** *Editorial*

The following statement in the introductory material is not true: "Ethernet at 10 Mb/s was approved as an IEEE standard by the IEEE Standards Board in 1983 and subsequently published in 1985 as IEEE Std 802.3-1985." What was initially approved and published by the IEEE was not identified as Ethernet. The only mention of the word "Ethernet" in the first 802.3 standard is in an acknowledgement on page 7 of the front matter between the Working Group member listing and the Standards Board membership roster. "The IEEE 802.3 Working Group acknowledges and appreciates that many concepts embodied in this standard are based largely upon the CSMA/CD access method earlier described in The Ethernet specification as written jointly by individuals from Xerox Corporation, Digital Equipment Corporation, and Intel Corporation. Appreciation is also expressed to Robert M. Metcalfe and David R. Boggs for their pioneering work in establishing the original concepts." IEEE Std 802.3-1985

SuggestedRemedy

Change the sentence to read: The derivative at 10 Mb/s was approved as an IEEE standard by the IEEE Standards Board in 1983 and subsequently published in 1985 as IEEE Std 802.3-1985 titled Information technology-- Telecommunications and information exchange between systems-- Local and metropolitan area networks-- Specific requirements-- Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications.

Response *Response Status* **U**

REJECT.

The Front Matter is included in the draft, but is not open for ballot. Therefore the "Must Be Satisfied" aspect of the comment is not applicable.

The CRG disagrees with the commenter. The text in the introductory material is exactly as provided in the introduction to IEEE Std 802.3-2018.

Cl **00** *SC* **0** *P* **11** *L* **20** # i-208

Thompson, Geoffrey Independent Consultant

Comment Type **E** *Comment Status* **R** *Editorial*

This material does not address the radical change in the title done in the 2012 revision.

SuggestedRemedy

Insert the following text in front of the current text: "The title of the standard was changed to the more concise 'Standard for Ethernet' with the 2012 revision."

Response *Response Status* **C**

REJECT.

The Front Matter is included in the draft, but is not open for ballot. Therefore the "Must Be Satisfied" aspect of the comment is not applicable.

The CRG disagrees with the commenter. The text in the introductory material is exactly as provided in the introduction to IEEE Std 802.3-2018.

Cl **00** *SC* **FM** *P* **12** *L* **28** # i-9

Anslow, Peter Ciena

Comment Type **E** *Comment Status* **A** *Editorial*

The Editor's note: "New front matter text needs review." should be removed.

SuggestedRemedy

Review the text and delete the note.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Delete Editor's note on lines 28-31

Cl **00** *SC* **FM** *P* **13** *L* **5** # i-323

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Editorial*

Suggest that '... on a single balanced pair copper cable.' should be changed to read '... on a single balanced pair of conductors.'.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace, "on a single balanced pair copper cable."

with, "on a single balanced pair of conductors."

Cl **01** *SC* **1.3** *P* **26** *L* **38** # i-288

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **TR** *Comment Status* **R** *Editorial*

On link coupling attenuation limit it was decided to do the same as other limits but as being the first measurement standard specifying .1 MHz to add it in the list of references.

SuggestedRemedy

Add "IEC 62153-4-9 Ed2 Amd1: Coupling attenuation
of screened balanced cables, triaxial method" in the list if Normative references

Response *Response Status* **W**

REJECT.

CRG disagrees with the commenter. IEC 62153-4-9 does not appear in the draft as a reference or normative requirement and, therefore, cannot be added as a Normative reference.

Cl **00** *SC* **FM** *P* **26** *L* **52** # i-10

Anslow, Peter Ciena

Comment Type **E** *Comment Status* **A** *Editorial*

"IEEE P802.3bj and IEEE P802.3bk" are not projects "running in parallel". They were completed some time ago and the amendments have been incorporated into the base standard.

SuggestedRemedy

Change "IEEE P802.3bj and IEEE P802.3bk" to: "IEEE P802.3ca and IEEE P802.3cm" (or some other current projects).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace, "IEEE P802.3bj and IEEE P802.3bk"

with, "IEEE P802.3ca and IEEE P802.3cm"

Cl **01** *SC* **1.1.3** *P* **27** *L* **8** # i-11

Anslow, Peter Ciena

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

In the editing instruction, "Figure 1--1" should be "Figure 1-1" (en dash rather than em dash)

SuggestedRemedy

In the editing instruction, change "Figure 1--1" to "Figure 1-1" (en dash rather than em dash)

Response *Response Status* **C**

ACCEPT.

Cl **01** *SC* **1.4** *P* **27** *L* **16** # i-210

Thompson, Geoffrey Independent Consultant

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

Modify the current 802.3 definition of 1.4.131 that is now incomplete.

SuggestedRemedy

Change text to read: "1.4.131 8B/10B transmission code: A DC-balanced octet-oriented data encoding specified in IEEE Std 802.3, Table 36-1a-e, Table 36-2 and Table 147-1."

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **01** *SC* **1.4** *P* **27** *L* **16** # i-209

Thompson, Geoffrey Independent Consultant

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

Modify the current 802.3 definition of 1.4.298 that is restricted by the current text.

SuggestedRemedy

Change text to read: 1.4.298 jumper cable assembly: An portable electrical or optical assembly, used for the bidirectional transmission and reception of information, consisting of a pair of
MDI connectors and their interconnecting media. This assembly may or may not contain additional components, located between the plug connectors, to perform equalization.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **01** *SC* **1.1.3** *P* **27** *L* **30** # i-316

Kabra, Lokesh Synopsys, Inc.

Comment Type **G** *Comment Status* **R** *MII*

Figure 90-1 (Note 1) of 802.3-2018 indicates that MII is used only for 100 Mb/s and above. If clause 90 is applicable on MII of 10BASE-T1S/L, then this note needs to be updated to avoid confusion

SuggestedRemedy

Response *Response Status* **C**

REJECT.

The CRG disagrees with the commenter. Note 1 of Figure 90-1 states "NOTE 1-In this figure, the xMII is used as a generic term for the Media Independent Interfaces for implementations of 100 Mb/s and above. For example: for 100 Mb/s implementations, this interface is called MII; for 1 Gb/s implementations, it is called GMII; for 10 Gb/s implementations, it is called XGMII; etc."

The statement is relative to the content of Figure 90-1, and does not say "only for 100 Mb/s and above" as the Commenter states. The statement remains correct with the addition of 10BASE-T1S and 10BASE-T1L using the MII.

Cl **01** *SC* **1.1.3** *P* **27** *L* **31** # i-211

Thompson, Geoffrey Independent Consultant

Comment Type **T** *Comment Status* **R** *MII*

The note text in Fig. 1-1 says: "for 100 Mb/s implementations this interface is called MII" but this is a 10 Mb/s implementation and 10 Mb/s implementations including this one (Ref: cl. 148.3 and 148.4.1)

SuggestedRemedy

Change the quoted text to read: "for 10 and 100 Mb/s implementations this interface is called MII"

Response *Response Status* **C**

REJECT.

The CRG disagrees with the commenter. The note text does not say what the comment says - it says "For example: for 100 Mb/s implementations this interface is called MII". Text is correct. No change necessary.

Cl **01** *SC* **1.3** *P* **28** *L* **18** # i-25

Fritsche, Matthias HARTING Technologie Gruppe

Comment Type **E** *Comment Status* **A** *MDI*

The IEC 61076-3-125 is now renumbered from IEC SC48B secretary to IEC 63171-6 during the publishing process of the document 48B_2720e_CDV at the 2019-03-01.

SuggestedRemedy

Change in the complete document the references from "IEC 61076-3-125" to "IEC 63171-6"

Response *Response Status* **C**

ACCEPT.

Cl **01** *SC* **1.3** *P* **28** *L* **22** # i-4

Hajduczenia, Marek Charter Communications

Comment Type **ER** *Comment Status* **A** *MDI*

So what happens when IEC 61076-3-125 is not published by the time this draft is done? Do you wait for its completion?

SuggestedRemedy

I am not sure what the strategy is in case of IEC specifications in flight, but we cannot (I believe) have a reference to an unpublished IEC draft. It seems that the spec would have to wait for iEC publication to become available?
The same comment / question about IEC 63171-1 under development

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Replace, "Editor's Note (to be removed prior to publication): IEC 61076-3-125 is still in development. The publication date will need to be inserted and the document title and number confirmed."

with, "Editor's Note (to be removed prior to final recirculation): IEC 63171-6 is still in development. The publication date will need to be inserted and the document title and number confirmed. If IEC 63171-6 is not referenceable by final circulation, then the entry for IEC 63171-6, this Editor's Note, and references to IEC 63171-6 in this draft will be removed."

Cl **01** *SC* **1.3** *P* **28** *L* **24** # i-12

Anslow, Peter Ciena

Comment Type **TR** *Comment Status* **A** *MDI*

The editor's note says "IEC 61076-3-125 is still in development. The publication date will need to be inserted and the document title and number confirmed."
However, the IEC web site does not contain any status information on IEC 61076-3-125. This suggests that the document number is incorrect or it will not be published by the expected approval date for the P802.3cg amendment of September 2019.
Since any normative reference has to be available at the time of approval of the draft, this issue has to be corrected prior to the draft being suitable for RevCom submittal.

SuggestedRemedy

Either:
Change the reference to a document that will be published by the expected date of RevCom submittal or remove this reference.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Accomodated by i-4. The resolution to i-4 is:

ACCEPT IN PRINCIPLE.

Replace, "Editor’s Note (to be removed prior to publication): IEC 61076-3-125 is still in development. The publication date will need to be inserted and the document title and number confirmed."

with, "Editor’s Note (to be removed prior to final recirculation): IEC 63171-6 is still in development. The publication date will need to be inserted and the document title and number confirmed. If IEC 63171-6 is not referenceable by final circulation, then the entry for IEC 63171-6, this Editor's Note, and references to IEC 63171-6 in this draft will be removed."

Cl **01** *SC* **1.3** *P* **28** *L* **39** # i-13

Anslow, Peter Ciena

Comment Type **TR** *Comment Status* **A** *MDI*

The editor's note says "IEC 63171-1 is still in development. The publication date will need to be inserted."
However, the IEC web site shows an expected publication date for IEC 63171-1 of May 2020.
Also, the title shown on the IEC web site is "IEC 63171-1, Connectors for Electrical and Electronic Components--Product Requirements--Part 1: Detail specification for 2-way, shielded or unshielded, free and fixed connectors: mechanical mating information, pin assignment and additional requirements for TYPE 1 / Copper LC Style"
Since any normative reference has to be available at the time of approval of the draft, this issue has to be corrected prior to the draft being suitable for RevCom submittal.

SuggestedRemedy

Either:
Change the reference to a document that will be published by the expected date of RevCom submittal or remove this reference.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Replace, "Editor’s Note (to be removed prior to publication): IEC 63171-1 is still in development. The publication date will need to be inserted."

with, "Editor’s Note (to be removed prior to final recirculation): IEC 63171-1 is still in development. The publication date will need to be inserted. If IEC 63171-1 is not referenceable by final circulation, then the entry for IEC 63171-1, this Editor's Note, and references to IEC 63171-1 in this draft will be removed."

Cl **01** *SC* **1.4** *P* **28** *L* **48** # i-324

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Editorial*

Subclause 1.4.151 of IEEE Std 802.3-2018 reads 'BASE-T1: PHYs that belong to the set of specific Ethernet PCS/PMA/PMDs that operate on a single twisted-pair copper cable, including 100BASE-T1 and 1000BASE-T1. (See IEEE Std 802.3, Clause 96 and Clause 97.)'. This definition needs to be updated to add 10BASE-TS1 and 10BASE-TL1.

SuggestedRemedy

Suggest that the following change be added to subclause 1.4 of IEEE P802.3cg:

In subclause 1.4.151 of IEEE Std 802.3-2018, the text '... that operate on a single twisted-pair copper cable, including 100BASE-T1 and 1000BASE-T1. (See IEEE Std 802.3, Clause 96 and Clause 97.)' be changed to read "... that operate on a single twisted-pair copper cable, including 10BASE-T1S, 10BASE-T1L, 100BASE-T1 and 1000BASE-T1. (See IEEE Std 802.3, Clause 96, 97, 146 and 147).'.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Insert editor's instruction, "Change the Definition for 1.4.151 BASE-T1 as follows:" on page 29, line 4.

Insert the definition for clause 1.4.151 BASE-T1 from IEEE Std 802.3-2018 after the editor's instruction.

Grant editorial license to show the change of

replace, "that operate on a single twisted-pair copper cable, including 100BASE-T1 and 1000BASE-T1. (See IEEE Std 802.3, Clause 96 and Clause 97.)"

with, "that operate on a single twisted-pair copper cable, including 10BASE-T1S, 10BASE-T1L, 100BASE-T1 and 1000BASE-T1. (See IEEE Std 802.3, Clause 96, Clause 97, Clause 146, and Clause 147)."

with appropriate strikeouts and underlines.

Cl **01** *SC* **1.5** *P* **29** *L* **22** # i-14

Anslow, Peter Ciena

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

The expansion for the abbreviation "DCR" should not be capitalised as this is not a proper noun.

SuggestedRemedy

Change "Direct Current Resistance" to "direct current resistance"

Response *Response Status* **C**

ACCEPT.

Cl **01** *SC* **1.5** *P* **29** *L* **23** # i-5

Hajduczenia, Marek Charter Communications

Comment Type **E** *Comment Status* **R** *Editorial*

I do not believe we need abbreviation added for a term that is already defined and abbreviated in definition (1.4.389a)

SuggestedRemedy

Remove abbreviation for PLCA

Response *Response Status* **C**

REJECT.

The remedy is not aligned with similar examples in 802.3-2018. See Definition and Abbreviation entries for bit error ratio and BER and bit rate and BR as two examples.

Cl **01** *SC* **1.4** *P* **29** *L* **51** # i-289

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **TR** *Comment Status* **R** *Editorial*

The definition of T1S shows the same wording as T1L. Only the reach is different. But this is not the only difference. It may be additionally a point to multipoint System and only half duplex. No optional PoDL is described. It may be also 25m long.

SuggestedRemedy

This needs some editing by a native speaker. As the commenter is not able to do this in good english he would grant editor liscence to do so

Response *Response Status* **W**

REJECT.

Proposed change in the comment does not contain sufficient detail so that the CRG can understand the specific changes that will satisfy the commenter.

The CRG disagrees with the commenter. The comment appears to desire some tutorial text on some certain aspects of Clause 146, Clause 147 and, possibly, Clause 104. The applicable clauses are referenced in the current text. Further information and exposition are not appropriate for the definition.

Cl **9** *SC* **9.1** *P* **30** *L* **4** # i-291

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **T** *Comment Status* **R** *Multidrop*

The sentence about a repeater is misleading. Repeaters are mentioned in clause 30 but not in clause 146 or 147 or what is meant with exception?

SuggestedRemedy

not understood, no proposal can be made.

Response *Response Status* **C**

REJECT.

The CRG disagrees with the commenter. The commenter did not provide a proposed resolution in sufficient detail to readily determine the specific wording of changes that will cause him to change his vote to approve (see SASB Ops Manual clause 5.4.3.2,b).

Cl **9** *SC* **9.1** *P* **30** *L* **8** # i-212

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *Multidrop*

Correction text is incorrect and baseline text is (now) incomplete.

SuggestedRemedy

Change text to read: "This clause specifies a repeater for use with half duplex IEEE 802.3 10 Mb/s baseband networks, with the exceptions of 10BASE-T1S (Clause 147). A repeater for any other IEEE 802.3 network type is beyond the scope of this clause."

Response *Response Status* **U**

REJECT.

The CRG disagrees with the commenter. The commenter's suggested remedy goes beyond the scope of this amendment and potentially excludes PHYs beyond the project's scope.

Cl **22** *SC* **22.1** *P* **31** *L* **2** # i-305

Kabra, Lokesh Synopsys, Inc.

Comment Type **E** *Comment Status* **A** *MII*

Figure 22-1 requires similar update as done for Figure 1-1 in 802.3cg

SuggestedRemedy

Change "100 Mb/s, 1 Gb/s" to "10BASE-T1L, 10BASE-T1S, 100 Mb/s, 1 Gb/s"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Copy and insert the clause 22.1 header and figure Figure 22-1 from 802.3-2018 into page 31, line 3.

Insert editor's instruction, "Change the text at the bottom of the right column in Figure 22-1 as follows:" after the inserted clause 22.1 header.

Insert "10BASE-T1L, 10BASE-T1S, " in underline before "100 Mb/s, 1 Gb/s" at the bottom on the right column in Figure 22-1.

Cl **22** *SC* **22** *P* **31** *L* **13** # i-394

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *MII*

[CSD] CSD/Compatibility states "As a PHY amendment to IEEE Std802.3, the proposed project will use MII, and follow the existing format and structure of IEEE 802.3 protocol-independent specification of managed objects." It does NOT state that it will change MII and then use the modified version of MII. It states that this project will use MII. This project violates the stated compatibility statement. In addition, MII is widely used and deployed exposed interoperability interface, still with large installed based that is difficult to determine (installation spread over 10~15 years, starting 20+ years ago). One of the test whether an interface has been materially changed is by looking at the PICS in CL22.8.3 and there are 5 enteries that changes the requirments to the installed base of MII.

SuggestedRemedy

Reverse all material changes to CL22 and make appropriate changes in other clauses of this project to make it work with CL22. If this cannot be done, then appropriate changes to the CSD/Compatibility with regard to CL22 be made and to be approved.

Response *Response Status* **W**

REJECT.

The CRG disagrees with the commenter. Functionality is specified using reserved codes at the MII to prevent any compatibility issue with compliant PHYs.

Cl **22** *SC* **22.2.2.4** *P* **31** *L* **17** # i-213

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *PLCA*

BIG TICKET ITEM: Remove the changes you have here for PLCA. IFF you are going to insist that the PLCA lives in the Physical Layer then you don't get to change the layer interface to the MAC to accommodate a PLCA.

SuggestedRemedy

Remove the changes here and document them in clause 148. This is apprpriate for a) keeping PLCA identified as being in the Physical Layer, b) Placing PLCA as a new supplementary MAC sublayer below the CSMA/CD sublayer or c) moving PLCA to a new standard for a MAC sublayer shim to Ethernet to convert CSMA/CD to CSMA/CA. This is my preferred solution which I would label "Standard for DetermiNet".

Response *Response Status* **U**

REJECT.

The CRG disagrees with the commenter. The layer interface to the MAC is not modified. The interface to the MAC, according to Clause 6 are the Physical Layer service specifications. These primitives are unmodified. Only the interface within the physical layer, the MII, which is between the RS and the PHY, is modified.

Cl **22** *SC* **22.2.2.5** *P* **31** *L* **49** # i-395

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *MII*

In "..with the exception of 10BASE-T1L (see 146.3.3.1) and 10BASET1S(see 147.3.2.1, Figure 147-4).", 10BASE-T1L is unnecesarily included as if 10BASE-T1L requires this change. It doesn't. TXER was added during 100 Mbps Ethernet projects, and some 10 Mbps system implementations being upgraded to 100 Mbps would experience buffer underruns, and wanted to have an option to signal to the PHY to corrupt the FCS. 10 Mb/s system never had such considerations nor signal that corresponds to TXER. If TXER is asserted, then 10BASE-T1L merely maps to an error symbol.

There is no need to change CL22 from 10BASE-T1L, and having it included in this proposed revision to CL22 distracts from the fact that CL22 modification is entirely caused by CL148 PLCA RS.

SuggestedRemedy

Remove the text "10BASE-T1L (see 146.3.3.1) and ", and make appropriate changes to the 10BASE-T1L (CL146) to remove superfluous support of TXER.

(Note: the subjective "superflueous" is used becase in modern (higher performance) systems as well as back in 10 Mbps systems, the need for FIFO underrun implementational error handling are not needed).

Response *Response Status* **W**

REJECT.

The CRG disagrees with the commenter. An exception has been added to clarify that the use of TX_ER with 10BASE-T1L/S PHYs is not precluded and, in fact, references to the behavior of these new PHYs with TX_ER are provided.

Cl **22** *SC* **22.2.1.3.3** *P* **32** *L* **3** # i-306

Kabra, Lokesh Synopsys, Inc.

Comment Type **G** *Comment Status* **R** *PLCA*

Second paragraph in 22.2.1.3.3 states that ".. any transition of the CRS signal from asserted to deasserted must cause a transition of CARRIER_STATUS from the CARRIER_ON to the CARRIER_OFF value". This is not adhered to when PLCA is activated or enabled. Hence suggest to add aparagraph (similar to the paragragph added for EEE exception)

SuggestedRemedy

Add new paragraph at end of 22.2.1.3.3.
When PLCA functions is enabled, CARRIER_STATUS is overridden according to the behavior of the PLCA DATA state diagram (see 148.4.6)

Response *Response Status* **C**

REJECT.
The CRG disagrees with the commenter.
The PLCA Reconciliation Sublayer is an extension of the RS defined in Clause 22, as specified in 148.4.1. The mapping between the MII and the PLCA RS is defined in Clause 148.4.3, which includes the CARRIER_STATUS parameter (which is set according to the PLCA data state diagram in 148.4.6, as the commenter indicated correctly). See also 148.4.3.3.

Additionally, 148.4.2 reads "When PLCA functions are not supported or are disabled by the management interface (plca_en = FALSE), RS operation shall conform to the MII RS definition in Clause 22.". Therefore modifying the text in Clause 22 as the commenter suggests would create a recursive reference.

Cl **30** *SC* **30.2.2.1** *P* **34** *L* **8** # i-214

Thompson, Geoffrey Independent Consultant

Comment Type **E** *Comment Status* **A** *PLCA*

There is no addition to the text of the last sentence for oPHYEntity to note its containment of your new oPLCA (Needed to be consistent with your view of the world. Not needed here for my view of the world.)

SuggestedRemedy

Add appropriate text to the last sentence of oPLCA.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

At line 8 of page 34, insert new Editing Instruction, "Change the entry for oPHYEntity in 30.2.2.1 (as amended by IEEE Std 802.3bt-2018) as follows:"

Insert...

"oPHYEntity

If oOMPEmulation is implemented, oPHYEntity is contained within oOMPEmulation. If oMACMergeEntity is implemented, oPHYEntity is contained within oMACMergeEntity. Otherwise oPHYEntity is contained within oMACEntity. Many instances of oPHYEntity may coexist within one instance of oMACEntity or oMACMergeEntity; however, only one PHY may be active for data transfer to and from the MAC at any one time. oPHYEntity is the managed object that contains the MAU, PAF, PLCA, PSE, and PoDLPSE managed objects in a DTE."

Underline "PLCA, " to show change from amended IEEE Std 802.3bt-2018 text.

Cl **30** *SC* **30.2.3** *P* **35** *L* **1** # i-307

Kabra, Lokesh Synopsys, Inc.

Comment Type **E** *Comment Status* **A** *Editorial*

Object oOAM shown in Figure 30-3 of 802.3-2018 is missing in new Figure 30-3 of 802.3cg

SuggestedRemedy

Correct Figure 30-3 for missing oOAM object and its input/output connection arrows

Response *Response Status* **C**

ACCEPT.

Cl **30** *SC* **30.2.5** *P* **36** *L* **34** # i-312

Kabra, Lokesh Synopsys, Inc.

Comment Type **E** *Comment Status* **A** *Editorial*

Mixing of rows in table for ACTION and ATTRIBUTES for this oPLCA object class

SuggestedRemedy

Alphabhetically Sort and place rows for ACTION below the ATTRIBUTE for oPLCA object

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Accomodated by i-398. The resolution to i-398 is:

ACCEPT IN PRINCIPLE.

Implement the following changes:

P36 L1 - P37 L28: remove edits to Table 30-1c

P36 L1 Add editing instruction, "Change the last sentence of the first paragraph of 30.2.5 as follows:"

Change last sentence to, "The capabilities and packages for IEEE 802.3 Management are specified in Table 30-1a through Table 30-11." and grant editorial license to show changes with correct strikethrough and underline markings.

P36 L1 Add new editing instruction and table 30-11:
"Insert new Table 30-11 PLCA capabilities after Table 30-10 as follows:"

add new table 30-11 - PLCA capabilities
With 4 columns
(last column, with "X"'s is labeled: "PLCA Capability (optional)")
Rows are from P36 L32 - P36 L42:

oPLCA managed object class (30.3.9)
aPLCAAdminState ATTRIBUTE GET X
aPLCANodeCount ATTRIBUTE GET-SET X
aPLCALocalNodeID ATTRIBUTE GET-SET X
aPLCATransmitOpportunityTimer ATTRIBUTE GET-SET X
aPLCAMaxBurstCount ATTRIBUTE GET-SET X
aPLCABurstTimer ATTRIBUTE GET-SET X
acPLCAAdminControl ACTION X
acPLCAReset ACTION X

P38 L1: Change editing instruction to read: "Insert new clause 30.16 after 30.15 (and its subclauses) as follows:"

Change numbering of 30.3.9 oPLCA managed object class to 30.16 (and promote subclauses 1 level)

Cl **30** *SC* **30.2.5** *P* **36** *L* **34** # i-311

Kabra, Lokesh Synopsys, Inc.

Comment Type **E** *Comment Status* **A** *PLCA*

Attribute aPLCAStatus not listed for oPLCA managed object class in Table 30-1c

SuggestedRemedy

Add row for "aPLCAStatus" after the "aPLCAAdminState" attribute row

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Insert row for "aPLCAStatus" after the "aPLCAAdminState" attribute row in Table 30-11 as follows:

aPLCAStatus | ATTRIBUTE | GET | | | | | | | | X |

Cl **30** *SC* **30.2.5** *P* **36** *L* **52** # i-15

Anslow, Peter Ciena

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

When a table splits across two pages, the bottom ruling on the first page should be "very thin"

SuggestedRemedy

In Table 30-1c, uncheck "Draw Bottom Ruling on Last Sheet Only"

Response *Response Status* **C**

ACCEPT.

Cl **30** *SC* **30.3** *P* **37** *L* **31** # i-215

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *PLCA*

I believe that the BEHAVIOUR of each of the following MAC attributes may need additional text to describe how it behaves (differently) when used in a PLCA network: 30.3.1.1.3 aSingleCollisionFrames; 30.3.1.1.4 aMultipleCollisionFrames; 30.3.1.1.9 aFramesWithDeferredXmissions; 30.3.1.1.10 aLateCollisions; 30.3.1.1.20 aFramesWithExcessiveDeferral; 30.3.1.1.30 aCollisionFrames; 30.3.1.1.31 aMACCapabilities; 30.3.1.1.32 aDuplexStatus

SuggestedRemedy

Examine each BEHAVIOUR for each of the listed attributes in the context of PLCA operation and augment the text definition of each BEHAVIOUR to cover operation in PLCA mode. This should explicitly cover whether an occurrence is an error in PLCA operation when such is not the case in CSMA/CD.

Response *Response Status* **U**

REJECT.

The CRG disagrees with the commenter. PLCA does not to change the behavior of these attributes.

Cl **30** *SC* **30.3.9** *P* **38** *L* **3** # i-398

Kim, Yongbum NIO

Comment Type **ER** *Comment Status* **A** *Management*

PLCA managed object class is put in the wrong part of the CL30. 30.3 is Layer mgmt for DTEs. This project claims to be a Physical Layer project. 30.8 is WIS. 30.14 is MAC Merge. Logically and structurally, PLCA does not belong under 30.3, where it is also more difficult to find. It should follow other sublayer additions in CL30 and go after 30.15. If this project insists that this content belongs in DTE (where MAC resides and Physical Layer doesn't) clause, then own up to what PLCA really is -- a MAC, or signifcant portion therer of.

SuggestedRemedy

Renumber and change the instructions to add this proposed 30.3.9 to be inserted after current 30.15

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Implement the following changes:

P36 L1 - P37 L28: remove edits to Table 30-1c

P36 L1 Add editing instruction, "Change the last sentence of the first paragraph of 30.2.5 as follows:"

Change last sentence to, "The capabilities and packages for IEEE 802.3 Management are specified in Table 30-1a through Table 30-11." and grant editorial license to show changes with correct strikethrough and underline markings.

P36 L1 Add new editing instruction and table 30-11:
"Insert new Table 30-11 PLCA capabilities after Table 30-10 as follows:"

add new table 30-11 - PLCA capabilities
With 4 columns
(last column, with "X"'s is labeled: "PLCA Capability (optional)")
Rows are from P36 L32 - P36 L42:

oPLCA managed object class (30.3.9)
aPLCAAdminState ATTRIBUTE GET X
aPLCANodeCount ATTRIBUTE GET-SET X
aPLCALocalNodeID ATTRIBUTE GET-SET X
aPLCATransmitOpportunityTimer ATTRIBUTE GET-SET X
aPLCAMaxBurstCount ATTRIBUTE GET-SET X
aPLCABurstTimer ATTRIBUTE GET-SET X
acPLCAAdminControl ACTION X
acPLCAReset ACTION X

P38 L1: Change editing instruction to read: "Insert new clause 30.16 after 30.15 (and its subclauses) as follows:"

Change numbering of 30.3.9 oPLCA managed object class to 30.16 (and promote subclauses 1 level)

Cl **30** *SC* **30.3.9.1.1** *P* **38** *L* **13** # i-308

Kabra, Lokesh Synopsys, Inc.

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

As per format of previous, similar sub-sections in 802.3-2018, the enumerated values for a attribute are listed in new lines

SuggestedRemedy

Move "disabled enabled" in to new lines for each value;
Make similar formattinng for other attributes in below sub-sections (line 24, line 37, line 50)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

On page, 38:

Replace,
"An ENUMERATED VALUE that has the following entries: disabled enabled"

with,
An ENUMERATED VALUE that has the following entries:
disabled
enabled"

in two locations (line 13 and line 37)

Replace,
"An ENUMERATED VALUE that has the following entries: TRUE FALSE"

with,
An ENUMERATED VALUE that has the following entries:
TRUE
FALSE"

on line 24

Replace,
"An ENUMERATED VALUE that has the following entries: reset normal"

with,
An ENUMERATED VALUE that has the following entries:
reset
normal"

on line 50

Cl **30** *SC* **30.3.9** *P* **38** *L* **15** # i-24

Thompson, Michael nVent

Comment Type **E** *Comment Status* **R** *Editorial*

In 12 places "behaviour" should be "behavior".

SuggestedRemedy

Change "behaviour" to "behavior" in all occurrences.

Response *Response Status* **C**

REJECT.

BEHAVIOUR in clause 30 is a "reserved" word and its use in this amendment is consistent with 802.3-2018.

Cl **30** *SC* **30.3.9.1.1** *P* **38** *L* **15** # i-216

Thompson, Geoffrey Independent Consultant

Comment Type **E** *Comment Status* **A** *PLCA*

I feel that the "Behaviour" descrption could be improved.

SuggestedRemedy

Replace text with: A read-only value that indicates the mode of operation of the Reconciliation Sublayer for PLCA operation. When PLCA is enabled, the reconciliation sublayer functions in PLCA mode whose operation is defined by Clause 148. When PLCA functions are not supported or are disabled by the management interface (plca_en = FALSE), RS operation shall conform to the MII RS definition in Clause 22. By default, PLCA is disabled.;

Response *Response Status* **C**

ACCEPT.

Cl **30** *SC* **30.3.9.1.2** *P* **38** *L* **29** # i-309

Kabra, Lokesh Synopsys, Inc.

Comment Type **E** *Comment Status* **A** *Editorial*

The last sentence is redundant as the mapping of aPLCAStatus to plca_status variable is already specified in previous sentence

SuggestedRemedy

Remove last sentence " aPLCAStatus maps to the variable plca_status iin the PLCA Status state diagram specified in 148.4.7.1"

Response *Response Status* **C**

ACCEPT.

Cl **30** *SC* **30.3.9.2.2** *P* **39** *L* **1** # i-310

Kabra, Lokesh Synopsys, Inc.

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

Typo error " Clause 147 PLCA"

SuggestedRemedy

Correct "Clause 147 PLCA" to "Clause 148 PLCA"

Response *Response Status* **C**

ACCEPT.

Cl **30** *SC* **30.3.9.2.2** *P* **39** *L* **1** # i-217

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **A** *PLCA*

The text: "After reset is complete, acPLCAReset returns 1 to normal" implies that this management entity is READ-WRITE. To my knowledge, an ACTION is a write only operation.

SuggestedRemedy

Confirm whether an ACTION of this sort requires a single operation (i.e. sends a pulse) or two operations (i.e. actuate, then deactuate) then modify the behavior text to make clear the nature of the operation and what it takes to exert it properly.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Delete " After reset is complete, acPLCAReset returns to normal. The default state of acPLCAReset is normal." on page 39, line 1.

Cl **30** *SC* **30.3.9.2.3** *P* **39** *L* **4** # i-267

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *PLCA*

(Wrong page & section ref. Put here for sorting purposes) In the current configuration of the draft it appears that the BEHAVIOUR of the Late Collision Counter (30.3.1.1.10 aLateCollisions) is incomplete.

SuggestedRemedy

Augment the referenced BEHAVIOUR with a PLCA conditional statement that describes what causes a late collision in the PLCA case including whether it is a normal or error condition.

Response *Response Status* **U**

REJECT.

The CRG disagrees with the commenter. A late collision at the MAC is a late collision. Its definition is unchanged and no additional text is needed.

Cl **30** *SC* **30.3.9.2.3** *P* **39** *L* **4** # i-266

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **A** *PLCA*

As far as I know, the actual viability of a 255 node network has not been established. It is certainly true that a 255 node PLCA network is not within our goal set (Ref: Obj. 11b) and it has been asserted in an ad hoc that such a high node count would interfere with long established 802.3 error detection mechanisms. Therefore, even though a generous address space (255) is appropriate so that it will not have to be revisited, 255 is not an appropriate default value.

SuggestedRemedy

In accordance with our objectives, change the default value to 8.

Response *Response Status* **C**

ACCEPT.

Cl **30** *SC* **30.3.9.2.3** *P* **39** *L* **4** # i-313

Kabra, Lokesh Synopsys, Inc.

Comment Type **E** *Comment Status* **A** *Editorial*

Attributes aPLCANodeCount to aPLCABurstTimer are placed under PLCA device actions sub-section

SuggestedRemedy

Change 30.3.9.2.3 to 30.3.9.2.7 to 30.3.9.1.3 to 30.3.9.1.7 and move accordingly

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Re-number clauses 30.3.9.2.3 to 30.3.9.2.7 to 30.3.9.1.3 to 30.3.9.1.7 and move to appear after 30.3.9.1.2.

Cl **30** *SC* **30.3.9.2.3** *P* **39** *L* **12** # i-189

Beruto, Piergiorgio Canova Tech S.r.l.

Comment Type **T** *Comment Status* **A** *PLCA*

aPLCANodeCount has a default value of 255. This makes no sense at all since this attribute is
used to set the maximum number of nodes that will get a transmit opportunity on the local collision domain, as specified in Clause 148.
This is one of the parameters that have to be set prior to enable PLCA operations, as stated in
148.4.5.1.

On the other hand, aPLCALocalNodeID has no default value, which also makes no sense as value 255 is used to prevent PLCA from starting a cycle of transmit opportunities as shown in figure 148-3 in the transition from DISABLE to RESYNC state.

SuggestedRemedy

At line 12 change " The default value is 255.;" to " The default value is 0.;"
At line 22 add " The default value is 255." after "This value is assigned to define the ID of the local node on the PLCA network."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Page 39
At line 12 change " The default value is 255.;" to " The default value is 8.;"
At line 22 add " The default value is 255." after "This value is assigned to define the ID of the local node on the PLCA network."
Page 219
At line 32 change "plca_node_count is set on the node with local_nodeID = 0 to the number of nodes on the local collision domain" to " plca_node_count is set on the node with local_nodeID = 0 to the maximum number of nodes supported on the local collision domain"

Cl **30** *SC* **30.3.9.2.4** *P* **39** *L* **21** # i-6

Hajduczenia, Marek Charter Communications

Comment Type **E** *Comment Status* **A** *PLCA*

We typically avoid the use of "must" except for the use cases specidified in Style Manual - this is not the case.

SuggestedRemedy

Change "Value must be" to "Value is"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Accommodated by i-190.

The resolution to i-190 is:

Replace,
"Value must be in the range of [0, aPLCANodeCount - 1] (inclusive).;"

with, "Valid range is 0 to 255, inclusive.;"

Cl **30** *SC* **30.3.9.2.4** *P* **39** *L* **21** # i-190

Beruto, Piergiorgio Canova Tech S.r.l.

Comment Type **T** *Comment Status* **A** *PLCA*

The description of aPLCALocalNodeID specifies that the number must be in the range of 0 to aPLCANodeCount-1.
However, in figure 148-3 the "local_nodeID" variable, which maps to aPLCANodeCount, is checked in the transition from "DISABLE to "RESYNC" against the value 255.
Additionally, a node with local_nodeID >= aPLCANodeCount would not be able to send a packet during a cycle of transmit opportunities but it could receive packets as normal.
Since this is the desired behavior, it should not be disallowed by the valid range of aPLCALocalNodeID.

SuggestedRemedy

Replace "Value must be in the range of [0, aPLCANodeCount - 1] (inclusive).;"
with "Valid range is 0 to 255, inclusive.;"

Response *Response Status* **C**

ACCEPT.

Cl **30** *SC* **30.3.9.2.4** *P* **39** *L* **22** # i-16

Anslow, Peter Ciena

Comment Type **E** *Comment Status* **A** *PLCA*

IEEE uses an en dash as a minus sign.

SuggestedRemedy

In "[0, aPLCANodeCount - 1]" change the hyphen to an en dash (Ctrl-q shift-p)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Accommodated by i-190.

The resolution to i-190 is:

Replace,
"Value must be in the range of [0, aPLCANodeCount - 1] (inclusive).;"

with, "Valid range is 0 to 255, inclusive.;"

Cl **30** *SC* **30.3.9.2.5** *P* **39** *L* **24** # i-401

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **A** *PLCA*

aPLCATransmitOpportunityTimer seem to be a tuning parameter that is related with both PHY delay and given propogation delay (network diagmeter). And the PHY delays of *all* the nodes in the system. The default value of 20 bit times does not match 8 node 15 meter network worst case pararmeter.

SuggestedRemedy

Provide the default value that represent the worst case delays and supported network diameter such that a network using all defaults (plug and play and no configuration) is assured to work. If

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Accommodated by comment i-191.

Response to Comment i-191 is:

Replace, "The default value is 20."

with, "The default value is 24." on page 39, line 34.

Cl **30** *SC* **30.3.9.2.5** *P* **39** *L* **34** # i-191

Baggett, Tim Microchip Technology, Inc.

Comment Type **T** *Comment Status* **A** *PLCA*

The current PLCA Transmit Opportunity Timer is set to 20 bit times (BT). This needs to be changed to 24BT to insure proper operation over a mixing segment of 25m with worst case propagation delay.

Details or the derivation may be found in the presentation located at http://www.ieee802.org/3/cg/public/adhoc/802d3cg_beruto_plca_timings.pdf

SuggestedRemedy

Change:
"The default value is 20."
To:
"The default value is 24."

Response *Response Status* **C**

ACCEPT.

Cl **30** *SC* **30.3.9.2.6** *P* **39** *L* **36** # i-400

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *PLCA*

Capability for aPLCAMaxBurstCount set to 255 packet bursts would significantly impact fairness ("multiple-access") and would cause upper layer protocol time-outs.

SuggestedRemedy

Reduce the burst down to maximum size frame worth of packet packing (which I believe is not possible in current MAC services model), or some reasonable length such as 2 x max size frame (which I believe is achievable), or demonstrate the max range still provides fairness and provide confidence that properly (in-range value) configured nodes in a given network would not cause upper layer protcol time-outs.

Response *Response Status* **U**

REJECT.

The CRG disagrees with the commenter. The comment regarding upper layer protocols is protocol specific, which is outside the scope of IEEE 802.3.

The commenter did not provide a proposed resolution in sufficient detail to readily determine the specific wording of changes that will cause him to change his vote to approve (see SASB Ops Manual clause 5.4.3.2,b).

Cl **30** *SC* **30.3.9.2.7** *P* **39** *L* **47** # i-399

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *PLCA*

aPLCABurstTimer measure bit times inside the internal process where the entire packet is transferred atomically. This is entirely (externally) invisible parameter, meaning any number of bit-times an implementation uses, it is indinguishable from other MAC transmit schedulling; therefore meaningless. IPG is generated by PLS/RS. The default value of 128 *may be* relevant if this timer is measuring the gap at the PCS. But at RS, this timer is meaningless.

SuggestedRemedy

Delete this timer.

Response *Response Status* **W**

REJECT.

The CRG disagrees with the commenter. The RS interfaces to the MAC layer via the PLS primitives and to the PHY via the MII interface. The RS groups and aligns the bits conveyed by the MAC via the PLS_DATA.request primitive to the MII TX_CLK (See 22.2.1.1 and 22.2.1.1.3). This mapping clarifies the specification of bit times within an RS. (see also 148.4.3.1)

Cl **30** *SC* **30.3.9.2.7** *P* **39** *L* **54** # i-52

Graber, Steffen Pepperl+Fuchs GmbH

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

comma at the end of the line is too much.

SuggestedRemedy

Remove comma at the end of the line.

Response *Response Status* **C**

ACCEPT.

Cl **30** *SC* **30.5.1.1.2** *P* **40** *L* **17** # i-218

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **A** *Management*

The text: "10BASE-T1S Single balanced pair PHY as specified in Clause 147" does not specify the duplex modality as required.

SuggestedRemedy

Change text to: "10BASE-T1SHD Single balanced pair PHY as specified in Clause 147, half duplex mode" AND
"10BASE-T1SFD Single balanced pair PHY as specified in Clause 147, full duplex mode."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace "10BASE-T1S Single balanced pair PHY as specified in Clause 147" with 3 entries:

"10BASE-T1SHD Single balanced pair PHY as specified in Clause 147, half duplex mode"
"10BASE-T1SMD Single balanced pair PHY as specified in Clause 147, multidrop mode",
"10BASE-T1SFD Single balanced pair PHY as specified in Clause 147, full duplex mode."

Cl **45** *SC* **45.2** *P* **42** *L* **1** # i-8

Rannow, R K self

Comment Type **GR** *Comment Status* **R** *Editorial*

verbose and confusing wording throughout Subclause 45.2

SuggestedRemedy

Response *Response Status* **W**

REJECT.

The CRG disagrees with the commenter. The commenter did not provide a proposed resolution in sufficient detail to readily determine the specific wording of changes that will cause him to change his vote to approve (see SASB Ops Manual clause 5.4.3.2,b).

Cl **45** *SC* **45.2.1.7.4** *P* **42** *L* **29** # i-219

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **A** *Management*

No entry(ies?) for 10BASE-T1 in this table

SuggestedRemedy

Seems like this is a requirement for completeness and functional management.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Bring 45.2.1.7.4 Transmit fault (1.8.11) into the draft.
Add:
Insert new row for 10BASE-T1L in Table 45-9 before row for 100BASE-T1 as shown (unchanged rows not shown):
PMA/PMD | Description location
10BASE-T1L | 146.4.2

Bring 45.2.1.7.5 Receive fault (1.8.10) into the draft.
Add:
Insert new row for 10BASE-T1L in Table 45-10 before row for 100BASE-T1 as shown (unchanged rows not shown):
PMA/PMD | Description location
10BASE-T1L | 146.4.3

Convert external references to 45.2.1.7.4 and 45.2.1.7.5 in 146.4.2 and 146.4.3 to active cross references.

Editorial license granted to craft necessary text and Editing Instruction in accordance with IEEE style.

Cl **45** *SC* **45.2.1.185** *P* **43** *L* **12** # i-220

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *Management*

See my comment for 30.3.9.2.2. I believe there needs to be an entry here for each of the two types. 10BASE-T1S Type no longer should exist in this context.

SuggestedRemedy

Replace "10BASE-T1S" text with: "10BASE-T1SHD" AND "10BASE-T1SFD" as two separate entries, each with their own bit

Response *Response Status* **U**

REJECT.

The CRG disagrees with the commenter. Unlike clause 30 MAU Type, the PMA/PMD type in clause 45 PMA/PMD control registers does not specify modes of the PHY separately.

Cl **45** *SC* **45.2.1.185.2** *P* **43** *L* **27** # i-221

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *Management*

See my comment for 30.3.9.2.2. I believe there needs to be discussion text here for each of the two 10BASE-T1S types. 10BASE-T1S Type no longer should exist in this context.

SuggestedRemedy

Replace "10BASE-T1S" text with: "10BASE-T1SHD" AND "10BASE-T1SFD" as two separate entries, each with their own bit

Response *Response Status* **U**

REJECT.

The CRG disagrees with the commenter. Unlike clause 30 MAU Type, the PMA/PMD type in clause 45 PMA/PMD control registers does not specify modes of the PHY separately.

Cl **45** *SC* **45.2.1.185.2** *P* **44** *L* **1** # i-222

Thompson, Geoffrey Independent Consultant

Comment Type **E** *Comment Status* **R** *PMA*

It would appear that you are dropping all of this text and table material as a single insert grouped by speed. As closely as I can tell they aren't organized this way.

SuggestedRemedy

Insert all new register descriptions and tables in a manner that is consistent with the current main standard.

Response *Response Status* **C**

REJECT.

The CRG disagrees with the commenter. The Type Selection in the referenced BASE-T1 PMA/PMD control register (Table 45-149) in the IEEE Std 802.3-2018 has only two entries, each of which is a different speed. Grouping by speed is consistent with the base standard.

Similarly, Type Selection in Table 45-7, which is analagous, is primarily grouped by speed and phy type. Since Table 45-149 is only BASE-T1 PHYs, and already grouped by type, this is also consistent.

Cl **45** *SC* **45.2.1.186a.3** *P* **45** *L* **4** # i-53

Graber, Steffen Pepperl+Fuchs GmbH

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

If bit 1.2294.12 is set to one the PHY shall operate in 2.4 Vpp operating mode according to 146.5.4.1. (add comma after "one")

SuggestedRemedy

If bit 1.2294.12 is set to one, the PHY shall operate in 2.4 Vpp operating mode according to 146.5.4.1.

Response *Response Status* **C**

ACCEPT.

Cl **45** *SC* **45.2.1.186a.3** *P* **45** *L* **5** # i-54

Graber, Steffen Pepperl+Fuchs GmbH

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

If bit 1.2294.12 is set to zero the PHY shall operate in 1.0 Vpp operating mode according to 146.5.4.1. (add comma after "zero")

SuggestedRemedy

If bit 1.2294.12 is set to zero, the PHY shall operate in 1.0 Vpp operating mode according to 146.5.4.1.

Response *Response Status* **C**

ACCEPT.

Cl **45** *SC* **45.2.1.186d.4** *P* **49** *L* **43** # i-223

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **A** *PLCA*

Does the setting of this bit ever get changed by reset? Whichever way it works, the operation should be described.

SuggestedRemedy

Declare in the text description of the operation of 1.2297.10 whether it is affected or not by reset. If it is not, then it should also bescribed in the text of bit 1.2297.15.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

One page 49, line 45:

Replace, "The default value of bit 1.2297.10 is zero."

with, "The setting of bit 1.2297.10 is not affected by reset."

Cl **45** *SC* **45.2.1.186d.5** *P* **49** *L* **52** # i-55

Graber, Steffen Pepperl+Fuchs GmbH

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

When in loopback the 10BASE-T1S PHY ... (add comma after "loopback")

SuggestedRemedy

When in loopback, the 10BASE-T1S PHY ...

Response *Response Status* **C**

ACCEPT.

Cl **45** *SC* **45.2.1.186e.1** *P* **51** *L* **16** # i-404

Kim, Yongbum NIO

Comment Type **ER** *Comment Status* **R** *Multidrop*

The word "multi-drop" is a new term that does not convey any different meaning than "[half-duplex] [shared] mixing segment" as opposed to "[point to point] link segment". There is no reason to introduce a new term that does not convey anything new.

SuggestedRemedy

Delete the use of "multi-drop" here and the rest of the draft, and use existing "half-duplex", "shared medium", "mixing segment", etc, as appropriate. OR, clearly define what is different about the use of "multi-drop".

Response *Response Status* **W**

REJECT.

The CRG disagrees with the commenter. Multidrop is only used in the draft for the name of the shared-medium mode of Clause 147 PHYs as "multidrop mode" (the term "multi-drop" is not used), and is defined at the start of clause 147 (page 167, line 15 "a half-duplex shared-medium mode, referred to as multidrop mode, capable of operating with multiple stations connected to a mixing segment, defined in 147.8."). No further description is needed, and it is not synonymous with any of the terms suggested by the commenter.

Cl **45** *SC* **45.2.3.68a** *P* **52** *L* **41** # i-224

Thompson, Geoffrey Independent Consultant

Comment Type **E** *Comment Status* **R** *Registers*

Add "normal operation" text to description to match the last clause of the the text above.

SuggestedRemedy

Change text "Disable loopback mode" to "Disable loopback mode, normal operation"

Response *Response Status* **C**

REJECT.

The CRG disagrees with the commenter. Text is consistent with all other existing "loopback mode" entries in IEEE Std 802.3. See, e.g., Table 45-4, bit 1.0.0.

Whether normal operation is, in fact, in order is subject to other controls. For example, test modes would prohibit normal operation, even though loopback was disabled.

Cl **45** *SC* **45.2.3.68b.5** *P* **54** *L* **40** # i-405

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *Registers*

"Fault -- Fault condition
detected.. " is just too vague. Does reader assume the "fault" relates to PCS fault? And is it any detectable fault? Any implementation specific faults? So if I read this latched bit as one, what information do I get -- there was a fault and we don't know what caused it.
So what value is there? Makes little sense. I cannot even suggest wording that may be satisfactory.

SuggestedRemedy

Assuming this is PCS fault TX or RX.. Reference detected fault types in relevant PCS clauses. If this is just thrown in for any fault and .3cg want it, then say "ANY DETECTED PCS FAULT". If there is no agreement how this is used, then I suggest deleting it.

Response *Response Status* **W**

REJECT.

The CRG disagrees with the commenter. Text is consistent with specification for PMA and PCS faults in IEEE Std 802.3.

See, e.g., 45.2.1.2.3 Fault (1.1.7) for PMA/PMD faults, or 45.2.3.2.5 Fault (3.1.7), for the corresponding PCS fault.

Cl **45** *SC* **45.2.3.68c** *P* **55** *L* **5** # i-225

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *Registers*

The text here says that "The default value for each bit of the ... control register should be chosen so that the initial state of the device upon power up or reset is a normal operational state without management intervention." It is not well placed or a requirement nor is it reflected in the table definitions.

SuggestedRemedy

There needs a) to be a "shall" statement b) so that there will be a corresponding entry in the PICS Pro Forma, c) placed so the text applies to the entire device below the MII and d) reflected with a default value declaration for each bit in each control register.

Response *Response Status* **U**

REJECT.

The CRG disagrees with the commenter. The statement is consistent in placement and wording with similar statement in similar control registers in Clause 45 of IEEE Std 802.3-2018. Like these registers, the 10BASE-T1S PCS control register controls test modes, and the statement is advisory. IEEE Std 802.3-2018 does not require this with a 'shall' statement, as the commenter suggests.

Cl **45** *SC* **45.2.3.68c.1** *P* **55** *L* **23** # i-226

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *Registers*

The text description here and its corresponding table entry are confusing. If (as described in the table) this bit is self-clearing (as described in the table) then the text should indicate that in the description and the penultimate sentence should be modified. If the bit is not self clearing then the SC should be removed from the table.

SuggestedRemedy

Modify text and table contents so that they are fully descriptive and consistent.

Response *Response Status* **C**

REJECT.

The CRG disagrees with the commenter. The text indicates that the bit is self-clearing at page 55, line 28, "This bit is self-clearing and the 10BASE-T1S PCS shall return a value of one in bit 3.2291.15 when a reset is in progress; otherwise, it shall return a value of zero."

Cl **45** *SC* **45.2.3.68c.2** *P* **55** *L* **40** # i-227

Thompson, Geoffrey Independent Consultant

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

We had discussions in the TF that the conventional wisdom is to place the loopback as close to the MDI as possible in order to test as much of the circuitry as possible (even though that can be an additional technical challenge).

SuggestedRemedy

Add informative text to this paragraph about the desirability of having the loopback close to the MDI. (I might be talked out of this being a REQUIRED comment)

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **45** *SC* **45.2.3.68c.3** *P* **56** *L* **5** # i-199

Griffiths, Scott Rockwell Automation

Comment Type **E** *Comment Status* **A** *Editorial*

Bit 3.0.8 is defined as reserved with a value of always zero in 802.3-2018. Is this the correct reference?

SuggestedRemedy

Correct reference or remove line.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace "3.0.8" with "0.8 (see Table 22-7)"

Cl **45** *SC* **45.2.3.68e** *P* **56** *L* **41** # i-228

Thompson, Geoffrey Independent Consultant

Comment Type **E** *Comment Status* **R** *Registers*

Add a "Non Wrapping" desgnation to the table for added clarity and to match the text.

SuggestedRemedy

Add "NW" to the right hand cell and "NW = Non-Wrapping" to footnote a. Do the same for other non-wrapping counters.

Response *Response Status* **C**

REJECT.

The CRG disagrees with the commenter. There are no other "NW" designations in IEEE Std 802.3-2018, nor are there designations for wrapping counters.

Standard practice is to describe wrapping behavior in the text of the bit.

Cl **45** *SC* **45.2.3.68d.1** *P* **57** *L* **32** # i-406

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *PLCA*

The concern is where entire function of PLCA resides. Is it just in RS (CL148)? Or is there PLCA mandatory components in PCS and/or PMA? This specification indicates that [optional] PLCA RS resides in PCA and PMA, requiring features otherwise not required for non-PLCA implementations.

10BASE-T1S PCS contains PLCA components that are optional. This is entirely inconsistent with PLCA is a optional function in RS layer. It looks to be that PLCA is also an optional function in PCS layer. If this is the case, the standard should state this. And if the PLCA is also an optional function in PMA layer, it should also be stated as such.

SuggestedRemedy

Either delete this PLCA Support in PCS/PMA and other PCS/PMA clauses, or clarify which layer(s), the optional PLCA function resides\, besides stated CL148 RS.

Response *Response Status* **W**

REJECT.

The CRG disagrees with the commenter. The referenced text is purely a detection that the transmitted signal is not corrupted and is entirely in Clause 147 PCS/PMA and does not represent PLCA function. It is not strictly PLCA support, and is not PLCA function. It may be useful for a variety of debugging purposes, including, but not limited to, when the clause 148 PLCA is used.

Cl **45** *SC* **45.2.7.25** *P* **58** *L* **7** # i-229

Thompson, Geoffrey Independent Consultant

Comment Type **E** *Comment Status* **A** *Registers*

This "mode" is not supported in the current standard or any current project or proposal.

SuggestedRemedy

Add the following text to the end of the description: "(RESERVED, Not currently supported)"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Page 58, line 4
Replace, "10BASE-T1L full duplex ability advertisement"

with, "10BASE-T1L full duplex capability advertisement"

Replace, "1 = Advertise that the PHY has 10BASE-T1L full duplex ability (default) 0 = Do not advertise that the PHY has 10BASE-T1L full duplex ability"

with," 1 = Advertise PHY as 10BASE-T1L capable
0 = Do not advertise PHY as 10BASE-T1L capable"

Page 58, line 25
Replace, "10BASE-T1S half duplex ability advertisement"

with, "10BASE-T1S half duplex capability advertisement"

Replace, "1 = Advertise that the 10BASE-T1S PHY has half duplex ability
0 = Do not advertise that the 10BASE-T1S PHY has half duplex ability"

Copy these

with," 1 = Advertise PHY as 10BASE-T1S half duplex capable
0 = Do not advertise PHY as 10BASE-T1S half duplex capable"

Implement similar changes into Table 45-330b on page 60.

Cl **45** *SC* **45.2.3.68f** *P* **58** *L* **19** # i-408

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *MDI*

"...MDI". There is no definition of MDI in CL147 that this refers to. Medium Dependant Interface, MDI, is an accepted interoperability interface. Optional-use connectors in CL147 are not MDI, unless it states the normative nature of the connector.

SuggestedRemedy

Either provide alternate referece to the medium connection point, or define nomative MDI in CL147.

Response *Response Status* **W**

REJECT.

The CRG disagrees with the commenter. The MDI is a defined interface point in Clause 147. See figure 147-1. A connector at the MDI may or may not be defined (and this varies in other IEEE Std 802.3 clauses), but the MDI remains at the plane of connection between the DTE and the specified link or mixing segment. See Figure 147-1. Additionally, electrical and tolerance characteristics of the MDI are specified in 147.9.2, 147.9.3, and 147.9.4.

Cl **45** *SC* **45.2.3.68f** *P* **58** *L* **24** # i-407

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **A** *PLCA*

CorruptedTxCnt is defined as "16 bits field counting each time a transmission initiated locally results in a corrupted signal at
the MDI since last read of this register". This counter has several issues. It is not clear whether this counter is to count 1) every bit error (bit-by-bit comparison), 2) every error event (burst error event), or 3) every packet error event. Also "transmission initiated locally" is not clear. Assuming this means local node transmitting, does it apply to packets, BEACON and other signals? And is it bit-by-bit, or burst or symbol or packet or other error events?

SuggestedRemedy

Please clarify what "corruption" event this counter is counting, and reference where in the CL147 specification the event-to-be-counted resides (to assure proper formal reference to the event(s)).

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Replace, "Bits 3.2294.15:0 count up each time a transmission initiated locally results in a corrupted signal at the MDI."

with,
"Bits 3.2294.15:0 count up at each positive edge of the MII signal COL."

Cl **45** *SC* **45.2.7.25.1** *P* **58** *L* **35** # i-230

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **A** *AutoNeg*

I don't understand the purpose of this text.

SuggestedRemedy

Relace with: "If bit 7.526.15 is set to one the PHY shall advertise 10BASE-T1L full duplex capability. If bit 7.526.15 is set to zero, the PHY shall advertise is does not operate as a compliant 10BASE-T1L device."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace, "45.2.7.25.1 10BASE-T1L full duplex ability advertisement (7.526.15)

Bit 7.526.15 is used to select whether or not Auto-Negotiation advertises the ability to operate the 10BASE-T1L PHY in full duplex mode. If bit 7.526.15 is set to one the PHY shall advertise 10BASE-T1L full duplex capability. If bit 7.526.15 is set to zero, the PHY shall not advertise the ability to operate in 10BASE-T1L full duplex mode."

with, "45.2.7.25.1 10BASE-T1L capability advertisement (7.526.15)

Bit 7.526.15 is used to select whether or not Auto-Negotiation advertises the capability to operate as a 10BASE-T1L PHY. If bit 7.526.15 is set to one, the PHY shall advertise 10BASE-T1L capability. If bit 7.526.15 is set to zero, the PHY shall not advertise the ability to operate as a 10BASE-T1L PHY."

Replace, "45.2.7.25.6 10BASE-T1S half duplex ability advertisement (7.526.6)

Bit 7.526.6 is used to select whether or not Auto-Negotiation advertises the ability to operate the 10BASE-T1S PHY in half duplex mode. If bit 7.526.6 is set to one the PHY shall advertise 10BASE-T1S half duplex capability. If bit 7.526.6 is set to zero, the PHY shall not advertise the ability to operate in 10BASE-T1S half duplex mode."

with, "45.2.7.25.6 10BASE-T1S half duplex capability advertisement (7.526.6)

Bit 7.526.6 is used to select whether or not Auto-Negotiation advertises the capability to operate the 10BASE-T1S PHY in half duplex mode. If bit 7.526.6 is set to one the PHY shall advertise 10BASE-T1S half duplex capability. If bit 7.526.6 is set to zero, the PHY shall not advertise the capability to operate in 10BASE-T1S half duplex mode."

Cl **45** *SC* **45.2.7.25.4** *P* **59** *L* **6** # i-56

Graber, Steffen Pepperl+Fuchs GmbH

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

If bit 7.526.12 is set to one the PHY shall advertise a request to operate the 10BASE-T1L PHY in increased transmit level mode. (add comma after "one")

SuggestedRemedy

If bit 7.526.12 is set to one, the PHY shall advertise a request to operate the 10BASE-T1L PHY in increased transmit level mode.

Response *Response Status* **C**

ACCEPT.

Cl **45** *SC* **45.2.7.25.5** *P* **59** *L* **13** # i-57

Graber, Steffen Pepperl+Fuchs GmbH

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

If bit 7.526.7 is set to one the PHY shall advertise 10BASE-T1S full duplex capability. (add comma after "one")

SuggestedRemedy

If bit 7.526.7 is set to one, the PHY shall advertise 10BASE-T1S full duplex capability.

Response *Response Status* **C**

ACCEPT.

Cl **45** *SC* **45.2.7.25.6** *P* **59** *L* **20** # i-58

Graber, Steffen Pepperl+Fuchs GmbH

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

If bit 7.526.6 is set to one the PHY shall advertise 10BASE-T1S half duplex capability. (add comma after "one")

SuggestedRemedy

If bit 7.526.6 is set to one, the PHY shall advertise 10BASE-T1S half duplex capability.

Response *Response Status* **C**

ACCEPT.

Cl **45** *SC* **45.2.9.2.7** *P* **62** *L* **25** # i-17

Anslow, Peter Ciena

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

As pointed out in Comment #7 against D2.3, in the editing instruction "42.2.9.2.7 " should be "45.2.9.2.7" (45 instead of 42)

SuggestedRemedy

In the editing instruction, change: "42.2.9.2.7 " to "45.2.9.2.7"

Response *Response Status* **C**

ACCEPT.

Cl **45** *SC* **45.5.3.3** *P* **64** *L* **17** # i-231

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *Registers*

The default states do not appear in the table for the referenced items. The PICS entries Y and N/A do not appear to me reference the univers of possibilities.

SuggestedRemedy

Expand answer table and indicate default values in the relevant register tables.

Response *Response Status* **U**

REJECT.

The CRG disagrees with the commenter. PICS entry for referenced text is is consistent with practice in IEEE Std 802.3 clause 45. Reporting of default values is consistent with practice and style of Clause 45. Default values are generally not listed in PICS tables, but are in text of clause 45 subclauses.

The commenter did not provide a proposed resolution in sufficient detail to readily determine the specific wording of changes that will cause him to change his vote to approve (see SASB Ops Manual clause 5.4.3.2,b).

Cl **45** *SC* **45.5.3.3** *P* **65** *L* **8** # i-59

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

... using 1 Vpp operating mode (the name of the operating mode is 1.0 Vpp operating mode)

SuggestedRemedy

... using 1.0 Vpp operating mode

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Provide editorial license to change all instances of "1 Vpp operating mode" to "1.0 Vpp operating mode",

including those listed below and:
P65 L8 (45.5.3.3)
P150 L44 and L46 (Table 146-5)
P165 L30 (146.11.4.4, Item LMF1 Feature)

Cl **45** *SC* **45.5.3.7** *P* **68** *L* **44** # i-60

Graber, Steffen Pepperl+Fuchs GmbH

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

Support tick boxes for RM172 are missing.

SuggestedRemedy

Please add "Yes [ ]" and "N/A [ ]" into the support field for RM172.

Response *Response Status* **C**

ACCEPT.

Cl **78** *SC* **78.2** *P* **71** *L* **32** # i-61

Graber, Steffen Pepperl+Fuchs GmbH

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

Modify the key EEE parameters in Table 78-2 for 10BASE-T1L to support a wider range of implementations.

SuggestedRemedy

Use the following values within Table 78-2 for 10BASE-T1L: Ts,min: 250 us, Ts,max: 250 us, Tq,min: 6000 us, Tq,max: 6000 us, Tr,min: 250 us, Tr,max: 250 us

Response *Response Status* **C**

ACCEPT.

Cl **78** *SC* **78.2** *P* **71** *L* **32** # i-314

Kabra, Lokesh Synopsys, Inc.

Comment Type **G** *Comment Status* **R** *EEE*

The quiet time Tq specified (6000 usec) corresponds to around 5 max-sized (1518 Bytes) packets in 10 Mb/s. This ratio (Tq to Tr) seems to be very low as compared to the quiet times specified for 100 or 1000 Mb/s (in terms of max-sized packets)

SuggestedRemedy

Response *Response Status* **C**

REJECT.

Suggested remedy in the comment does not contain sufficient detail so that the CRG can understand the specific changes that satisfy the commenter.

Cl **78** *SC* **78.5** *P* **71** *L* **49** # i-62

Graber, Steffen Pepperl+Fuchs GmbH

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

Correct and modify the LPI timing parameters for 10BASE-T1L in Table 78-4 to support a wider range of implementations.

SuggestedRemedy

Use the following values within Table 78-4 for 10BASE-T1L: Tw_sys_tx: 270 us, Tw_phy: 250.5 us, Tphy_shrink_tx: 10 us, Tphy_shrink_rx: 240 us, Tw_sys_rx: 20 us

Response *Response Status* **C**

ACCEPT.

Cl **78** *SC* **78.5** *P* **71** *L* **49** # i-315

Kabra, Lokesh Synopsys, Inc.

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

As per equations given in Figure 78-5 of 802.3-2018,
Tw_sys_tx(min) = Tw_sys_rx(min) + Tphy_shrink_tx(max) + Tphy_shrink_rx(max)". The values given in Table 78-4 does not satisfy this equation

SuggestedRemedy

Change value for Tw_sys_tx from 220 to 450

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Accomodated by comment i-62.

Response to comment i-62 is:

Use the following values within Table 78-4 for 10BASE-T1L: Tw_sys_tx: 270 us, Tw_phy: 250.5 us, Tphy_shrink_tx: 10 us, Tphy_shrink_rx: 240 us, Tw_sys_rx: 20 us

Cl **98** *SC* **98.2.1** *P* **72** *L* **10** # i-33

Yseboodt, Lennart Signify

Comment Type **T** *Comment Status* **R** *AutoNeg*

"Two different Auto-Negotiation speeds are defined in this subclause. A PHY shall support at least one of these Auto-Negotiation speeds."
and
"If Auto-Negotiation is implemented, 1000BASE-T1, 100BASE-T1, and 10BASE-T1S PHYs shall support HSM and may optionally support LSM."

I assume that support for Autoneg is optional. If this is the case, then the first requirement will need a qualifier. As-is, every PHY is required to support at least on Autoneg speed.

SuggestedRemedy

Change first quoted snippet to:
"Two different Auto-Negotiation speeds are defined in this subclause. If Auto-Negotiation is implemented, a PHY shall support at least one of these Auto-Negotiation speeds."

Possibly you may want to change "a PHY" into something more specific, given that this paragraph deals only with 10SPE ?

Response *Response Status* **C**

REJECT.

While auto-negotiation is optional, when it is not implemented, Clause 98 compliance is not required at all. Hence a statement in clause 98 which says "when auto-negotiation is not implemented" is moot.

Cl **98** *SC* **98.2.1.1.2** *P* **72** *L* **27** # i-34

Yseboodt, Lennart Signify

Comment Type **E** *Comment Status* **R** *Editorial*

"The timing parameters for DME pages shall be followed as in Table 98-1."

Bad English.

SuggestedRemedy

"The timing parameters of the DME pages shall conform to Table 98-1."

Response *Response Status* **C**

REJECT.

This comment is against text that is not changed by this amendment. The commenter is encouraged to submit a Maintenance request.

Cl **98** *SC* **98.2.1.1.2** *P* **72** *L* **30** # i-35

Yseboodt, Lennart Signify

Comment Type **T** *Comment Status* **A** *Editorial*

"When operating in high-speed mode, the period, T1, shall be 30.0 ns +- 0.01%."
and
"When operating in low-speed mode, the period, T1, shall be 800 ns +- 0.005%."

This requirement is already specified in Table 98-1 and made a requirement by a previous shall statement.
Not only are both of these sentences redundant, they also copy the value of a parameter out of Table 98-1 and present it in a different way.

SuggestedRemedy

Remove both sentences. Add "When operating in high|low speed mode," to the sentences that specify when transitions occur (or add this parameter to the Table).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace the last 4 sentences in clause 98.2.1.1.2 (starting with, "TWhen operating in) with,

"The period, T1, shall be 30.0ns ± 0.01%.Transitions shall occur within ±0.8 ns of their ideal positions." shown in strikethough followed by,

"When operating in low-speed mode, transitions shall occur within ± 0.8 ns of their ideal positions. When operating in high-speed mode, transitions shall occur within ± 10 ns of their ideal positions." shown in underline.

Cl **98** *SC* **98.2.1.1.2** *P* **73** *L* **6** # i-36

Yseboodt, Lennart Signify

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

Last column "Units" is broken at the last letter.

SuggestedRemedy

Increase column width slightly.

Response *Response Status* **C**

ACCEPT.

Cl **98** *SC* **98.5.1** *P* **73** *L* **44** # i-325

Law, David Hewlett Packard Enterprise

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

The editing instruction reads 'Insert variable for autoneg_speed after the variable for an_receive_idle ...' yet the variable is called ANSP.

SuggestedRemedy

Suggest that the editing instruction be changed to read 'Insert the variable ANSP after the variable an_receive_idle ...'.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace, "Insert variable for autoneg_speed after the variable for an_receive_idle as follows:"

with, "Insert variable for ANSP after the variable for an_receive_idle as follows:

Cl **98** *SC* **98.5.1** *P* **73** *L* **45** # i-326

Law, David Hewlett Packard Enterprise

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

Suggest that the ANSP variable is formatted in the same way as other variables in this subclause.

SuggestedRemedy

Suggest that the ANSP valuable be formatted to read as follows:

ANSP
This variable contains the type of the selected Auto-Negotiation speed.
Values:
HSM: high-speed mode.
LSM: low-speed mode.

Response *Response Status* **C**

ACCEPT.

Cl **98** *SC* **98.5.1** *P* **73** *L* **46** # i-159

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

Comment Type **T** *Comment Status* **A** *Editorial*

The editing instruction refers to a variable autoneg_speed, but the variable is ANSP. This variable is also referred to by autoneg_speed in 98.5.1

SuggestedRemedy

Change editing instruction on P 73 L44 from "Insert variable for autoneg_speed after the variable for an_receive_idle as follows:" to "Insert variable for ANSP after the variable for an_receive_idle as follows:" and change autoneg_speed in 98.5.6.1 (P81 L17) to ANSP, and change the two references in Figure 98-11, P82 L22 from autoneg_speed to ANSP.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change editing instruction on P 73 L44 from "Insert variable for autoneg_speed after the variable for an_receive_idle as follows:" to "Insert variable for ANSP after the variable for an_receive_idle as follows:" and

Page 80, line 50: Change '... through the variable autoneg_speed and ...' to read '... through the variable ANSP and ...'.

Page 81, line 17: change autoneg_speed in 98.5.6.1 to ANSP, and

Figure 98-11 (Page 82 line 22): change the two references in Figure 98-11, P82 L22 from autoneg_speed to ANSP.

Cl **98** *SC* **98.5.1** *P* **73** *L* **46** # i-63

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **T** *Comment Status* **A** *Editorial*

ANSP is the abbreviation for autoneg_speed in the state diagrams, the variable name itself has to be autoneg_speed.

SuggestedRemedy

Change ANSP to autoneg_speed and define within a new paragraph ANSP - ANSP is an abbreviation for the variable autoneg-speed.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Accomodated by comment i-159.

The resolution to comment i-159 is:

Change editing instruction on P 73 L44 from "Insert variable for autoneg_speed after the variable for an_receive_idle as follows:" to "Insert variable for ANSP after the variable for an_receive_idle as follows:" and

Page 80, line 50: Change '... through the variable autoneg_speed and ...' to read '... through the variable ANSP and ...'.

Page 81, line 17: change autoneg_speed in 98.5.6.1 to ANSP, and

Figure 98-11 (Page 82 line 22): change the two references in Figure 98-11, P82 L22 from autoneg_speed to ANSP.

Cl **98** *SC* **98.5.1** *P* **73** *L* **53** # i-64

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **R** *EZ*

Condition that is true until such time as the power supply ... (redundant wording)

SuggestedRemedy

Condition that is true until the power supply ...

Response *Response Status* **C**

REJECT.

The phrase "Condition that is true until such time" is consistent with all similar statements in 802.3-2018.

Cl **98** *SC* **98.5.2** *P* **74** *L* **29** # i-282

McCarthy, Mick Analog Devices Inc.

Comment Type **TR** *Comment Status* **A** *AutoNeg*

For 10BASE-T1L and 10BASE-T1S, the break_link_timer_[HSM] duration is too short to ensure that the link partner will enter a Link Fail state.

For 10BASE-T1S, this is related to heartbeat transmission of SC 147.3.7.

For 10BASE-T1L, this is related to the lpi_quiet_timer and possibly also the silent_timer (which dictate normal periods of silence).

SuggestedRemedy

Change break_link_timer_[HSM] description as follows:

Timer for the amount of time to wait in order to assure that the link partner enters a Link Fail state.
For all PHY types except 10BASE-T1S and 10BASE-T1L, this timer shall expire 300 us to 305 us after being started.
For a 10BASE-T1S PHY, this timer shall expire 400 ms to 405 ms after being started.
For a 10BASE-T1L PHY, this timer shall expire 150 ms to 155 ms after being started.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Clause 98.5.2:

P.74, Line 29:
Replace:
break_link_timer_[HSM]
Timer for the amount of time to wait in order to assure that the link partner enters a Link Fail state. The timer shall expire 300 µs to 305 µs after being started.

With:
break_link_timer_[HSM]
Timer for the amount of time to wait in TRANSMIT DISABLE in order to assure that the link partner will exit from either ACKNOWLEDGE DETECT or NEXT PAGE WAIT; effect on the link partner in other states is not defined. The timer shall expire 300 µs to 305 µs after being started.

P.75, Line 42:
Replace:
break_link_timer_[LSM]
Timer for the amount of time to wait in order to assure that the link partner enters a Link Fail state. The timer shall expire 300 µs to 305 µs after being started.

With:
break_link_timer_[LSM]
Timer for the amount of time to wait in TRANSMIT DISABLE in order to assure that the link partner will exit from either ACKNOWLEDGE DETECT or NEXT PAGE WAIT; effect on the link partner in other states is not defined. The timer shall expire 8000 µs to 8133 µs after being started.

Clause 98.5.6.3

P.81, Line 51:
Replace:
Timer value: (2.5 ms ± 0.1 ms) + (random integer from 0 to 15) × (0.5 ms ± 0.05 ms)

With:
Timer value: (10.0 ms ± 0.1 ms) + (random integer from 0 to 15) × (0.5 ms ± 0.05 ms)

P.82, Line 3:
Replace:
Timer value: 100 ms ± 1 ms

With:
Timer value: 150 ms ± 1 ms

Editorial license granted to craft necessary Editing Instruction text in accordance with IEEE Style.

Cl **98** *SC* **98.5.2** *P* **75** *L* **42** # i-283

McCarthy, Mick Analog Devices Inc.

Comment Type **TR** *Comment Status* **A** *AutoNeg*

For 10BASE-T1L and 10BASE-T1S, the break_link_timer_[LSM] duration is too short to ensure that the link partner will enter a Link Fail state.

For 10BASE-T1S, this is related to heartbeat transmission of SC 147.3.7.

For 10BASE-T1L, this is related to the lpi_quiet_timer and possibly also the silent_timer (which dictate normal periods of silence).

SuggestedRemedy

Change break_link_timer_[LSM] description as follows:

Timer for the amount of time to wait in order to assure that the link partner enters a Link Fail state.
For all PHY types except 10BASE-T1S and 10BASE-T1L, this timer shall expire 300 us to 305 us after being started.
For a 10BASE-T1S PHY, this timer shall expire 400 ms after being started.
For a 10BASE-T1L PHY, this timer shall expire 150 ms after being started.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Accomodated by comment i-282. The resolution to i-282 is:

Clause 98.5.2:

P.74, Line 29:
Replace:
break_link_timer_[HSM]
Timer for the amount of time to wait in order to assure that the link partner enters a Link Fail state. The timer shall expire 300 µs to 305 µs after being started.

With:
break_link_timer_[HSM]
Timer for the amount of time to wait in TRANSMIT DISABLE in order to assure that the link partner will exit from either ACKNOWLEDGE DETECT or NEXT PAGE WAIT; effect on the link partner in other states is not defined. The timer shall expire 300 µs to 305 µs after being started.

P.75, Line 42:
Replace:
break_link_timer_[LSM]
Timer for the amount of time to wait in order to assure that the link partner enters a Link Fail state. The timer shall expire 300 µs to 305 µs after being started.

With:
break_link_timer_[LSM]
Timer for the amount of time to wait in TRANSMIT DISABLE in order to assure that the link partner will exit from either ACKNOWLEDGE DETECT or NEXT PAGE WAIT; effect on the link partner in other states is not defined. The timer shall expire 8000 µs to 8133 µs after being started.

Clause 98.5.6.3

P.81, Line 51:
Replace:
Timer value: (2.5 ms ± 0.1 ms) + (random integer from 0 to 15) × (0.5 ms ± 0.05 ms)

With:
Timer value: (10.0 ms ± 0.1 ms) + (random integer from 0 to 15) × (0.5 ms ± 0.05 ms)

P.82, Line 3:
Replace:
Timer value: 100 ms ± 1 ms

With:
Timer value: 150 ms ± 1 ms

Editorial license granted to craft necessary Editing Instruction text in accordance with IEEE Style.

Cl **98** *SC* **98.5.2** *P* **76** *L* **40** # i-65

Graber, Steffen Pepperl+Fuchs GmbH

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

3030 to 3090 ms (add unit "ms" after 3030)

SuggestedRemedy

3030 ms to 3090 ms

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace, "3030 to 3090 ms"

with, "3030 ms to 3090 ms"

Cl **98** *SC* **98.5.5** *P* **77** *L* **19** # i-327

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Editorial*

The variable multispeed_autoneg_reset is used in Figure 98-7 'Arbitration state diagram' but is not defined in subclause 98.5.1 'State diagram variables'.

SuggestedRemedy

Add the following variable definition to subclause 98.5.1:

multispeed_autoneg_reset
See 98.5.6.1.

Response *Response Status* **C**

ACCEPT.

Cl **98** *SC* **98.5.5** *P* **77** *L* **23** # i-328

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Editorial*

There is no transition condition on the transition from the AN ENABLE state to the TRANSMIT DISABLE state. I note that the condition on the same transition in IEEE Std 802.3-2018 is mr_autoneg_enable = true, however since mr_autoneg_enable = false is an open arrow condition to the AN ENABLE state, the condition seems redundant, so I assume was removed to indicate an unconditional transition. If that is the case the transition should be marked with UCT (see IEEE Std 802.3-1018 subclause 21.5.3).

SuggestedRemedy

Mark the transition from the AN ENABLE state to the TRANSMIT DISABLE state, on exit from the AN ENABLE state, with 'UCT'.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

On page 77, line 23: Mark the transition from the AN ENABLE state to the TRANSMIT DISABLE state, on exit from the AN ENABLE state, with ' mr_autoneg_enable = true ' as was used in IEEE 802.3-2018. Revert the state name from ‘AN ENABLE’ to ‘Auto-Negotiation ENABLE’ as was used in IEEE 802.3-2018.

On page128, line 47: Change the RSTCD condition to an UCT condition between states DATA and DATA_ERR“

Cl **98** *SC* **98.5.5** *P* **77** *L* **25** # i-329

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Editorial*

There is an imbalance in the number of brackets on the transition condition from the COMPLETE ACKNOWLEDGE state to the NEXT PAGE WAIT.

SuggestedRemedy

Suggest that '... ((tx_link_code_word[NP] = 1) + (np_rx = 1)' should read '... ((tx_link_code_word[NP] = 1) + (np_rx = 1))'.

Response *Response Status* **C**

ACCEPT.

Cl **98** *SC* **98.5.5** *P* **77** *L* **26** # i-330

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *State Diagram*

It is not clear to me why the mr_autoneg_enable variable would be set to true in the AN GOOD CHECK state. It is not possible to transition into the AN GOOD CHECK state if the mr_autoneg_enable variable is not already set to true due to the open arrow entry into the AN ENABLE state based on mr_autoneg_enable = false. In addition, mr_autoneg_enable is a register bit sourced from bit 7.512.12 Auto-Negotiation enable (see Table 98-7) so I don't see why this state diagram would want to overwrite the value sourced by the management entity in the register bit.

Finally, on review of the IEEE Std 802.3-2018 Arbitration state diagram I don't see this action in the AN GOOD CHECK state, but instead, I see the action link_control_[notHCD] <= DISABLE. I can see why that might have been removed as the only way to get to the AN GOOD CHECK state is from the COMPLETE ACKNOWLEDGE state from the ACKNOWLEDGE DETECT state where link_control_[all] <= DISABLE is one of the actions. But this doesn't explain the addition of the action mr_autoneg_enable = true.

SuggestedRemedy

Remove the action mr_autoneg_enable = true from the AN GOOD CHECK state.

Response *Response Status* **C**

ACCEPT.

Cl **98** *SC* **98.5.5** *P* **78** *L* **37** # i-331

Law, David Hewlett Packard Enterprise

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

Typo, the transition condition from the WAIT 2 state to the TRANSMIT COUNT ACK state should read 'transmit_DME_wait = false', that is the Assignment (<=) should be an Equals (=).

SuggestedRemedy

Suggest that 'transmit_DME_wait <= false' should read 'transmit_DME_wait = false'.

Response *Response Status* **C**

ACCEPT.

Cl **98** *SC* **98.5.5** *P* **78** *L* **38** # i-332

Law, David Hewlett Packard Enterprise

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

Round brackets are normally used to indicate precedence (see IEEE Std 802.3-2018 subclause 21.5.4 'Operators'), square brackets are usually used to denote bit ranges.

SuggestedRemedy

Suggest that 'tx_link_code_word(tx_bit_cnt)' should read 'tx_link_code_word[tx_bit_cnt]'.

Response *Response Status* **C**

ACCEPT.

Cl **98** *SC* **98.5.6.1** *P* **81** *L* **14** # i-333

Law, David Hewlett Packard Enterprise

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

A minor point, but all other variables in subclause 98.5 use lowercase 'true' and false'.

SuggestedRemedy

Suggest that 'TRUE' be changed to 'true' and 'FALSE' be changed to 'false' here and throughout subclause 98.5.6.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace "TRUE" with "true" in these locations:
page 81, line 10
page 81, line 15
page 81, line 33
page 81, line 36
page 81, line 39
page 81, line 44
page 82, in the SPEED DETECTION box in Figure 98-11

Replace "FALSE" with "false" in these locations:
page 81, line 14
page 81, line 16
page 81, line 36
page 81, line 37
page 81, line 43
page 81, line 44
page 82, in the LOW-SPEED AN box in Figure 98-11
page 82, in the HIGH-SPEED AN box in Figure 98-11

Cl **98** *SC* **98.5.6.1** *P* **81** *L* **17** # i-334

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Editorial*

The variable autoneg_speed used in figure 98-11 is defined here by reference to subclause 98.5.1, yet I can't find a variable autoneg_speed defined in subclause 98.5.1. Based on the assignments of autoneg_speed to HSM and LSM in the HIGH-SPEED and LOW-SPEED states respectively, I suspect that autoneg_speed has been changed to ANSP in subclause 98.5.1.

SuggestedRemedy

Suggest that the following changes are made:
[1] Page 80, line 50: Change '... through the variable autoneg_speed and ...' to read '... through the variable ANSP and ...'.
[2] Page 81, line 17: Change 'autoneg_speed' to read 'ANSP'.
[3] Page 82, line 22: Change 'autoneg_speed <= HSM' to read 'ANSP <= HSM' in the HIGH-SPEED state.
[4] Page 82, line 22: Change 'autoneg_speed <= LSM' to read 'ANSP <= LSM' in the LOW-SPEED state.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Accomodated by comment i-159.

The Response to Comment i-159 is:

PROPOSED ACCEPT IN PRINCIPLE.
Change editing instruction on P 73 L44 from "Insert variable for autoneg_speed after the variable for an_receive_idle as follows:" to "Insert variable for ANSP after the variable for an_receive_idle as follows:" and

Page 80, line 50: Change '... through the variable autoneg_speed and ...' to read '... through the variable ANSP and ...'.

Page 81, line 17: change autoneg_speed in 98.5.6.1 to ANSP, and

Figure 98-11 (Page 82 line 22): change the two references in Figure 98-11, P82 L22 from autoneg_speed to ANSP.

Cl **98** *SC* **98.5.6.3** *P* **81** *L* **45** # i-335

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Editorial*

Operation of the timers, such as the meaning of start timer, stop time and timer_done, should be defined by reference to the subclause 40.4.5.2.

SuggestedRemedy

Suggest the text 'All timers operate in the manner described in 40.4.5.2.' is inserted as the first paragraph of this subclause.

Response *Response Status* **C**

ACCEPT.

Cl **98** *SC* **98.5.6.3** *P* **81** *L* **51** # i-336

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *State Diagram*

The 'timer value' for the detection_timer is defined as (2.5 ms +/- 0.1 ms) + (random integer from 0 to 15) x (0.5 ms +/- 0.05 ms). Based on this the minimum value is 2.5 ms - 0.1 ms = 2.4 ms and the maximum is (2.5 ms + 0.1 ms) + (15 x (0.5 ms + 0.05 ms)) = 10.85 ms. It would, therefore, seem to imply that a fixed value between 2.4 ms and 10.85 ms can be chosen for the time. I suspect that this is not what is intended, and instead, the random number needs to be selected each time the time is restarted.

SuggestedRemedy

Suggest that the text 'A new random integer from 0 to 15 inclusive is generated every time the detection_timer is started. The random value should be uniformly distributed.' is added to the end of the 'Timer value' text.

Response *Response Status* **C**

ACCEPT.

Cl **98** *SC* **98.5.6.2** *P* **81** *L* **54** # i-158

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

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

"under laying" should be "underlying"

SuggestedRemedy

Change "under laying" to "underlying"

Response *Response Status* **C**

ACCEPT.

Cl **98** *SC* **98.5.6.3** *P* **81** *L* **54** # i-66

Graber, Steffen Pepperl+Fuchs GmbH

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

under laying (correct spelling)

SuggestedRemedy

underlying

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Accomodated by comment i-158.

The resolution to comment i-158 is:

Change "under laying" to "underlying"

Cl **98** *SC* **98.5.6.3** *P* **82** *L* **5** # i-337

Law, David Hewlett Packard Enterprise

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

The variable pwr_on on the open arrow entry to the state SEED DETECTION should be power_on, see subclause 98.5.6.1.

SuggestedRemedy

Change 'pwr_on + mr_main_reset + ...' to read 'power_on + mr_main_reset + ...'.

Response *Response Status* **C**

ACCEPT.

Cl **98** *SC* **98.6.8** *P* **85** *L* **13** # i-67

Graber, Steffen Pepperl+Fuchs GmbH

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

0.005 % (remove space acc. to style guide requirements)

SuggestedRemedy

5e-05

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace, "0.005 %"

with, "0.005%"

Cl **104** *SC* **104** *P* **86** *L* **1** # i-37

Yseboodt, Lennart Signify

Comment Type **TR** *Comment Status* **A** *PoDL*

After reviewing 146.8.4 I realized that PoDL's PSE spec does not include a voltage polarity requirement.
The PD section does not specify whether PDs need to be polarity insensitive, or what the expected pinout is either.

SuggestedRemedy

Add a subsection with appropriate requirements for the PSE and PD that specifies output/input voltage polarity (possibly linked only to 10SPE and/or the listed IEC connectors there).

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Bring Figure 104-3 in the document and replace MDI+ with BI_DA+ and replace MDI- with BI_DA- in the figure.

Add sub-clause 104.4.1
"104.4.1 PI pin assignments
A PSE provides power via a single two wire connection. Table 104-1a in conjunction with Figure 104-3 illustrates the PSE pinout.

A PSE shall implement the PSE pinout in Table 104-1a.

Table 104-1a - PSE Pinout
{
{ {{Contact} {PI} }
{ {1} {PI+} }
{ {2} {PI-} }
}
"

Add sub-clause 104.5.1
"104.5.1 PD PI
A PD may receive power in two modes, Mode A and Mode B. Table 104-4a in conjunction with Figure 104-3 illustrates the PD pinout.

Table 104-4a - PD Pinout
{
{ { Contact} {Mode A} {Mode B} }
{ {1} {PI+} {PI-} }
{ {2} {PI-} {PI+} }
}

Class 0 to class 9 PDs shall be able to operate per the Mode A column in Table 104-4a.
Class 10 to class 15 PDs shall be implemented to be insensitive to the polarity of the

power supply and shall be able to operate per the Mode A column and the Mode B column in Table 104-4a.

Editorial license granted to craft necessary Editing Instruction text in acccordance with IEEE style.

Cl **104** *SC* **104.1.3** *P* **86** *L* **15** # i-322

Stewart, Heath Analog Devices Inc.

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

Clause 104.1.3 states that "PoDL systems are not specified for mixing segments". As such 10BASE-T1S PHYs cannot be correlated with a PoDL Type.

SuggestedRemedy

Change
"A Type A or Type C PSE and Type A or Type C PD is compatible with 10BASE-T1S and 100BASE-T1 PHYs... A Type C PSE and Type C PD is compatible with 10BASE-T1S, 100BASE-T1, and 1000BASE-T1 PHYs..."
To
"A Type A or Type C PSE and Type A or Type C PD is compatible with 100BASE-T1 PHYs... A Type C PSE and Type C PD is compatible with 100BASE-T1, and 1000BASE-T1 PHYs..."

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **104** *SC* **104.1.3** *P* **86** *L* **16** # i-292

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **E** *Comment Status* **R** *Editorial*

The relation of PHYs and PoDL System types is extremely difficult to follow

SuggestedRemedy

separate the sentences with bullet points (cannot be shown here)

Response *Response Status* **C**

REJECT.

This comment affects text and sentence structure that is not changed by this amendment. The commenter is encouraged to submit a Maintenance request.

Cl **104** *SC* **104.2** *P* **86** *L* **26** # i-293

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **E** *Comment Status* **R** *Editorial*

The relation of loop resistance and PoDL class types is extremely difficult to follow

SuggestedRemedy

separate the sentences with bullet points (cannot be shown here) and change loop resistances (another comment)

Response *Response Status* **C**

REJECT.

This comment affects text and sentence structure that is not changed by this amendment. The commenter is encouraged to submit a Maintenance request. The response to the proposal to change the loop resistances is capture in the response to comment i-295.

Cl **104** *SC* **104.2** *P* **86** *L* **28** # i-321

Stewart, Heath Analog Devices Inc.

Comment Type **TR** *Comment Status* **A** *PoDL*

*** Comment submitted with the file 100635300003-stewart_3cg_01_0519_v1.pdf attached ***

Clause 104 modifications are required to correct the dc loop resistance for 10BASET1L channels. Classes enabling 24V nominal, 50V max and SELV max are proposed. Class related parameters and encodings changes which derive from these corrections are also proposed.

SuggestedRemedy

See stewart_3cg_01_0519

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add additional power classes, including control registers, and adjust loop resistances as shown in http://www.ieee802.org/3/cg/public/May2019/stewart_3cg_01_0519_v3.pdf , by making the following changes: (references to “Stewart comment i-321 presentation” below are to this URL).

Modify Clause 30 to reflect new classes as follows:
Add new edit on (P41, L20):
Change text of BEHAVIOUR DEFINED AS section of 30.15.1.1.6 as shown:

“BEHAVIOUR DEFINED AS:
A read-only value that indicates the class of the detected PoDL PD as specified in Table 104–1 <UL>and Table 104-1a<UL>.
This value is only valid while a PD is being powered, that is the attribute aPoDLPSEPowerDetectionStatus is reporting the enumeration “deliveringPower”.

If a Clause 45 MDIO Interface to the PoDL PSE function is present, then this attribute may be derived from the PD Class <UL>and PD Extended Class<UL> bits specified in 45.2.9.2.8 <UL>and 45.2.9.3.1a<UL>.;”

Update the PoDL PSE Status registers to support the new classes as follows:

Modify Table 45-340 PoDL PSE Status 1 (P62) and Table 45-341 PoDL PSE Status 2 Register Bit Definitions (P63) to extend class codes as shown on slide 7 of Stewart comment i-321 presentation.

Update the PoDL Class register and Change the last sentence of the 45.2.9.2.8 (P62) from: When read as 0000 a Class 0 PD is indicated…, and when read as 1111 a Class 15 PD is indicated.”
To:
“When read as 0000 a Class 0 PD is indicated…, and when read as 1111 the Class will be as indicated by the PD Extended Class (13.2.4:3) bits.”

Add new subclause 45.2.9.3.1a PD Extended Class (13.2.4:3) to the draft, with editing instruction:
“Insert New subclause 45.2.9.3.1a PD Extended Class (13.2.4:3) after 45.2.9.3.1. Add text under 45.2.9.3.1a as below:”
“When read as 00 a Class 15 PD is indicated. Values of 01 and 1x are reserved.”

Change the edit to last 3 sentences of the first paragraph of 104.2 Link segment (P86 L28-31) from:
“The link segment dc loop resistance shall be less than 59 ohm for Classes 10 and 13. The link segment dc loop resistance shall be less than 39 ohm for classes 11 and 14. The link segment dc loop resistance shall be less than 36 ohm for classes 12 and 15.”

To “The link segment dc loop resistance shall be less than 65 ohm for classes 10 and 13. The link segment dc loop resistance shall be less than 25 ohm for classes 11 and 14. The link segment dc loop resistance shall be less than 9.5 ohm for Classes 12 and 15”

And, change the edit to Table 104-1a (P87 L1-22) deleting the last two rows (Cable mm (AWG) and Cable Length (m)) and modifying the entries in classes 10 through 15, as shown on Slide 10 of Stewart comment i-321 presentation.

Change Table 104-4 items 6 and 7 (Page 89 L22) to change class on existing values to Classes 0 to 9, and add new row for requirements on Classes 10 to 15 as shown on slide 11 of Stewart comment i-321 presentation.

Add new entries to Table 104-7 PD Power Supply limits table (Page 91 line 20), inserting new rows 4f, 4g and 5f, 5g for turn on and turn off voltages for the 2 new groups of classes respectively as shown on slide 12 of Stewart comment i-321 presentation, and add new entry for item 7 in Table 104-7 Inrush enable delay time for Classes 10 to 15 as shown on slide 13 of Stewart comment i-321 presentation.

Change Table 104-8 item 1 (Page 95 line 10) to change class on existing values of PSE Pull-up Voltage to apply to Classes 0 to 9, and add new row for requirement on Classes 10 to 15 as shown on slide 14 of Stewart comment i-321 presentation.

Editorial license granted to craft necessary Editing Instruction text in accordance with IEEE style.

Cl **104** *SC* **104.3** *P* **87** *L* **4** # i-294

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **TR** *Comment Status* **A** *PoDL*

Table 104-1a needs changes: 1-classes 10-12 for 36 V are outdated and should be deleted. 2-one more 60V class should be added

SuggestedRemedy

1-classes 10-12 for 36 V are outdated and should be deleted. 2-one more 60V class should be added

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Accomodated by comment i-321.

Response to comment i-321 is:

Add additional power classes, including control registers, and adjust loop resistances as shown in http://www.ieee802.org/3/cg/public/May2019/stewart_3cg_01_0519_v3.pdf , by making the following changes: (references to “Stewart comment i-321 presentation” below are to this URL).

Modify Clause 30 to reflect new classes as follows:
Add new edit on (P41, L20):
Change text of BEHAVIOUR DEFINED AS section of 30.15.1.1.6 as shown:

“BEHAVIOUR DEFINED AS:
A read-only value that indicates the class of the detected PoDL PD as specified in Table 104–1 <UL>and Table 104-1a<UL>.
This value is only valid while a PD is being powered, that is the attribute aPoDLPSEPowerDetectionStatus is reporting the enumeration “deliveringPower”.

If a Clause 45 MDIO Interface to the PoDL PSE function is present, then this attribute may be derived from the PD Class <UL>and PD Extended Class<UL> bits specified in 45.2.9.2.8 <UL>and 45.2.9.3.1a<UL>.;”

Update the PoDL PSE Status registers to support the new classes as follows:

Modify Table 45-340 PoDL PSE Status 1 (P62) and Table 45-341 PoDL PSE Status 2 Register Bit Definitions (P63) to extend class codes as shown on slide 7 of Stewart comment i-321 presentation.

Update the PoDL Class register and Change the last sentence of the 45.2.9.2.8 (P62) from: When read as 0000 a Class 0 PD is indicated…, and when read as 1111 a Class 15 PD is indicated.”
To:
“When read as 0000 a Class 0 PD is indicated…, and when read as 1111 the Class will be as indicated by the PD Extended Class (13.2.4:3) bits.”

Add new subclause 45.2.9.3.1a PD Extended Class (13.2.4:3) to the draft, with editing instruction:
“Insert New subclause 45.2.9.3.1a PD Extended Class (13.2.4:3) after 45.2.9.3.1. Add text under 45.2.9.3.1a as below:”
“When read as 00 a Class 15 PD is indicated. Values of 01 and 1x are reserved.”

Change the edit to last 3 sentences of the first paragraph of 104.2 Link segment (P86 L28-31) from:
“The link segment dc loop resistance shall be less than 59 ohm for Classes 10 and 13. The link segment dc loop resistance shall be less than 39 ohm for classes 11 and 14. The link segment dc loop resistance shall be less than 36 ohm for classes 12 and 15.”

To “The link segment dc loop resistance shall be less than 65 ohm for classes 10 and 13. The link segment dc loop resistance shall be less than 25 ohm for classes 11 and 14. The link segment dc loop resistance shall be less than 9.5 ohm for Classes 12 and 15”

And, change the edit to Table 104-1a (P87 L1-22) deleting the last two rows (Cable mm (AWG) and Cable Length (m)) and modifying the entries in classes 10 through 15, as shown on Slide 10 of Stewart comment i-321 presentation.

Change Table 104-4 items 6 and 7 (Page 89 L22) to change class on existing values to Classes 0 to 9, and add new row for requirements on Classes 10 to 15 as shown on slide 11 of Stewart comment i-321 presentation.

Add new entries to Table 104-7 PD Power Supply limits table (Page 91 line 20), inserting new rows 4f, 4g and 5f, 5g for turn on and turn off voltages for the 2 new groups of classes respectively as shown on slide 12 of Stewart comment i-321 presentation, and add new entry for item 7 in Table 104-7 Inrush enable delay time for Classes 10 to 15 as shown on slide 13 of Stewart comment i-321 presentation.

Change Table 104-8 item 1 (Page 95 line 10) to change class on existing values of PSE Pull-up Voltage to apply to Classes 0 to 9, and add new row for requirement on Classes 10 to 15 as shown on slide 14 of Stewart comment i-321 presentation.

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Cl **104** *SC* **104.3** *P* **87** *L* **19** # i-68

Graber, Steffen Pepperl+Fuchs GmbH

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

Cable mm (AWG) (from the text it is not clear that the "mm" means the diameter)

SuggestedRemedy

Cable diameter in mm (AWG)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace, "Cable mm (AWG)"

with,

"Conductor diameter in mm (AWG)"

Cl **104** *SC* **104.3** *P* **87** *L* **19** # i-295

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **TR** *Comment Status* **A** *PoDL*

In Table 104-1a cable related limits are specified in he last two lines. As this is outside scope it should be replaced just by the loop resistance, giving the IEC cable group the task to define the cables. In Annex 146B there is an informative Table 146B-1 showing a lot of details.

SuggestedRemedy

The new classes 10 to 13 should show in the last row 9.25; 15; 25; 65 Ohm loop resistance at 60 C

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Accomodated by comment i-321.

Response to comment i-321 is:

Add additional power classes, including control registers, and adjust loop resistances as shown in http://www.ieee802.org/3/cg/public/May2019/stewart_3cg_01_0519_v3.pdf , by making the following changes: (references to “Stewart comment i-321 presentation” below are to this URL).

Modify Clause 30 to reflect new classes as follows:
Add new edit on (P41, L20):
Change text of BEHAVIOUR DEFINED AS section of 30.15.1.1.6 as shown:

“BEHAVIOUR DEFINED AS:
A read-only value that indicates the class of the detected PoDL PD as specified in Table 104–1 <UL>and Table 104-1a<UL>.
This value is only valid while a PD is being powered, that is the attribute aPoDLPSEPowerDetectionStatus is reporting the enumeration “deliveringPower”.

If a Clause 45 MDIO Interface to the PoDL PSE function is present, then this attribute may be derived from the PD Class <UL>and PD Extended Class<UL> bits specified in 45.2.9.2.8 <UL>and 45.2.9.3.1a<UL>.;”

Update the PoDL PSE Status registers to support the new classes as follows:

Modify Table 45-340 PoDL PSE Status 1 (P62) and Table 45-341 PoDL PSE Status 2 Register Bit Definitions (P63) to extend class codes as shown on slide 7 of Stewart comment i-321 presentation.

Update the PoDL Class register and Change the last sentence of the 45.2.9.2.8 (P62) from: When read as 0000 a Class 0 PD is indicated…, and when read as 1111 a Class 15 PD is indicated.”
To:

"When read as 0000 a Class 0 PD is indicated…, and when read as 1111 the Class will be as indicated by the PD Extended Class (13.2.4:3) bits."
Add new subclause 45.2.9.3.1a PD Extended Class (13.2.4:3) to the draft, with editing instruction:
"Insert New subclause 45.2.9.3.1a PD Extended Class (13.2.4:3) after 45.2.9.3.1. Add text under 45.2.9.3.1a as below:"
"When read as 00 a Class 15 PD is indicated. Values of 01 and 1x are reserved."

Change the edit to last 3 sentences of the first paragraph of 104.2 Link segment (P86 L28-31) from:
"The link segment dc loop resistance shall be less than 59 ohm for Classes 10 and 13. The link segment dc loop resistance shall be less than 39 ohm for classes 11 and 14. The link segment dc loop resistance shall be less than 36 ohm for classes 12 and 15."

To "The link segment dc loop resistance shall be less than 65 ohm for classes 10 and 13. The link segment dc loop resistance shall be less than 25 ohm for classes 11 and 14. The link segment dc loop resistance shall be less than 9.5 ohm for Classes 12 and 15"

And, change the edit to Table 104-1a (P87 L1-22) deleting the last two rows (Cable mm (AWG) and Cable Length (m)) and modifying the entries in classes 10 through 15, as shown on Slide 10 of Stewart comment i-321 presentation.

Change Table 104-4 items 6 and 7 (Page 89 L22) to change class on existing values to Classes 0 to 9, and add new row for requirements on Classes 10 to 15 as shown on slide 11 of Stewart comment i-321 presentation.

Add new entries to Table 104-7 PD Power Supply limits table (Page 91 line 20), inserting new rows 4f, 4g and 5f, 5g for turn on and turn off voltages for the 2 new groups of classes respectively as shown on slide 12 of Stewart comment i-321 presentation, and add new entry for item 7 in Table 104-7 Inrush enable delay time for Classes 10 to 15 as shown on slide 13 of Stewart comment i-321 presentation.

Change Table 104-8 item 1 (Page 95 line 10) to change class on existing values of PSE Pull-up Voltage to apply to Classes 0 to 9, and add new row for requirement on Classes 10 to 15 as shown on slide 14 of Stewart comment i-321 presentation.

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Cl **104** *SC* **104.4.1** *P* **87** *L* **30** # i-69

Graber, Steffen Pepperl+Fuchs GmbH

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

For PoDL systems there are multiple types of PSEs ... (add comma after "systems")

SuggestedRemedy

For PoDL systems, there are multiple types of PSEs ...

Response *Response Status* **C**

ACCEPT.

Cl **104** *SC* **104.4.6.3** *P* **89** *L* **41** # i-70

Graber, Steffen Pepperl+Fuchs GmbH

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

100 +/-0.1 % (add space before "0.1", remove space before "%" to meet the style guide requirements)

SuggestedRemedy

100 +/- 0.1%

Response *Response Status* **C**

ACCEPT.

Cl **104** *SC* **104.4.6.3** *P* **90** *L* **2** # i-71

Graber, Steffen Pepperl+Fuchs GmbH

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

3.18 kHz +/- 1 % ... 0.1 MHz +/- 1 % (remove 2 x space before %)

SuggestedRemedy

3.18 kHz +/- 1% ... 0.1 MHz +/- 1%

Response *Response Status* **C**

ACCEPT.

Cl **104** *SC* **104.5.11** *P* **90** *L* **15** # i-72

Graber, Steffen Pepperl+Fuchs GmbH

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

For PoDL systems there are five types ... (add comma after "systems")

SuggestedRemedy

For PoDL systems, there are five types ...

Response *Response Status* **C**

ACCEPT.

Cl **104** *SC* **104.7** *P* **92** *L* **27** # i-18

Anslow, Peter Ciena

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

"Table 104-6" is an external cross-reference, so should be forest green.

SuggestedRemedy

Apply character tag "External" to "Table 104-6"

Response *Response Status* **C**

ACCEPT.

Cl **104** *SC* **104.7.1.4** *P* **97** *L* **22** # i-38

Yseboodt, Lennart Signify

Comment Type **ER** *Comment Status* **A** *PoDL*

104.7.1.4 is the subclause that specifies how a PoDL system can determine the actual cable resistance between the PIs.
The measured value is named "RCable_initial". This value is then increased with a margining factor and the result is called RAutoclass.

Autoclass is a specific term used in Clause 145 to denote a classification mechanism.
The parameter naming here is confusing, as this is about a cable resistance measurement method.

SuggestedRemedy

Rename RAutoclass to RCable.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Replace "RAutoclass" with "RCable" in sub-clause 104.7.4.1 and in Equation 104-5 (Page 97)

Cl **104** *SC* **104.7.1.4** *P* **97** *L* **26** # i-19

Anslow, Peter Ciena

Comment Type **ER** *Comment Status* **A** *EZ*

As pointed out in Comment #11 against D2.3:
In Equation (104-5) "min" is a function not a variable, so should not be italic font.
Same issue for Equation (104-6)

SuggestedRemedy

Change "min" to be in upright font in both Equation (104-5) and Equation (104-6)

Response *Response Status* **W**

ACCEPT.

Cl **104** *SC* **104.7.1.5** *P* **97** *L* **49** # i-39

Yseboodt, Lennart Signify

Comment Type **E** *Comment Status* **A** *PoDL*

In the variable description of Eq 104-6, several variables are missing.

SuggestedRemedy

Add descriptions for:
- PClass(min)
- IPI(max)
- RAutoclass (which becomes RCable)
- PPD(max)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Insert the following text on page 97, line 54:

See Table 104-1 for descriptions of Pclass(min), IPI(max), and PPD(max).

Cl **104** *SC* **104.7.2.6** *P* **100** *L* **40** # i-40

Yseboodt, Lennart Signify

Comment Type **TR** *Comment Status* **A** *PoDL*

Bits 13:8 in the VOLT_POWER_INFO register (Table 104-10) denote the power the PD is asking.
The table says "Power requested by PD, 0.3125 W per LSB".

With the 6 available bits, we can express power up to (2^6)-1 * 0.3125W = 19.69W.
This is less than the amount of power supported by PoDL.

SuggestedRemedy

Suggest to:
- use bits 15:8 and make the LSB count for 400mW, resulting in max 102W.

Make sure to align solution with similar comment on Table 104-11.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Make the following changes:
1) In Table 104-10, first Row, first Column, change from "b[15:14]" to "b[31:20]" ; second Row, first Column, change from "b[13:8]" to "b[19:8]" ; second Row, third Column, change from "Power requested by PD, 0.3125 W per LSB" to "Power requested by PD, 0.025 W per LSB"
2) In 104.7.2.6, line 29 change from "shall respond with a 16-bit VOLT_POWER_INFO read payload" to "shall respond with a 32-bit VOLT_POWER_INFO read payload"
3) In 104.7.2.5, line 43, change from "contents of the preceding 16-bit Read/Write payload" to "contents
of the preceding Read/Write payload"
4) In 104.7.1.5 line 49, change from "is the PD Requested Power as reported in b[13:8] of VOLT_POWER_INFO" to "is the PD Requested Power as reported in b[19:8] of VOLT_POWER_INFO"
5) In 104.7.1.5 line 36, change from "via the PD Requested Power, PPD_req, field of the VOLT_POWER_INFO Register b[13:8]" to "via the PD Requested Power, PPD_req, field of the VOLT_POWER_INFO Register b[19:8]"

Cl **104** *SC* **104.7.2.7** *P* **101** *L* **16** # i-41

Yseboodt, Lennart Signify

Comment Type **TR** *Comment Status* **A** *PoDL*

Bits 5:0 in the POWER_ASSIGN register (Table 104-11) denote the power assigned to the PD.
Like in the other Table, 6 bits with 0.3125W/bit only get us to just under 20W

SuggestedRemedy

Implement solution consistent as with fix VOLT_POWER_INFO.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Make the following changes:
1) In Table 104-11, first Row, first Column, change from "b[15:6]" to "b[31:12]" ; second Row, first Column, change from "b[5:0]" to "b[11:0]" ; second Row, third Column, change from "PD assigned power, 0.3125 W per LSB" to "PD assigned power, 0.025 W per LSB"
2) In 104.7.2.7 line 5, change from "the PSE shall transmit a 16-bit POWER_ASSIGN write payload" to "the PSE
shall transmit a 32-bit POWER_ASSIGN write payload"
3) In 104.7.2.8 line 25, change from "the PD shall respond with a 16-bit POWER_ASSIGN read payload" to "the PD shall respond with a 32-bit POWER_ASSIGN read payload"
4) In 104.7.1.5 line 52, change from "is the PD Assigned Power by PSE as assigned in b[5:0] of POWER_ASSIGN" to "is the PD Assigned Power by PSE as assigned in b[11:0] of POWER_ASSIGN"
5) In 104.7.1.5 line 2 on page 98, change from "the PSE determines PPD_assign, as assigned in b[5:0] of POWER_ASSIGN" to "the PSE determines PPD_assign, as assigned in b[11:0] of POWER_ASSIGN"

Add MDIO registers to accommodate the larger number of bits in the PD power fields as shown in http://www.ieee802.org/3/cg/public/May2019/stewart_3cg_02_0519_v1.pdf, by making the following changes: (references to “Stewart comment i-40_41 presentation” below are to this URL).

Change the edit to clause 45.2.9 Power Unit Registers with editing instructions:
“modify Table 45-211p Power Unit MMD Registers to add two rows for registers 13.3 and 13.4 below the existing row for register 13.2 as shown on slide 3 of Stewart comment i-40_41 presentation”

And add new subclause 45.2.9.4 PoDL PSE Status 3 Register (Register 13.3) and 45.2.9.4.1 PD Assigned Power (13.3.11:0) to the draft, with editing instruction:
“Insert New subclause 45.2.9.4 PoDL PSE Status 3 Register (Register 13.3) after 45.2.9.3 and add text under subclause 45.2.9.4 as below:”
“The PoDL PSE Status 3 Register is defined if cable resistance measurement is supported”
“And Insert New subclause 45.2.9.4.1 PD Assigned Power (13.3.11:0) after 45.2.9.4 and insert text under subclause 45.2.9.4.1 PD Extended Class (13.3.11:0) as below:
“The PD Assigned Power is the maximum average available power at the PD PI.”
Add Table 45-342 PoDL PSE Status 3 Register (Register 13.3) under clause 45.2.9.4 to

denote PD Assigned Power as shown on slide 4 of Stewart comment i-40_41 presentation.

And add new subclause 45.2.9.5 PoDL PSE Status 4 Register (Register 13.4) and 45.2.9.5.1 PD Requested Power (13.4.11:0) to the draft, with editing instruction:
“Insert New subclause 45.2.9.5 PoDL PSE Status 4 Register (Register 13.4) after 45.2.9.4 and add text under subclause 45.2.9.5 as below:”
“The PoDL PSE Status 4 Register is defined if cable resistance measurement is supported”
“And Insert New subclause 45.2.9.5.1 PD Requested Power (13.4.11:0) after 45.2.9.5”
“Insert text under subclause 45.2.9.5.1 PD Extended Class (13.4.11:0) as below:
“The PD Requested Power is the requested average available power at the PD PI.”
Add Table 45-343 PoDL PSE Status 4 Register (Register 13.4) under clause 45.2.9.5 to denote PD Assigned Power as shown on slide 5 of Stewart comment i-40_41 presentation.

Editorial license granted to craft necessary Editing Instruction text in accordance with IEEE style.

Cl **146** *SC* **146** *P* **104** *L* **1** # i-174

Seaman, Michael MICK SEAMAN

Comment Type **E** *Comment Status* **A** *Editorial*

There appears to be no editing instruction to add the new cclause 146.

SuggestedRemedy

Add suitable editing instruction. At the bottom of the prior page would be convenient, so as not to disrupt og 104 layout or force pagination differences when an rolled up edition is produced.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add the following editing instruction at the top of page 104 (immediately prior to header for clause 146):
"Insert Clause 146 to Clause 148 in numeric order (see later in this amendment for the addition of corresponding annexes):"

Add the following editing instruction at the top of page 236 (immediately prior to header of Annex 146A):
"Insert Annex 146A through Annex 146B in alphanumeric order (see earlier in this amendment for the addition of corresponding clauses):"

Cl **146** *SC* **146.1** *P* **104** *L* **15** # i-232

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **A** *MDI*

Clarify the demarcation points between the specified PHY and the cabling. I have seen and heard apparent confusion in the TF that makes me think some think the spec is a chip interface spec.

SuggestedRemedy

Change the text: "...between the attachment points (Medium Dependent Interface (MDI))," to: between the DTE attachment points (Medium Dependent Interface (MDI)),

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.1** *P* **104** *L* **15** # i-296

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **T** *Comment Status* **R** *PMA Electrical*

As there are 2 link segment implementations (one for 2.4 Volt and one for 1 Volt) this sentence needs to be defined differently. As this occurs at a lot of places it is proposed to define everything to 2.4V 1000m link only

SuggestedRemedy

Add at line 16 after " this clause are met" For insertion loss take Equation 146-10.

Response *Response Status* **C**

REJECT.
Existing text references the normative requirements in this clause. The normative requirements for the link segment would be relative to the transmit output voltage modes that the PHY supports. When the (optional) 2.4 Vpp mode is supported and selected, that would be Equation 146-10, but when the (mandatory) 1.0 Vpp mode is supported, that would be 146-11.

This is clear in 146.7.1.1

Cl **146** *SC* **146.1.2** *P* **104** *L* **33** # i-338

Law, David Hewlett Packard Enterprise

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

Suggest that '... effective rate of 10 Mb/s ..' should read '... an effective data rate of 10 Mb/s ..'.

SuggestedRemedy

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change "effective rate" to "effective data rate" at P104 L33

Cl **146** *SC* **146.1.2** *P* **104** *L* **37** # i-233

Thompson, Geoffrey Independent Consultant

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

It isn't clear here that you are talking about the coding on the link rather than the XMII.

SuggestedRemedy

Change the text: "...transmitted at 7.5 MBd." to: "transmitted at 7.5 Mbd on the link segment."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the text: "...transmitted at 7.5 MBd." to: "transmitted at 7.5 MBd on the link segment."

Cl **146** *SC* **146.1.2** *P* **105** *L* **50** # i-73

Graber, Steffen Pepperl+Fuchs GmbH

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

... provides clock recovery, link management and PHY Control functions. (serial comma after "management" is missing)

SuggestedRemedy

... provides clock recovery, link management, and PHY Control functions.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.1.2.2** *P* **106** *L* **10** # i-74

Graber, Steffen Pepperl+Fuchs GmbH

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

... up to 1000 m in length. (avoid redundant wording)

SuggestedRemedy

... up to 1000 m.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **146** *SC* **146.1.2.3** *P* **106** *L* **26** # i-75

Graber, Steffen Pepperl+Fuchs GmbH

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

While the transmit function is in the LPI mode the PHY may disable data path ... (use comma after "mode")

SuggestedRemedy

While the transmit function is in the LPI mode, the PHY may disable data path ...

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.1.2.4** *P* **106** *L* **40** # i-339

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Definitions*

Since Clause 146 uses the term 'code-group' the definition for code-group found in IEEE Std 802.3-2018 subclause 1.4.198 needs to be updated to include Clause 146 10BASE-T1L.

SuggestedRemedy

Suggest that:
[1] 'For 10BASE-T1L, a set of three ternary symbols that, when representing data, conveys four bits, as defined in 146.3.' be added to IEEE Std 802.3-2018 subclause 1.4.198.
[2] The text '... Clause 36, Clause 40, and Clause 96.)' in IEEE Std 802.3-2018 subclause 1.4.198 be changed to read '... Clause 36, Clause 40, Clause 96 and Clause 146).'.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.1.2.4** *P* **106** *L* **43** # i-340

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Definitions*

Since Clause 146 uses the term 'ternary' the definition for ternary found in IEEE Std 802.3-2018 subclause 1.4.471 needs to be updated to include Clause 146 10BASE-T1L.

SuggestedRemedy

Suggest that the definition be updated to read 'In 10BASE-T1L, 100BASE-T4, and 100BASE-T1, a ternary data element. A ternary symbol can have one of three values: -1, 0, or +1. (See IEEE Std 802.3, Clause 23, Clause 96, and Clause 146).'.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.1.3.1** *P* **107** *L* **9** # i-76

Graber, Steffen Pepperl+Fuchs GmbH

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

If the logical expression associated with the IF evaluates TRUE all the actions listed between THEN and ELSE will be executed. (add comma after "TRUE")

SuggestedRemedy

If the logical expression associated with the IF evaluates TRUE, all the actions listed between THEN and ELSE will be executed. (please change this also on page 168, line 41 and page 214, line 22)

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.1.3.1** *P* **107** *L* **11** # i-77

Graber, Steffen Pepperl+Fuchs GmbH

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

If the logical expression associated with the IF evaluates FALSE the actions listed between ELSE and END will be executed. (add a comma after "FALSE")

SuggestedRemedy

If the logical expression associated with the IF evaluates FALSE, the actions listed between ELSE and END will be executed. (please change this also on page 168, line 43 and page 214, line 24)

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.2.5** *P* **110** *L* **52** # i-78

Graber, Steffen Pepperl+Fuchs GmbH

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

... defined in 146.3.3.2 to represent MII data, idle data or zero data. (serial comma after "idle data" is missing)

SuggestedRemedy

... defined in 146.3.3.2 to represent MII data, idle data, or zero data.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.2.10.3** *P* **113** *L* **37** # i-160

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

Comment Type **E** *Comment Status* **A** *PMA*

"The receiver may adjust the link training and clock recovery" "Link training" is defined as a mode of operation and mentioning it here does not make sense.

SuggestedRemedy

Change to "The receiver may adjust the clock recovery."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change
"The receiver may adjust the link training and clock recovery"
to "The receiver may adjust the clock recovery"

Cl **146** *SC* **146.3.3.1** *P* **117** *L* **18** # i-341

Law, David Hewlett Packard Enterprise

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

Suggest that 'In each symbol period, PCS Transmit generates a ...' should be changed to read 'In each symbol period, the PCS Transmit function generates a ...'.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.3** *P* **117** *L* **18** # i-342

Law, David Hewlett Packard Enterprise

Comment Type **TR** *Comment Status* **A** *State Diagram*

Is it correct that 'The PCS Transmit function shall conform to the PCS Transmit state diagram in Figure 146-5 ...' and that 'In each symbol period, PCS Transmit generates a symbol An provided to the PMA ...'? The PCS Transmit state diagram in Figure 146-5 changes state based on STD being true, with STD being an alias for symb_triplet_timer_done, and the output of the PCS Transmit state diagram is tx_symb_triplet which is defined in subclause 146.3.3.1.1 'Variables' as 'A triplet of ternary symbols generated by the PCS Transmit function after 4B3T encoding.'.

I think the problem is that there is another function within the PCS Transmit function that is missing from the PCS Transmit state diagram in Figure 146-5, the 'multiplexor' shown in Figure 146-6 'PCS transmit symbol generation'. This 'multiplexor' function operates at the symbol clock rate and serialises the tx_symb_triplet code-groups output by the PCS Transmit state diagram into individual symbols.

This may also explain when subclause 146.3.3.1.3 'Timers' defines the symb_timer that is not used in the PCS Transmit state diagram in Figure 146-5.

SuggestedRemedy

[1] Insert a new subclause 146.3.3.2 titled 'PCS Transmit multiplexor state diagram' that reads 'In each symbol period, the PCS Transmit multiplexor generates a ternary symbol that can take the values of {-1, 0, +1} and passes it to the PMA sublayer via the PMA_UNITDATA.request primitive. The nominal symbol clock frequency is specified in 146.5.4.5.'. Renumber the following subclauses as required.

[2] Add a new subclause 146.3.3.2.1 titled 'Variables' that reads:

pcs_reset
The pcs_reset parameter set by the PCS Reset function.
Values: TRUE or FALSE

tx_symb_vector
A ternary symbol generated through serialization of tx_symb_triplet. This symbol is conveyed to the PMA as the parameter of a PMA_UNITDATA.request(tx_symb_vector) service primitive.
Values: A ternary transmit symbol. The ternary symbols may take on one of the values {-1, 0, +1}.

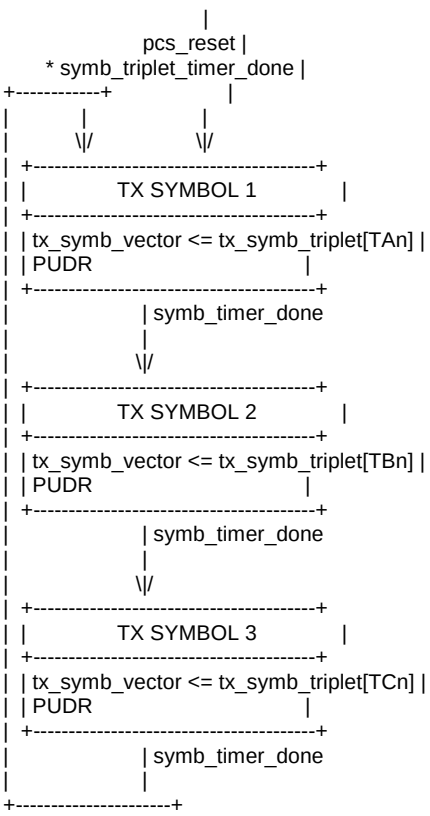
tx_symb_triplet{TAn, TBn, TCn)
A triplet of ternary symbols generated by the PCS Transmit state diagram. The element TAn is the first ternary symbol transmitted; TCn is the last ternary symbol transmitted.
Value: A triplet of ternary transmit symbols. Each of the ternary symbols may take on one of the values {-1, 0, +1}.

[4] Add a new subclause 146.3.3.2.2 titled 'Timers'. Move the symb_timer definition from subclause 146.3.3.1.3 Timers to this new subclause.

[5] Add a new subclause 146.3.3.2.4 'Abbreviations' that reads:

PUDR
Alias for PMA_UNITDATA.request(tx_symb_vector).

[6] Insert a new Figure 145-6 shown below (view using a non-proportional font such as courier), renumbering the following figures as required.



[7] Add text to subclause 146.3.3 'PCS Transmit' that reads 'The PCS Transmit function shall conform to the PCS Transmit state diagram in in Figure 146-5 and the PCS Transmit multiplexor state diagram in 146-6, and their associated state variables, functions, timers, and messages.'.

[8] Delete the first and second paragraphs of subclause 146.3.3.1 'PCS Transmit State Diagram' as these not functions of the PCS Transmit state diagram which is what this

subclause is describing, change the text '... the PCS Transmit function passes ...' in the current third paragraph to read '... the PCS Transmit state diagram passes ...'.

Response *Response Status* **W**

ACCEPT.

Cl **146** *SC* **146.3.3.1** *P* **117** *L* **20** # i-79

Graber, Steffen Pepperl+Fuchs GmbH

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

The integer, n, is a time index, ... (remove commas around "n")

SuggestedRemedy

The integer n is a time index, ...

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.3.1** *P* **117** *L* **20** # i-161

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

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

"The integer, n, is a time index" should have no commas

SuggestedRemedy

Change to "The integer n is a time index."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accomodated by comment i-79
Response to comment i-79 is:
ACCEPT.

Suggested remedy to comment i-179 is:
(Change to) "The integer n is a time index, ..."

Cl **146** *SC* **146.3.3.1** *P* **117** *L* **24** # i-343

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Editorial*

Subclause 1.4.463 'Start-of-Stream Delimiter (SSD)' reads 'Within IEEE 802.3, a pattern of defined codewords used to delineate the boundary of a data transmission sequence on the Physical Layer stream.'.
In addition the PCS Transmit state diagram in Figure 146-5 changes state based on STD being true, with STD being an alias for symb_triplet_timer_done, and the output of the PCS Transmit state diagram is tx_symb_triplet which is defined in subclause 146.3.3.1.1 'Variables' as 'A triplet of ternary symbols generated by the PCS Transmit function after 4B3T encoding.'.

There is a similar issue with ESD (see IEEE Std 802.3-2018 subclause 1.4.242).

SuggestedRemedy

Suggest that:

[1] The text '... passes an SSD of 12 consecutive symbols ... replaces the first 16 bits of the preamble.' be changed to read '... passes an SSD of a sequence of 4 code-groups ... replaces the first 2 bytes of the preamble.'.

[2] The text '... a special code ESD ... of 12 consecutive symbols is ...' be changed to read '... a special code ESD ... of 3 code-groups is ...'.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace, "... passes an SSD of 12 consecutive symbols ... replaces the first 16 bits of the preamble."

With, "... passes an SSD of a sequence of 4 code-groups ... replaces the first 2 bytes of the preamble.'"

Replace, "... a special code ESD ... of 12 consecutive symbols is …"

with, "... a special code ESD ... of 4 code-groups is …"

Cl **146** *SC* **146.3.3.1** *P* **117** *L* **31** # i-80

Graber, Steffen Pepperl+Fuchs GmbH

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

Therefore, this symbol triplet will be used for the COMMA symbols ... (avoid redundant wording)

SuggestedRemedy

This symbol tripled is used for the COMMA symbols ...

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace, "Therefore, this symbol triplet will be used"

with, "This symbol triplet is used"

Cl **146** *SC* **146.3.3.1** *P* **117** *L* **32** # i-344

Law, David Hewlett Packard Enterprise

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

Suggest that '... symbol triplet (0, 0, 0) ...' should read '... symbol triplet {0, 0, 0} ...'.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.3.1** *P* **117** *L* **33** # i-162

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

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

"Therefore, this symbol triplet will be used" is not standard language in the style manual

SuggestedRemedy

Change to "This symbol triplet is used"

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Accomodated by comment i-80.
The response to comment i-80 is:

Replace, "Therefore, this symbol triplet will be used"

with, "This symbol triplet is used"

Cl **146** *SC* **146.3.3.1.1** *P* **118** *L* **26** # i-81

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **T** *Comment Status* **A** *Editorial*

loc_lpi_req is defined in 146.3.3.1.1 and also in 146.4.4.1, while the definition is 146.4.4.1 is the more appropriate. Should be aligned.

SuggestedRemedy

Change the description for loc_lpi_req in Clause 146.3.3.1.1 to "See 146.4.4.1" or copy text for loc_lpi_req from 146.4.4.1 to 146.3.3.1.1

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Copy text for loc_lpi_req from 146.4.4.1 to 146.3.3.1.1

Cl **146** *SC* **146.3.3.1.1** *P* **118** *L* **34** # i-345

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Editorial*

Suggest that the transmit symbol order of tx_symb_triplet should be provided as part of the tx_symb_triplet variable definition.

SuggestedRemedy

[1] Change 'tx_symb_triplet' to read 'tx_symb_triplet(Tan, TBn, TCn)'.
[2] Add the text 'The element TAn is the first ternary symbol transmitted; TCn is the last ternary symbol transmitted.' to the variable description after the text '... 4B3T encoding.'.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.3.1.1** *P* **118** *L* **35** # i-346

Law, David Hewlett Packard Enterprise

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

It is not clear to me on reading the draft if 4B3T encoding is only when Sdn[3:0] is being encoded in to ternary triplet as defined in Table 146-1 '4B3T encoding' or if it includes all the encoding defined in Figure 146-5 'PCS transmit state diagram' which also include ternary triplets such as COMMA and ESD4.

If it is the former, only the encoding defined in Table 146-1, the text 'A triplet of ternary symbols generated by the PCS Transmit function after 4B3T encoding.' in the tx_symb_triplet variable definition will need to be updated as tx_symb_triplet is also assigned values such as COMMA (see SSD COMMA1 VECTOR state) and ESD4 (see ESD VECTOR state).

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change "'A triplet of ternary symbols generated by the PCS Transmit function after 4B3T encoding." in the tx_symb_triplet variable definition (146.3.3.1.1, P118 L35)" to
"A triplet of ternary symbols generated by the PCS Transmit function. These include 4B3T encoded data and assigned values (see 146.3.3.2.6)."

Cl **146** *SC* **146.3.3.1.1** *P* **118** *L* **36** # i-347

Law, David Hewlett Packard Enterprise

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

Suggest that '... generated by the PCS Transmit function after ...' should read '... generated by the PCS transmit state diagram after ...'.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.3.1.1** *P* **118** *L* **40** # i-82

Graber, Steffen Pepperl+Fuchs GmbH

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

After PCS Reset the initial value ... (use comma after "Reset")

SuggestedRemedy

After PCS Reset, the initial value ...

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.3.1.3** *P* **119** *L* **17** # i-348

Law, David Hewlett Packard Enterprise

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

In the 'Restart time' description for the symb_timer, suggest that the text '... expiration, timer restart resets the condition symb_timer_done.' be changed to read '... expiration; restarting the timer resets the condition symb_timer_done.'. Similarly, in the 'Restart time' description for the symb_triplet_timer, suggest that the text '... expiration, timer restart resets the condition symb_triplet_timer_done.' be changed to read '... expiration; restarting the timer resets the condition symb_triplet_timer_done.'.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.3.1.3** *P* **119** *L* **18** # i-349

Law, David Hewlett Packard Enterprise

Comment Type **TR** *Comment Status* **A** *PMA*

As illustrated in Figure 146-2 '10BASE-T1L PHY interfaces' and 146-3 'PCS reference diagram', and defined in IEEE Std 802.3-2018 subclause 22.2.2.1, TX_CLK is sourced from the PHY to the RS, not the other way round. Despite this, I was unable to find a specification of TX_CLK in Clause 146. Suggest that TX_CLK is generated by symb_triplet_timer and that symb_triplet_timer be generated from symb_timer.

SuggestedRemedy

[1] Change the description of the symb_timer to read 'A continuous free-running timer. PMA_UNITDATA.request messages are is issued by the PCS concurrently with symb_timer_done.'.

[2] Change the description of the symb_triplet_timer to read 'A continuous free-running timer that shall expire synchronously with every third expiration of symb_timer. TX_CLK (see 22.2.2.1) shall be generated from symb_triplet_timer with the rising edge of TX_TCLK generated synchronously with symb_triplet_timer_done.'.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
(commenter's proposed resolution + change to 146.4.5.4)
[1] Change the description of the symb_timer to read 'A continuous free-running timer. PMA_UNITDATA.request messages are issued by the PCS concurrently with symb_timer_done.'.

[2] Change the description of the symb_triplet_timer to read 'A continuous free-running timer that shall expire synchronously with every third expiration of symb_timer. TX_CLK (see 22.2.2.1) shall be generated from symb_triplet_timer with the rising edge of TX_CLK generated synchronously with symb_triplet_timer_done.'

[3] Change 146.4.5.4 (P139 L43) to add new first paragraph:
"The clock recovery provides a synchronous clock for sampling the signal on the pair. While it may not drive the MII directly, the Clock Recovery function is the underlying source of TX_CLK."

Cl **146** *SC* **146.3.3.1.5** *P* **119** *L* **43** # i-350

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *State Diagram*

The constants DISPRESET3 is defined in subclause 146.3.3.1.5, the PCS transmit state diagram constants, but is not used in the PCS transmit state diagram. In addition Table 146-2 defines multiple values for DISPRESET3 dependant on the current disparity.

SuggestedRemedy

Suggest that the definition of the constant DISPRESET3 is deleted.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.3.1.5** *P* **120** *L* **1** # i-83

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

The usage of the brackets in the conditional branches of Figure 146-5 is not consistent within the Figure itself and with other Clauses of 802.3cg.

SuggestedRemedy

Remove all "(" and ")" brackets within the conditional branches as they are not needed.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Order of precedence of operators is not defined in IEEE Std 802.3, so brackets are used when there are multiple operations (see clause 145 IEEE Std 802.3bt-2019 which needed to define these).
Brackets provide clarity to the reader when evaluating combined actions.

Review of other diagrams in clause 146 suggests the following change needed:
P120 L10 (Figure 146-5) change left-hand exit from SEND IDLE to "STD * (!tx_enable_mii)
"
P128 L1 (Figure 146-8) change entry condition to WAIT_SCRAMBLER to add parens around the compound term of the "or":
"pcs_reset +
((!receiving) *
[(loc_rcvr_status = NOT_OK) +
(link_status = FAIL) +
(rcv_jab_detected)])"

P130 L21 (Figure 146-10) change left-hand exit condition of RECEIVE state to add parens around !receiving:
"(!receiving) +
(link_status = FAIL)"

Editor to review other added clauses for consistency and revise accordingly to add brackets/parens where needed.

Cl **146** *SC* **146.3.3.1.5** *P* **120** *L* **7** # i-351

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *State Diagram*

In some cases, the result of a function is assigned to a variable, for example, the action in the ESD DISPRESET VECTOR state is tx_symb_triplet <= DISPRES(tx_disparity), yet in other cases, there is no assignment, for example, the action in the SEND IDLE state is ENCODE(Sdn[3:0], tx_disparity).

Suggest that there should be a consistent assignment of the result of a function to a variable within actions in state diagrams. Based on this:

[1] Change 'ENCODE(Sdn[3:0], tx_disparity)' to read 'tx_symb_triplet <= ENCODE(Sdn[3:0], tx_disparity)' in the SEND IDLE and TRANSMIT DATA in Figure 146-5 'PCS transmit state diagram'.

[2] Change 'DECODE (Rxn-5, rx_disparity)' to read 'RXD[3:0] <= DECODE (Rxn-5, rx_disparity)' in the DATA, FOURTH SSD, CHECK ESD COMMA2, CHECK ESD DISPRESET3, ESD, BAD ESD2, BAD ESD3, RX ERROR, CHECK ESD ESD4 and the BAD END states in Figure 146-8 'PCS receive state diagram (part a)' and Figure 146-9 'PCS receive state diagram (part b)'.

SuggestedRemedy

Suggest that there should be a consistent assignment of the result of a function to a variable within actions in state diagrams. Based on this:

[1] Change 'ENCODE(Sdn[3:0], tx_disparity)' to read 'tx_symb_triplet <= ENCODE(Sdn[3:0], tx_disparity)' in the SEND IDLE and TRANSMIT DATA in Figure 146-5 'PCS transmit state diagram'.

[2] Change 'DECODE (Rxn-5, rx_disparity)' to read 'RXD[3:0] <= DECODE (Rxn-5, rx_disparity)' in the DATA, FOURTH SSD, CHECK ESD COMMA2, CHECK ESD DISPRESET3, ESD, BAD ESD2, BAD ESD3, RX ERROR, CHECK ESD ESD4 and the BAD END states in Figure 146-8 'PCS receive state diagram (part a)' and Figure 146-9 'PCS receive state diagram (part b)'.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[1] Change 'ENCODE(Sdn[3:0], tx_disparity)' to read '{ tx_symbol_triplet, tx_disparity } <= ENCODE(Sdn[3:0], tx_disparity)' in the SEND IDLE and TRANSMIT DATA in Figure 146-5 'PCS transmit state diagram'.

[2] Change 'DECODE (Rxn-5, rx_disparity)' to read '{ RXD[3:0], rx_disparity } <= DECODE (Rxn-4, rx_disparity)' in the DATA, FOURTH SSD, CHECK ESD COMMA2, CHECK ESD DISPRESET3, ESD, BAD ESD2, BAD ESD3, RX ERROR, CHECK ESD ESD4 and the BAD END states in Figure 146-8 'PCS receive state diagram (part a)' and Figure 146-9 'PCS receive state diagram (part b)'.

(Note - this resolution includes the change in indices made by comment i-318)

Cl **146** *SC* **146.3.3.1.5** *P* **120** *L* **8** # i-352

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *State Diagram*

The variable 'error' used in Figure 146-5 'PCS transmit state diagram' is not defined in subclause 146.3.3.1.1 'Variables'.

SuggestedRemedy

Add the following new variable to subclause 146.3.3.1.1 'Variables'.

error
PCS local variable that records if an errored transmission has occurs during data transmission.
Values: TRUE or FALSE

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Add the following new variable to subclause 146.3.3.1.1 'Variables'.

error
PCS local variable that records if an errored transmission has occured during data transmission.
Values: TRUE or FALSE

Cl **146** *SC* **146.3.3.2** *P* **121** *L* **4** # i-353

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Editorial*

The terms 'ternary triplet' with 20 instances, 'symbol triplet' with 11 instances 'code-group' with 10 instances and 'symbol group' with 3 instances seem to be used interchangeably throughout Clause 146 to mean a group of three ternary symbols

SuggestedRemedy

Suggest that one of these three terms is used through the Clause, and since code-group is the term defined in IEEE Std 802.3-2018 this would seem to be the prime candidate.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Replace instances of 'ternary triplet', 'symbol triplet' (including usage as tx_symbol_triplet) and 'symbol group' in clause 146 with 'code-group'.

Editorial license to implement this change after all other changes are implemented to align the full revised text as appropriate.

Cl **146** *SC* **146.3.3.2.1** *P* **121** *L* **27** # i-354

Law, David Hewlett Packard Enterprise

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

Subclause 146.3.3.2.1 'Side-stream scrambler polynomial', subclause 146.3.3.2.2 'Generation of Syn[3:0]' in combination of subclause 146.3.3.2.3 'Generation of scrambled bits Sdn[3:0]' define the requirements in respect to the generation of Sdn[3:0] which is input to the ENCODE() function in the SEND IDLE and TRANSMIT DATA states of Figure 146-5 'PCS transmit state diagram'.

Subclause 146.3.3.2.4 'Generation of ternary triplet in mode SEND_N and SEND_I', subclause 146.3.3.2.5 'Generation of ternary triplet in mode SEND_Z' and subclause 146.3.3.2.6 'Generation of symbol sequence' then describes the encoding that is actually performed by Figure 146-5 'PCS transmit state diagram'. Since subclause 146.1.3 'Conventions in this clause' states that ' Should there be a discrepancy between a state diagram and descriptive text, the state diagram prevails.' the state diagram requirements override the subclause 146.3.3.2.4 shall statements.

SuggestedRemedy

[1] Change the block '4B3T ENCODER' in Figure 146-6 'PCS transmit symbol generation' to read 'PCS transmit state diagram'.
[2] Add TX_CLK as an input to the 'PCS transmit state diagram' block as this is used as the tx_symb_triplet clock.
[3] Insert a new subclause 146.3.3.3 titled 'Generation of scrambled bits Sdn[3:0]' that reads 'The scrambled bits Sdn[3:0] used by the ENCODE function defined in 146.3.3.1.2 are generated as follows.
[4] Renumber subclause 146.3.3.2.1 to 146.3.3.3.1, subclause 146.3.3.2.2 to 146.3.3.3.2 and subclause 146.3.3.2.3 to 146.3.3.3.3.
[5] Insert a new subclause 146.3.3.4 titled 'Generation of ternary triplet' that reads 'The PCS transmit state diagram generates ternary triplets as follows.
[6] Renumber subclause 146.3.3.2.4 to 146.3.3.4.1, subclause 146.3.3.2.5 to 146.3.3.4.2 and subclause 146.3.3.2.6 to 146.3.3.4.
[7] Reword subclause 146.3.3.4.1, 146.3.3.4.2 and 146.3.3.4 to be descriptive rather than normative.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
[1] Change the block '4B3T ENCODER' in Figure 146-6 'PCS transmit symbol generation' to read 'PCS transmit state diagram'.
[2] Add TX_CLK as an input to the 'PCS transmit state diagram' block as this is used as the tx_symb_triplet clock.
[3] Insert a new subclause 146.3.3.3 titled 'Generation of scrambled bits Sdn[3:0]' that reads 'The scrambled bits Sdn[3:0] used by the ENCODE function defined in 146.3.3.1.2 are generated as follows.
[4] Renumber subclause 146.3.3.2.1 to 146.3.3.3.1, subclause 146.3.3.2.2 to 146.3.3.3.2 and subclause 146.3.3.2.3 to 146.3.3.3.3.
[5] Insert a new subclause 146.3.3.4 titled 'Generation of ternary triplet' that reads 'The PCS transmit state diagram generates ternary triplets as follows.
[6] Renumber subclause 146.3.3.2.4 to 146.3.3.4.1, subclause 146.3.3.2.5 to 146.3.3.4.2 and subclause 146.3.3.2.6 to 146.3.3.4.
[7] Reword subclause 146.3.3.4.1, 146.3.3.4.2 and 146.3.3.4 to be descriptive rather than normative, to clarify that the state diagram governs the behavior.

(Note - resolution of other comments may substitute "code-group" for "ternary triplet" here).

Cl **146** *SC* **146.3.3.2.1** *P* **121** *L* **30** # i-355

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Definitions*

Subclause 1.4.319 of IEEE Std 802.3-2018 reads 'master Physical Layer (PHY): Within IEEE 802.3, in a 100BASE-T2 or 1000BASE-T link containing a pair of PHYs, the PHY that uses an external clock for generating its clock signals to determine the timing of transmitter and receiver operations. It also uses the master transmit scrambler generator polynomial for side-stream scrambling. Master and slave PHY status is determined during the Auto-Negotiation process that takes place prior to establishing the transmission link. See also: slave Physical Layer (PHY).'.

This definition needs to be updated to add 10BASE-T1L, as well as several other PHYs that use master-slave timing, and to align to 10BASE-T1 and other PHYs that permit master-slave selection through management, hardware or Auto-Negotiation.

SuggestedRemedy

Suggest that the following changes be added to subclause 1.4 of IEEE P802.3cg:

[1] In subclause 1.4.319 of IEEE Std 802.3-2018, the text 'Within IEEE 802.3, in a 100BASE-T2 or 1000BASE-T link containing ...' be changed to read 'Within IEEE 802.3, in a 100BASE-T2, 1000BASE-T, 10GBASE-T, 25GBASE-T, 40GBASE-T, 10BASE-T1L, 100BASE-T1 or 1000BASE-T1 link containing ...'.

[2] In subclause 1.4.319 of IEEE Std 802.3-2018, the text 'Master and slave PHY status is determined during the Auto-Negotiation process that takes place prior to establishing the transmission link.' be changed to read 'Master and slave PHY status is determined during the Auto-Negotiation process that takes place prior to establishing the transmission link, or in the case of a PHY where Auto-Negotiation is optional and not used, Master and slave PHY status is determined by management or hardware configuration.'.

[3] In subclause 1.4.456 of IEEE Std 802.3-2108, the text 'Within IEEE 802.3, in a 100BASE-T2 or 1000BASE-T link containing ...' be changed to read 'Within IEEE 802.3, in a 100BASE-T2, 1000BASE-T, 10GBASE-T, 25GBASE-T, 40GBASE-T, 10BASE-T1L, 100BASE-T1 or 1000BASE-T1 link containing ...'.

[4] In subclause 1.4.456 of IEEE Std 802.3-2108, the text 'Master and slave PHY status is determined during the Auto-Negotiation process that takes place prior to establishing the transmission link.' be changed to read 'Master and slave PHY status is determined during the Auto-Negotiation process that takes place prior to establishing the transmission link, or in the case of a PHY where Auto-Negotiation is optional and not used, Master and slave PHY status is determined by management or hardware configuration.'.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

[1] In subclause 1.4.319 of IEEE Std 802.3-2018, the text 'Within IEEE 802.3, in a 100BASE-T2 or 1000BASE-T link containing ...' be changed to read 'Within IEEE 802.3, in a 100BASE-T2, 1000BASE-T, 10BASE-T1L, 100BASE-T1, 1000BASE-T1, or any MultiGBASE-T link containing ...'.

[2] In subclause 1.4.319 of IEEE Std 802.3-2018, the text 'Master and slave PHY status is determined during the Auto-Negotiation process that takes place prior to establishing the transmission link.' be changed to read 'Master and slave PHY status is determined during the Auto-Negotiation process that takes place prior to establishing the transmission link, or in the case of a PHY where Auto-Negotiation is optional and not used, Master and slave PHY status is determined by management or hardware configuration.'.

[3] In subclause 1.4.456 of IEEE Std 802.3-2018, the text 'Within IEEE 802.3, in a 100BASE-T2 or 1000BASE-T link containing ...' be changed to read 'Within IEEE 802.3, in a 100BASE-T2, 1000BASE-T, 10BASE-T1L, 100BASE-T1, 1000BASE-T1, or any MultiGBASE-T link containing ...'.

[4] In subclause 1.4.456 of IEEE Std 802.3-2018, the text 'Master and slave PHY status is determined during the Auto-Negotiation process that takes place prior to establishing the transmission link.' be changed to read 'Master and slave PHY status is determined during the Auto-Negotiation process that takes place prior to establishing the transmission link, or in the case of a PHY where Auto-Negotiation is optional and not used, Master and slave PHY status is determined by management or hardware configuration.'.

Cl **146** *SC* **146.3.3.2.1** *P* **121** *L* **30** # i-84

Graber, Steffen Pepperl+Fuchs GmbH

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

For the master PHY PCS Transmit shall employ ... (use comma after "PHY")

SuggestedRemedy

For the master PHY, PCS Transmit shall employ ...

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.3.2.1** *P* **121** *L* **33** # i-85

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **R** *Editorial*

The two polynomials are defined as gm(x) and gs(x) with small characters for "s" and "m". This is different to the naming in 146.3.4.3. The naming should be unified.

SuggestedRemedy

Change to gM(x) and gS(x) with M and S in subscript.

Response *Response Status* **C**

REJECT.
The polynomials in 146.3.4.3 are different, there is no need to unify.

Cl **146** *SC* **146.3.3.2.1** *P* **121** *L* **35** # i-86

Graber, Steffen Pepperl+Fuchs GmbH

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

For the slave PHY PCS Transmit shall employ ... (use comma after "PHY")

SuggestedRemedy

For the slave PHY, PCS Transmit shall employ ...

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.3.2.6** *P* **123** *L* **8** # i-356

Law, David Hewlett Packard Enterprise

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

IEEE Std 802.3 subclause 1.4.471 'ternary symbol' states that 'A ternary symbol can have one of three values: -1, 0, or +1.' and in most cases, the IEEE P802.3cg follows this in relation to 10BASE-T1L code-groups which is a set of three ternary symbols. There are a few instances where just '-' is used instead of -1, and '+' or '1' is used to represent '+1'. As an example, Table 146-1 uses '-' and '+', yet Table 146-2 immediately below uses '-1' and '+1'.

SuggestedRemedy

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accomodated by comment i-360.
Response to comment i-360 is:
PROPOSED ACCEPT IN PRINCIPLE.
add footnote to Table 146-1 that '-' is an abbreviation for the ternary symbol value '-1' and that '+' is an abbreviation for the ternary symbol value '+1', and (2) on page 11, line 7, change '{-1, 0, 1}' to read '{-1, 0, +1}'.

Cl **146** *SC* **146.3.3.2.4** *P* **123** *L* **35** # i-357

Law, David Hewlett Packard Enterprise

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

Suggest that '... symbol triplet (0, 0, 0) ...' should read '... symbol triplet {0, 0, 0} ...'.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.3.2.5** *P* **123** *L* **45** # i-358

Law, David Hewlett Packard Enterprise

Comment Type **TR** *Comment Status* **A** *State Diagram*

There seems to be a disconnect between Figure 146-5 'PCS transmit state diagram' which outputs tx_symb_triplet, Figure 146-6 'PCS transmit symbol generation' that outputs tx_symb_triplet from a '4B3T ENCODER', and the text in subclause 146.3.3.2.5. While Figure 146-6 shows tx_mode as an input to the 4B3T ENCODER that produces tx_symb_triplet, and subclause 146.3.3.2.5 says that 'The ternary triplet (TAn, TBn, TCn) shall be a zero vector (0, 0, 0) when tx_mode = SEND_Z.' the states diagrams in 146-4 and 146-5 would seem to produce a different result.

If tx_mode = SEND_Z the Figure 146-4 'PCS data transmission enabling state diagram' will be in the 'DISABLE DATA TRANSMISSION' state, setting both tx_enable_mii and tx_error_mii to FALSE. In turn, if tx_enable_mii = FALSE the Figure 146-5 'PCS transmit state diagram' will, if necessary return to and, remain in the 'SEND IDLE' state. This will result in tx_symb_triplet being set to the result of ENCODE(Sdn[3:0], tx_disparity) and not (0, 0, 0) as required by subclause 146.3.3.2.5.

This appears to be a discrepancy between the state diagram and text requirements in respect to tx_symb_triplet, and since subclause 146.1.3 'Conventions in this clause' states that 'Should there be a discrepancy between a state diagram and descriptive text, the state diagram prevails.' tx_symb_triplet has to be set to ENCODE(Sdn[3:0], tx_disparity) and not (0, 0, 0). I don't believe that this is intended.

SuggestedRemedy

[1] Add the following definition to subclause 146.3.3.1.5 'Constants':

ZERO
A vector of three zero symbols sent when tx_mode = SEND_Z as specified in subclause 146.3.3.2.5.

[2] Replace the action ENCODE(Sdn[3:0], tx_disparity) in the SEND IDLE state of Figure 146-5 'PCS transmit state diagram' with:

```
IF(tx_mode = SEND_Z) THEN
  tx_symb_triplet <= ZERO
  tx_disparity <= 2
ELSE
  ENCODE(Sdn[3:0], tx_disparity)
END
```

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.3.2.6** *P* **123** *L* **51** # i-359

Law, David — Hewlett Packard Enterprise

Comment Type **TR** *Comment Status* **A** *EZ*

Subclause 146.3.3.2.6 'Generation of symbol sequence' states that 'A ternary triplet (TAn, TBn, TCn) shall be sent in the following order: TAn, TBn, TCn, TAn+1, TBn+1, TCn+1 ...'. The following Tables, 146-1 to 146-3, then define the various ternary triplet code-groups. Of these three tables only one, Table 146-3, defines which symbols are TAn, TBn, TCn.

SuggestedRemedy

To ensure the unambiguous definition of the transmission order, define which symbols are TAn, TBn, TCn in Table 146-1 and 146-2.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Add a note under Table 146-1:
"NOTE - The Ternary Triplet is (TAn, TBn, TCn)."

Add "(TAn, TBn, TCn)" under "Disparity = 1", "Disparity = 2", "Disparity = 3", and "Disparity = 4"

Cl **146** *SC* **146.3.3.2.6** *P* **124** *L* **8** # i-360

Law, David — Hewlett Packard Enterprise

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

IEEE Std 802.3 subclause 1.4.471 'ternary symbol' states that 'A ternary symbol can have one of three values: -1, 0, or +1.' and in most cases the IEEE P802.3cg follows this in relation to 10BASE-T1L code-groups which is a set of three ternary symbols. There are a few instances where just '-' is used instead of -1, and '+' or '1' is used to represent '+1'. As an example, Table 146-1 uses '-' and '+', yet Table 146-2 immediately below uses '-1' and '+1'.

SuggestedRemedy

Suggest that: (1) in Table 146-1 that all instances of '-' are replaced with '-1', and all instances of '+' are replaced with '+1'. Alternatively add footnote that '-' is an abbreviation for the ternary symbol value '-1' and that '+' is an abbreviation for the ternary symbol value '+1', and (2) on page 11, line 7, change '{-1, 0, 1}' to read '{-1, 0, +1}'.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
add footnote to Table 146-1 that '-' is an abbreviation for the ternary symbol value '-1' and that '+' is an abbreviation for the ternary symbol value '+1', and (2) on page 11, line 7, change '{-1, 0, 1}' to read '{-1, 0, +1}'.

Cl **146** *SC* **146.3.3.2** *P* **124** *L* **43** # i-284

McCarthy, Mick — Analog Devices Inc.

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

The delimiters SSD4 and ESD4/ESD_ERR4, as defined in Table 146-3, are always the same. If a PHY is transmitting a stream of packets of constant length and with a fixed interpacket gap, there will therefore be a non-zero value in the auto-correlation sequence of the transmitted signal. This will produce a harmonic in the transmit power spectrum. This could be avoided by randomizing the sign of the delimiters.

SuggestedRemedy

Add scheme to randomize the sign of the delimiters.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the following changes to implement the delimiter randomization:

For all of the following changes the time index n or n-1 need to be in subscript. Provide editorial license to format the needed changes according to IEEE 802.3 style.

P118, L29: Add new variable Syn[4:0] just before Sdn[3:0] as follows:

Syn[4:0]
The Syn[4:0] bits from the scrambler as defined in 146.3.3.2.2.

P119, L9: Change DISPRES function definition:

The function DISPRES returns one of the eight possible DISPRESET3 triple ternary symbols (see Table 146–2), depending on the values of Syn[4] and tx_disparity:

tx_symb_triplet = tableDISPRESET3(Syn[4], tx_disparity) (with DISPRESET3 in subscript)

P119, L14: Add new functions:

RND_SSD4
The function RND_SSD4 takes Syn-1[4] as its argument and returns the corresponding tx_symb_triplet as well as the updated tx_disparity.

(tx_symb_triplet , tx_disparity) = RND_SSD4(Syn-1[4])

The returned tx_symb_triplet corresponds to one of the two possible SSD4 triple ternary symbols (see Table 146–3), depending on the value of Syn-1[4]:

tx_symb_triplet = tableSSD4(Syn-1[4]) (with SSD4 in subscript)

The returned tx_disparity also depends on the value of Syn-1[4] as follows:

tx_disparity = 2 if Syn-1[4] = 0

= 3 else

RND_ESD4
The function RND_ESD4 takes Syn-1[4] as its argument and returns the corresponding tx_symb_triplet as well as the updated tx_disparity.

(tx_symb_triplet , tx_disparity) = RND_ESD4(Syn-1[4])

The returned tx_symb_triplet corresponds to one of the two possible ESD4 triple ternary symbols (see Table 146–3), depending on the value of Syn-1[4]:

tx_symb_triplet = tableESD4(Syn-1[4]) (with ESD4 in subscript)

The returned tx_disparity also depends on the value of Syn-1[4] as follows:

tx_disparity = 2 if Syn-1[4] = 0
= 3 else

RND_ESD_ERR4
The function RND_ESD_ERR4 takes Syn-1[4] as its argument and returns the corresponding tx_symb_triplet as well as the updated tx_disparity.

(tx_symb_triplet , tx_disparity) = RND_ESD_ERR4(Syn-1[4])

The returned tx_symb_triplet corresponds to one of the two possible ESD_ERR4 triple ternary symbols (see Table 146–3), depending on the value of Syn-1[4]:

tx_symb_triplet = tableESD_ERR4(Syn-1[4]) (with ESD_ERR4 in subscript)

The returned tx_disparity also depends on the value of Syn-1[4] as follows:

tx_disparity = 2 if Syn-1[4] = 0
= 3 else

P119, L47: Remove definition for constants SSD4, ESD4, ESD_ERR4, as they are replaced by the RND_SSD4, RND_ESD4 and RND_ESD_ERR4 functions.

P120, L1: Figure 146-5 PCS transmit state diagram

Change all three occurrances of tx_symb_triplet <= DISPRES(tx_disparity) to tx_symb_triplet <= DISPRES(Syn[4], tx_disparity)

In state SSD VECTOR replace tx_disparity <= 2, tx_symb_triplet <= SSD4 by {tx_symb_triplet, tx_disparity} <= RND_SSD4(Syn-1[4]).
In state ESD VECTOR replace tx_disparity <= 2, tx_symb_triplet <= ESD4 by {tx_symb_triplet, tx_disparity} <= RND_ESD4(Syn-1[4]).
In state ERR VECTOR replace tx_disparity <= 2, tx_symb_triplet <= ESD_ERR4 by {tx_symb_triplet, tx_disparity} <= RND_ESD_ERR4(Syn-1[4]).

P122, L22: Replace the text in 146.3.3.2.2 by the following text:

PCS Transmit encoding rules are based on the generation, at time n, of the five bits Syn[4:0]. The four bits Syn[3:0] are used for de-correlating the MII data word TXD<3:0> during data transmission and for generating the idle symbols. The bit Syn[4] is used to randomize the frame delimiters. These five bits are generated as described below, using the auxiliary generating polynomial, g(x) defined in Equation (146–3):

g(x) = x3 ^ x8 (146–3)

The five bits Syn[4:0] shall be generated using the bit Scrn[0] and g(x) as in the following equations:

Syn[0] = Scrn[0]
Syn[1] = g(Scrn[0]) = Scrn[3] ^ Scrn[8]
Syn[2] = g2(Scrn[0]) = Scrn[6] ^ Scrn[16]
Syn[3] = g3(Scrn[0]) = Scrn[9] ^ Scrn[14] ^ Scrn[19] ^ Scrn[24]
Syn[4] = g4(Scrn[0]) = Scrn[12] ^ Scrn[32]

By construction, the five bits Syn[4:0] are derived from elements of the same maximum-length shift register sequence of length 2^33–1 as Scrn[0], but shifted in time by varying delays. The associated delays are all large and different so that there is no apparent correlation among the bits.

P123, L27: Replace the text of the third and fourth paragraph of 146.3.3.2.4 by the following text:

The DISPRESET3 triplet, together with the following fourth symbol group, shall be used to bring back the running disparity to a defined value of either 2 or 3, depending on the value of the bit Syn[4] from the scrambler. The coding shown in Table 146-2 shall be used for the DISPRESET3 symbol triplet.

The fourth symbol group (SSD4/ESD4/ESD_ERR4) shall be encoded as shown in Table 146–3.

P124, L35: Replace Table 146-2 with the following table:

DISPRESET3	Disparity = 1	Disparity = 2	Disparity = 3	Disparity = 4
Syn[4] = 0	(-1, 0, 1)	(-1, 0, 0)	(-1, 0, -1)	(-1, -1, -1)
Syn[4] = 1	(1, 1, 1)	(1, 0, 1)	(1, 0, 0)	(1, 0, -1)

P124, L54: Replace Table 146-3 with the following table:

	Delimiter	(TAn,TBn,TCn)
	SSD4	(1, 1, -1)

```
! Syn-1[4] = 0 ! ESD4      ! (1, -1, 1)    !
!             ! ESD_ERR4  ! (-1, 1, 1)    !
!-------------!-----------!---------------!
!             ! SSD4      ! (-1, -1, 1)   !
! Syn-1[4] = 1 ! ESD4      ! (-1, 1, -1)   !
!             ! ESD_ERR4  ! (1, -1, -1)   !
!-------------!-----------!---------------!
```

P126, L52: Modify the definition of valid_dispreset function in the following way:

valid_dispreset
Determines if the rx_symb_triplet is one of the DISPRESET3 triplets as specified in 146.3.3.2.4. It returns a Boolean value indicating whether or not one of the eight possible DISPRESET3 triplets has been received.

P127, L3: Add the following new functions:

valid_ssd4
Determines if the rx_symb_triplet is one of the SSD4 triplets as specified in 146.3.3.2.4. It returns a Boolean value indicating whether or not one of the two possible SSD4 triplets has been received.

valid_esd4
Determines if the rx_symb_triplet is one of the ESD4 triplets as specified in 146.3.3.2.4. It returns a Boolean value indicating whether or not one of the two possible ESD4 triplets has been received.

valid_esd_err4
Determines if the rx_symb_triplet is one of the ESD_ERR4 triplets as specified in 146.3.3.2.4. It returns a Boolean value indicating whether or not one of the two possible ESD_ERR4 triplets has been received.

P127, L21: Add the following new function:

RESET_DISP
This function takes as its argument the value of Rxn, corresponding to a valid SSD4 triplet, and returns the updated rx_disparity as follows:

rx_disparity = 2 if Rxn = (1, 1, -1)
= 3 else

P127, L31: Add a new Clause 146.3.4.1.4 Constants

Under this new Clause add:

COMMA
A vector of three ternary symbols in the first or second code-group of any delimiter as specified in 146.3.3.2.4.

P128, L1: Apply the following changes to Figure 146-8 PCS receive state diagram (part a)

P128, L32: Replace (!valid_dispreset) by (!valid_dispreset(Rxn))
P128, L32: Replace (valid_dispreset) by valid_dispreset(Rxn)
P128, L27: Replace rx_disparity <= 2 by rx_disparity <= RESET_DISP(Rxn-4) (see comment i-318 changing index n-5 to index n-4)
P128, L38: Replace (Rxn = SSD4) by valid_ssd4(Rxn)
P128, L39: Replace (Rxn != SSD4) by (!valid_ssd4(Rxn))
P128, L46: Replace DECODE(Rxn–5, rx_disparity) by {RXD[3:0], rx_disparity} = DECODE(Rxn-4, rx_disparity) (see comment i-318 changing index n-5 to index n-4)

P129, L1: Apply the following changes to Figure 146-9 PCS receive state diagram (part b)

In Figure 146-9 replace all occurrances of DECODE(Rxn–5, rx_disparity) by {RXD[3:0], rx_disparity} = DECODE(Rxn-4, rx_disparity) (see comment i-318 changing index n-5 to index n-4)

P129, L23: Replace (valid_dispreset) by valid_dispreset(Rxn)
P129, L23: Replace (!valid_dispreset) by (!valid_dispreset(Rxn))
P129, L33: Replace (Rxn != ESD4) by (!valid_esd4(Rxn))
P129, L34: Replace (Rxn != ESD_ERR4) by (!valid_esd_err4(Rxn))
P129, L35: Replace (Rxn = ESD4) by valid_esd4(Rxn)
P129, L42: Replace (Rxn = ESD_ERR4) by valid_esd_err4(Rxn)

Cl **146** *SC* **146.3.4.1.1** *P* **126** *L* **23** # i-87

Graber, Steffen Pepperl+Fuchs GmbH

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

After PCS Reset the initial value ... (use comma after "Reset")

SuggestedRemedy

After PCS Reset, the initial value ...

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.4.1.1** *P* **126** *L* **32** # i-361

Law, David Hewlett Packard Enterprise

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

The values for the variable disparity_error are not defined.

SuggestedRemedy

Suggest that 'Values: TRUE or FALSE' be added to the variable disparity_error definition.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.4.1.1** *P* **126** *L* **32** # i-88

Graber, Steffen Pepperl+Fuchs GmbH

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

The values for disparity_error are missing.

SuggestedRemedy

Add a new line with: Values: TRUE or FALSE

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.4.1.2** *P* **126** *L* **40** # i-362

Law, David Hewlett Packard Enterprise

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

The values for the function valid_idle are not defined.

SuggestedRemedy

Suggest that 'Values: TRUE or FALSE' be added to the valid_idle function.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.4.1.2** *P* **126** *L* **41** # i-89

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

This function checks whether or not the decoded data bits ... (redundant wording)

SuggestedRemedy

This function checks if the decoded data bits ...

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Delete "or not" on page 146 line 42
Insert new line after end of sentence:
Values: TRUE or FALSE

Cl **146** *SC* **146.3.4.1.2** *P* **127** *L* **1** # i-90

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

It returns a Boolean value indicating whether or not one of the four ... (redundant wording)

SuggestedRemedy

It returns a Boolean value indicating if one of the four ...

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Delete "or not" on page 147 line 1
Insert new line after end of sentence:
Values: TRUE or FALSE

Cl **146** *SC* **146.3.4.1.2** *P* **127** *L* **16** # i-91

Graber, Steffen Pepperl+Fuchs GmbH

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

For function CHECK_DISP it is not clear, which table to use for the 4B3T encoding.

SuggestedRemedy

Add a sentence at the end of the paragraph: The encoding rules for the 4B3T encoding are stated in Table 146-1.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.4.1.2** *P* **127** *L* **20** # i-92

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **T** *Comment Status* **A** *Editorial*

disparity_error is meant as function result, but it may be misinterpreted as the variable disparity error, defined in 146.3.4.1.1.

SuggestedRemedy

Change the text for CHECK_DISP to: The CHECK_DISP function checks, if the currently received triple ternary symbol is allowed for the current rx_disparity, and returns a TRUE or FALSE according to the relation:
RXn != table4B3T(inverse_table4B3T(Rxn), rx_disparity)

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.4.1.3** *P* **127** *L* **25** # i-93

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **T** *Comment Status* **A** *State Diagram*

Period and behavior for timer RSTCD are not defined the timer behind RSTCD is not defined.

SuggestedRemedy

Define a new timer:
rcv_symb_triplet_timer - The rcv_symb_triplet_timer shall be generated synchronously with the PCS receive clock RX_CLK.

Continuous timer: The condition rcv_symb_triplet_timer_done becomes true upon timer expiration.

Restart time: Immediately after expiration, timer restart resets the condition rcv_symb_triplet_timer_done.

Duration: Three symbol times (see 146.5.4.5)

Modify existing text for RSTCD as: Abbreviation for Receive Symbol Triplet Conversion Done, which is equivalent to the timer condition rcv_symb_triplet_timer_done.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Define a new timer:
rcv_symb_triplet_timer
The rcv_symb_triplet_timer is a continuous free-running timer that shall expire with three times the period of the receive symbol clock synchronously to PMA_UNITDATA.indication. RX_CLK (see 22.2.2.1) shall be generated from rcv_symb_triplet_timer with the falling edge of RX_CLK generated synchronously with rcv_symb_triplet_timer_done. During initial link training, the phase of the rcv_symb_triplet_timer is aligned to the receive symbol clock as described in 146.3.4.2.

Continuous timer: The condition rcv_symb_triplet_timer_done becomes true upon timer expiration.

Restart time: Immediately after expiration.

Duration: Three symbol times (see 146.5.4.5)

Modify existing text for RSTCD as: Abbreviation for Receive Symbol Triplet Conversion Done, which is equivalent to the timer condition rcv_symb_triplet_timer_done.

Cl **146** *SC* **146.3.4.1.3** *P* **127** *L* **25** # i-163

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

Comment Type **T** *Comment Status* **A** *State Diagram*

The definition of RSTCD is unclear. From the phrase "Receive Symbol Tripled Conversion Done". This appears to be a symbol timer for triplets of received symbols, similar to symb_triplet_timer in 146.3.3.1.3. The text only says it is synchronized with the PCS receive clock. Also, this timer is not explicitly started anywhere.

SuggestedRemedy

Change RSTCD to Received_symbol_triplet_conversion_timer. Insert after sentence ending "RX_CLK." (new line, after line 25) "Continuous timer: The condition Received_symbol_triplet_conversion_timer_done (RSTCD) becomes true upon timer expiration.
Restart time: Immediately after expiration, timer restart resets the condition Received_symbol_triplet_conversion_timer_done (RSTCD).
Duration: Three symbol times (see 146.5.4.5)" Also, add new subclause 146.3.4.1.4 Abbreviations, with text: "RSTCD Received_symbol_conversion_timer_done."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accomodated by comment i-93, response to comment i-93 is:
ACCEPT IN PRINCIPLE.
Define a new timer:
rcv_symb_triplet_timer
The rcv_symb_triplet_timer is a continuous free-running timer that shall expire with three times the period of the receive symbol clock synchronously to PMA_UNITDATA.indication. RX_CLK (see 22.2.2.1) shall be generated from rcv_symb_triplet_timer with the falling edge of RX_CLK generated synchronously with rcv_symb_triplet_timer_done. During initial link training, the phase of the rcv_symb_triplet_timer is aligned to the receive symbol clock as described in 146.3.4.2.

Continuous timer: The condition rcv_symb_triplet_timer_done becomes true upon timer expiration.

Restart time: Immediately after expiration.

Duration: Three symbol times (see 146.5.4.5)

Modify existing text for RSTCD as: Abbreviation for Receive Symbol Triplet Conversion Done, which is equivalent to the timer condition rcv_symb_triplet_timer_done.

Cl **146** *SC* **146.3.4.1.3** *P* **128** *L* **1** # i-94

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

The usage of the brackets in the conditional branches of Figure 146-8 is not consistent within the Figure itself and with other Clauses of 802.3cg.

SuggestedRemedy

Remove all "(" and ")" brackets within the conditional branches as they are not needed. Convert the remaining "[" and "]" brackets to "(" and ")" brackets afterwards.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accomodated by comment i-83.
Response to Comment i-83 is:
Order of precedence of operators is not defined in IEEE Std 802.3, so brackets are used when there are multiple operations (see clause 145 IEEE Std 802.3bt-2019 which needed to define these).
Brackets provide clarity to the reader when evaluating combined actions.

Review of other diagrams in clause 146 suggests the following change needed:
P120 L10 (Figure 146-5) change left-hand exit from SEND IDLE to "STD * (!tx_enable_mii) "
P128 L1 (Figure 146-8) change entry condition to WAIT_SCRAMBLER to add parens around the compound term of the "or":
"pcs_reset +
((!receiving) *
[(loc_rcvr_status = NOT_OK) +
(link_status = FAIL) +
(rcv_jab_detected)])"

P130 L21 (Figure 146-10) change left-hand exit condition of RECEIVE state to add parens around !receiving:
"(!receiving) +
(link_status = FAIL)"

Editor to review other added clauses for consistency and revise accordingly to add brackets/parens where needed.

Cl **146** *SC* **146.3.4.1.3** *P* **128** *L* **4** # i-164

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

Comment Type **T** *Comment Status* **A** *Editorial*

Figure 146-8 has two open ended branches with conditions including rcv_jab_detected, but this variable is not defined, and appears like it should be rcv_overrun_detected.

SuggestedRemedy

Change rcv_jab_detected to rcv_overrun_detected in Figure 146-8 (2 instances, lines 4 & 5)

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.4.1.3** *P* **128** *L* **4** # i-363

Law, David Hewlett Packard Enterprise

Comment Type **TR** *Comment Status* **A** *Editorial*

The variable 'rcv_jab_detected' used in the open arrow entry to the WAIT SCRAMBLER and LINK FAILED states in Figure 146-8 'PCS receive state diagram (part a)' is not defined in subclause 146.3.4.1.1 'Variables'. On review of the draft, while I can find information about the transmit jabber, it is not clear to me where rcv_jab_detected woudlbe sourced from, or when it would be asserted.

SuggestedRemedy

Add a definition for the rcv_jab_detected variable to subclause 146.3.4.1.1 'Variables', or remove rcv_jab_detected from the open arrow entry to the WAIT SCRAMBLER and LINK FAILED states.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.
Accomodated by comment i-164.
Response to comment i-164 is:
ACCEPT.

Suggested remedy to comment i-164 is:
Change rcv_jab_detected to rcv_overrun_detected in Figure 146-8 (2 instances, lines 4 & 5)

Cl **146** *SC* **146.3.4.1.3** *P* **128** *L* **5** # i-364

Law, David Hewlett Packard Enterprise

Comment Type **ER** *Comment Status* **A** *Editorial*

Subclause 146.1.3.1 'State diagram notation' states that 'The conventions of 21.5 are adopted with the extension that some states in the state diagrams use an IF-THEN-ELSE-END construct to condition which actions are taken within the state.'. Table 21-1 'State diagram operators' in IEEE Std 802.3-2018 subclause 21.5.4 'Operators' lists the characters '( )' as 'Indicates precedence'. Based on this the use of '[ ]' in state diagram transitions should be replaced with '( )'.

SuggestedRemedy

Replace the three instances of '[ ]' used to indicate precedence in Figure 146-8 state diagram transitions with '( )'.

Response *Response Status* **W**

ACCEPT.

Cl **146** *SC* **146.3.4.1.3** *P* **128** *L* **5** # i-95

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **T** *Comment Status* **A** *Editorial*

The two initial conditions for the state diagram contain the old variable name "rcv_jab_detected". The new variable name is "rcv_overrun_detected".

SuggestedRemedy

Change the two occurrances of "rcv_jab_detected" in state diagram Figure 146-8 to "rcv_overrun_detected".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accomodated by comment i-164.
Response to comment i-164 is:
ACCEPT.

Suggested remedy to comment i-164 is:
Change rcv_jab_detected to rcv_overrun_detected in Figure 146-8 (2 instances, lines 4 & 5)

Cl **146** *SC* **146.3.4.1.3** *P* **128** *L* **9** # i-96

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **T** *Comment Status* **A** *State Diagram*

Variable rx_lpi_active is not initialized within WAIT SCRAMBLER state of the PCS receive state diagram. This variable is provided to the PHY Control state machine and also to the PMA receive block. While for the PHY Control state machine, the minwait_timer prevents misinterpreting this variable, not having this variable initialized may have, depending on the implementation, side effects in the PMA receive block, as this block accidently may assume, that the PHY is currently in LOW POWER IDLE state and handle the signal receiving accordingly (e.g. setting the receiver accidently into low power state).

SuggestedRemedy

Add "rx_lpi_active <= FALSE" at the end of the execution block of state WAIT SCRAMBLER.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.4.1.3** *P* **128** *L* **25** # i-97

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

The arcs from the exit conditions of states IDLE, CHECK SSD COMMA2, CHECK SSD DISPRESET3 and CHECK SSD SSD4 are fed to a common arc entering BAD DELIMITER state. According to the style guidelines separate arcs need to be used.

SuggestedRemedy

Draw separate arcs between states IDLE and BAD DELIMITER, CHECK SSD COMMA2 and BAD DELIMITER, CHECK SSD DISPRESET3 and BAD DELIMITER, and CHECK SSD SSD4 and BAD DELIMITER.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.4.1.3** *P* **128** *L* **25** # i-365

Law, David Hewlett Packard Enterprise

Comment Type **ER** *Comment Status* **A** *Editorial*

Subclause 146.1.3.1 'State diagram notation' states that 'The conventions of 21.5 are adopted with the extension that some states in the state diagrams use an IF-THEN-ELSE-END construct to condition which actions are taken within the state.'. Table 21-1 'State diagram operators' in IEEE Std 802.3-2018 subclause 21.5.4 'Operators' lists the 'Not Equal To' character <http://unicode.org/cldr/utility/character.jsp?a=2260> as 'Not equals'. I assume this is what is meant by the use '!=' in Figure 146-8, based on this the use of '!=! in state diagram transitions should be replaced with the 'Not Equal To' character.

SuggestedRemedy

Replace the eight instances of '!=' used in Figure 146-8 state diagram transitions with the 'Not Equal To' character <http://unicode.org/cldr/utility/character.jsp?a=2260>.

Response *Response Status* **W**

ACCEPT.

Cl **146** *SC* **146.3.4.1.3** *P* **128** *L* **41** # i-98

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **T** *Comment Status* **A** *State Diagram*

Within the PCS receive state diagram the BAD DELIMITER state is called by a wrong SSD and also by a wrong ESD. Within BAD DELIMITER state a false carrier indication is sent over the MII. According to other Clauses within 802.3 a false carrier indication is only sent over the MII, if a wrong SSD, but not if a wrong ESD is detected.

SuggestedRemedy

Rename the BAD DELIMITER state to BAD SSD. Remove the "B" input arc from BAD SSD state. Add a new state BAD ESD right from the BAD SSD state and add the "B" input arc to this new BAD ESD state. Connect the output of the BAD ESD state to the IDLE state with branch condition "check_idle". Content of the BAD ESD state is: "RX_ER <= TRUE, RX_DV <= FALSE, RXD[3:0] <= 0000, receiving <= TRUE"

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.4.1.3** *P* **128** *L* **45** # i-318

Beruto, Piergiorgio Canova Tech S.r.l.

Comment Type **T** *Comment Status* **A** *State Diagram*

tag [INDEX]
The function CHECK_DISP(RXn-5, rx_disparity) should be checking RXn-4, not RXn-5.
If it checks RXn-5, it is checking the value of RXn in the SSD state, which, according to the entry arc is SSD4.
The same offset error occurs multiple times also in the DECODE function.

SuggestedRemedy

In Figure 146-8, in all states, replace all occurrences of "RXn-5" to "RXn-4".
In Figure 146-9, in all states, replace all occurrences of "RXn-5" to "RXn-4".

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.4.1.3** *P* **129** *L* **1** # i-99

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

The usage of the brackets in the conditional branches of Figure 146-9 is not consistent with other Clauses of 802.3cg.

SuggestedRemedy

Remove all "(" and ")" brackets within the conditional branches as they are not needed.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accommodated by comment i-83.
Response to Comment i-83 is:
Order of precedence of operators is not defined in IEEE Std 802.3, so brackets are used when there are multiple operations (see clause 145 IEEE Std 802.3bt-2019 which needed to define these).
Brackets provide clarity to the reader when evaluating combined actions.

Review of other diagrams in clause 146 suggests the following change needed:
P120 L10 (Figure 146-5) change left-hand exit from SEND IDLE to "STD * (!tx_enable_mii)
"
P128 L1 (Figure 146-8) change entry condition to WAIT_SCRAMBLER to add parens around the compound term of the "or":
"pcs_reset +
((!receiving) *
[(loc_rcvr_status = NOT_OK) +
(link_status = FAIL) +
(rcv_jab_detected)])"

P130 L21 (Figure 146-10) change left-hand exit condition of RECEIVE state to add parens around !receiving:
"(!receiving) +
(link_status = FAIL)"

Editor to review other added clauses for consistency and revise accordingly to add brackets/parens where needed.

Cl **146** *SC* **146.3.4.1.3** *P* **130** *L* **1** # i-100

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

The usage of the brackets in the conditional branches of Figure 146-10 is not consistent within the Figure itself and with other Clauses of 802.3cg.

SuggestedRemedy

Remove all "(" and ")" brackets within the conditional branches as they are not needed.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accommodated by comment i-83.
Response to Comment i-83 is:
Order of precedence of operators is not defined in IEEE Std 802.3, so brackets are used when there are multiple operations (see clause 145 IEEE Std 802.3bt-2019 which needed to define these).
Brackets provide clarity to the reader when evaluating combined actions.

Review of other diagrams in clause 146 suggests the following change needed:
P120 L10 (Figure 146-5) change left-hand exit from SEND IDLE to "STD * (!tx_enable_mii)
"
P128 L1 (Figure 146-8) change entry condition to WAIT_SCRAMBLER to add parens around the compound term of the "or":
"pcs_reset +
((!receiving) *
[(loc_rcvr_status = NOT_OK) +
(link_status = FAIL) +
(rcv_jab_detected)])"

P130 L21 (Figure 146-10) change left-hand exit condition of RECEIVE state to add parens around !receiving:
"(!receiving) +
(link_status = FAIL)"

Editor to review other added clauses for consistency and revise accordingly to add brackets/parens where needed.

Cl **146** *SC* **146.3.4.2** *P* **130** *L* **34** # i-366

Law, David Hewlett Packard Enterprise

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

Suggest that '... (the triplet (0, 0, 0) ...' should read '... (the triplet {0, 0, 0} ...'.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Editors to search for code groups and ensure that they are denoted within curly braces (i.e., "{ }") instead of parenthesis (i.e., "( )")

Cl **146** *SC* **146.3.4.2** *P* **130** *L* **35** # i-178

Hoglund, David Johnson Controls Inc

Comment Type **E** *Comment Status* **A** *Editorial*

The commas are of unequal strength in the note "(the triplet (0, 0, 0) will never occur, if this triplet is being received, then the symbol synchronization in the de-interleaving block needs to be adjusted)". Changing the first comma may help.

SuggestedRemedy

Change "(the triplet (0, 0, 0) will never occur, if this triplet is being received, then the symbol synchronization in the de-interleaving block needs to be adjusted)" to "(the triplet (0, 0, 0) will never occur: if this triplet is being received, then the symbol synchronization in the de-interleaving block needs to be adjusted)".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change "(the triplet (0, 0, 0) will never occur, if this triplet is being received, then the symbol synchronization in the de-interleaving block needs to be adjusted)"

to (note deleted parenthesis)

"The code-group {0, 0, 0} should never occur. The symbol synchronization in the de-interleaving block needs to be adjusted if the code-group {0, 0, 0} is being received."

Cl **146** *SC* **146.3.4.3** *P* **131** *L* **3** # i-28

O Cuanachain, Oisin

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

The current wording here implies that the descrambling occurs before the decoding. This directly contradicts the definition of the DECODE function in Clause 146.3.4.1.2 where obviously the decoding occurs first followed by the descrambling.

SuggestedRemedy

Replace the existing text 'The PHY shall descramble the data stream and return the proper sequence of code-groups to the decoding
process for generation of RXD<3:0> to the MII.' with 'The PHY decodes the code-groups and returns the proper bit stream to the descrambling process for generation of RXD<3:0> to the MII'

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.5** *P* **131** *L* **38** # i-101

Graber, Steffen Pepperl+Fuchs GmbH

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

encompass (needs to be singular)

SuggestedRemedy

encompasses

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.4.3** *P* **133** *L* **35** # i-102

Graber, Steffen Pepperl+Fuchs GmbH

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

..., it is highly recommended that PMA Receive include the functions of ... (needs to be singular)

SuggestedRemedy

..., it is highly recommended that PMA Receive includes the functions of ...

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.4.3** *P* **133** *L* **35** # i-409

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *PMA*

"The sequence of symbols assigned to tx_symb_vector is needed to perform echo cancellation." is not sufficient. It should also include reference to the MASTER and SLAVE PMA clock recovery function.

SuggestedRemedy

Change the text to read
"In addition to the PMA Clock Recovery function (see 146.4.6), the sequence of symbols assigned to tx_symb_vector is needed to perform echo cancellation."

Response *Response Status* **W**

REJECT.
The CRG disagrees with the commenter.
The commenter asks for a tutorial and the standard is not a tutorial - no change required.

The only information which is inherently needed is the transmitted symbol stream. The echo can be removed an any implementation-dependent manner. The standard is not intended to be a tutorial on signal processing or constrain possible solutions. For example, a receiver could estimate the timing separately from the data, or cancel in the continuous time domain, neither of which requires the clock.

Cl **146** *SC* **146.4.4** *P* **134** *L* **25** # i-103

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **R** *Editorial*

The first paragraph of Clause 146.4.4 seems to be redundant to 146.6.2 (and in part also 146.6.3).

SuggestedRemedy

Remove first paragraph of Clause 146.4.4. Likely also the second paragraph of Clause 146.6.2 can be removed as it seems to be redundant to the information in 146.6.3.

Response *Response Status* **C**

REJECT.
The same information (that there is both a forced mode for configuration and Auto-negotiation) is used in multiple sections because it is relevant to different contexts. In 146.4.4 it is relevant to the description of how the PHY control state diagram functions. 146.6.2 and 146.6.3 describe how master-slave configuration actually operates, and how that interacts with management registers.

Cl **146** *SC* **146.4.4** *P* **134** *L* **25** # i-165

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

Comment Type **T** *Comment Status* **A** *State Diagram*

The term "FORCE mode" is not defined anywhere in this clause, nor in the base standard. The setting of MASTER and SLAVE roles is not a mode, it is a function. In clause 96 there is a similar specification in 96.4.4, and the text there can be re-used. Note that this information is repeated in 146.6.2 and in 146.6.3 so it may not be necessary here at all.

SuggestedRemedy

Replace the first paragraph of 146.4.4 with the following (taken from 96.4.4) "If the Auto-Negotiation process (Clause 98) is not implemented or not enabled, PMA_CONFIG MASTER-SLAVE configuration is predetermined to be MASTER or SLAVE via management control during initialization or via default hardware setup."

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.3.2.1** *P* **135** *L* **22** # i-155

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

Comment Type **E** *Comment Status* **A** *Editorial*

rem_rcvr_status is defined as OK or NOT_OK where the primitive is defined 146.2.7.1 and in the state diagram (Figures 146-14 and 146-15). Here it is defined as TRUE or FALSE.

SuggestedRemedy

Change TRUE to OK and change FALSE to NOT_OK

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.4.4.2** *P* **136** *L* **13** # i-430

Zimmerman, George

Comment Type **T** *Comment Status* **A** *Late*

The description of the mintraining timer is (editorially) confusing and lacks important information for interoperability. It needs to reflect the relationship between this timer and the stability of the slave clock during training.

SuggestedRemedy

Change: "A timer used to limit the minimum time a slave PHY stays in training mode before going to SILENT state in case a loss of clock lock is detected. The timer shall expire 100 ms after being started." to "A timer to define the minimum time a slave PHY stays in training mode before going to SILENT state when the slave loses clock lock. The slave clock may be unstable during this period. The timer shall expire 100 ms after being started."

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.4.4.2** *P* **136** *L* **14** # i-104

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **T** *Comment Status* **A** *State Diagram*

The timer shall expire 100 ms after being started. (it has been missed to transfer the tolerance of the timer of +/- 1 ms from the original presentation to the draft).

SuggestedRemedy

The timer shall expire 100 ms +/- 1 ms after being started.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add "+/- 1 ms" to the text describing the duration of the mintraining timer at P136 L14.

Cl **146** *SC* **146.4.4.2** *P* **136** *L* **17** # i-105

Graber, Steffen Pepperl+Fuchs GmbH

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

Modify the LPI timers for 10BASE-T1L to support a wider range of implementations and better synchronization by using precise timers, synchronous with the symbol transmit rate.

SuggestedRemedy

Change the expiration times in the following way: lpi_sleep_timer (line 20): "The timer shall expire 250 us (625 triple ternary symbols) after being started.", lpi_quiet_timer (line 23): "The timer shall expire 6000 us (15 000 triple ternary symbols) after being started.", lpi_refresh_timer (line 27): "The timer shall expire 250 us (625 triple ternary symbols) after being started.", lpi_wake_timer (line 30): "The timer shall expire 250 us (625 triple ternary symbols) after being started."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the expiration times in the following way: lpi_sleep_timer (line 20): "The timer shall expire 250 us after being started.", lpi_quiet_timer (line 23): "The timer shall expire 6000 us after being started.", lpi_refresh_timer (line 27): "The timer shall expire 250 us after being started.", lpi_wake_timer (line 30): "The timer shall expire 250 us after being started."

Cl **146** *SC* **146.4.4** *P* **137** *L* **1** # i-285

McCarthy, Mick Analog Devices Inc.

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

10BASE-T1L LPI signalling is driven primarily by MII data traffic.
No attempt has been made to introduce a scheme that synchronizes LPI quiet/refresh cycling between MASTER and SLAVE PHYs.
There is little predictability to LPI quiet/refresh cycling because of this, making implementation more complex.

SuggestedRemedy

Add LPI quiet/refresh cycling, synchronized using loc_lpi_req signalling during link startup.
A PHY implementation could use this scheme to know when link partner will be sending an LPI refresh state.
See attached document.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Implement the following changes to implement the changes in http://www.ieee802.org/3/cg/public/May2019/mccarthy_3cg_02b_0519.pdf, with editorial license to align with the presentation if necessary.

P106, L23:
Replace “the PHY asserts the loc_lpi_req signal”
With “the PHY asserts the loc_lpi signal”

P106, L26:
Replace “While the transmit function is in the LPI mode the PHY may disable data path and control logic to save additional power. Periodically, the transmit function of the local PHY transmits refresh frames that may be used by the link partner to update adaptive filters and timing circuits. The refresh cycle continues until the PCS function detects a condition that is not Assert Low Power Idle on the MII.”
With “While the transmit function is in the LPI mode, the PHY may cease transmission to save power and the link partner may disable receiver functions to save additional power. Periodically, the transmit function of the local PHY enters a refresh mode during which idle transmission resumes, and this may be used by the link partner to update adaptive filters and timing recovery circuits. Alternation between LPI quiet and refresh transmit modes proceeds according to a synchronized process between the PHYs, independent of data traffic patterns at the MII. The quiet-refresh cycling continues until the PCS function detects a condition that is not Assert Low Power Idle on the MII.”

P106, L31:
Replace “IDLE symbol stream with loc_lpi_req de-asserted”
With “IDLE symbol stream with loc_lpi de-asserted”

P118, L26:
Replace “loc_lpi_req
The loc_lpi_req is set TRUE, if low power idle mode is requested.
Values: TRUE or FALSE.”

With “loc_lpi
The variable loc_lpi is set by the PHY Control function in the PMA to indicate that it has entered low power idle mode.
Values:TRUE or FALSE”

P121, L16, Figure 146-6
Replace “loc_lpi_req”
With “loc_lpi”

P123, L12
Replace “loc_lpi_req”
With “loc_lpi”

P126, L47
Replace “rem_lpi_req
The rem_lpi_req function provides reliable detection of the received loc_lpi_req information from the remote PHY within the IDLE data stream.
Values: TRUE or FALSE”
With “rem_lpi
The rem_lpi function provides reliable detection of the received loc_lpi indication from the remote PHY within the IDLE data stream.
Values:TRUE or FALSE”

P128, L19, Figure 146-8
Replace “rem_lpi_req”
With “rem_lpi”

P128, L30, Figure 146-8
Replace “!rem_lpi_req”
With “!rem_lpi”

P132, Figure 146-11
Replace current Figure 146-11 – PMA functional block diagram with that from Slide 13 of http://www.ieee802.org/3/cg/public/May2019/mccarthy_3cg_02b_0519.pdf

P134, L34
Delete: “PHY Control shall comply with the state diagram shown in Figure 146–14 and Figure 146–15.”

P134, L42
Insert: “To maximize power savings, maintain link integrity, and ensure interoperability, EEE-capable PHYs shall synchronize refresh intervals during the low power idle (LPI) mode.
LPI synchronization is established by the PHY Control function, towards the end of link startup, using a handshake scheme initiated by the MASTER. This scheme initiates LPI quiet-refresh cycling at the same time as a transition from TRUE to FALSE of the loc_lpi variable. As loc_lpi is conveyed to the link partner PHY, the time of the start of LPI quiet-refresh cycling is also conveyed. LPI quiet-refresh cycling is defined in 146.4.7.
Thereafter, the LPI quiet-refresh cycling runs freely, with a cycle of fixed period, and, because the SLAVE maintains timing lock with the MASTER, the timing relationship between the quiet-refresh cycling in both PHYs remains fixed.
PHY Control shall comply with the state diagram shown in Figure 146–14, Figure 146-15 and Figure 146–16. Figure 146-14 describes link startup sequencing. Figure 146-15 describes LPI synchronization sequencing (only required to support EEE capability). Figure 146-16 describes entry and exit to LPI mode (also only required to support EEE capability).”

P135, L5
Replace “loc_lpi_req:
The variable loc_lpi_req is set TRUE if low power idle mode is requested by the PMA PHY control function.
Values: TRUE or FALSE”
With “loc_lpi
The variable loc_lpi is set by the PHY Control function to indicate that it has entered low power idle mode.
Values:TRUE or FALSE
loc_lpi_timer_sync_en
The variable loc_lpi_timer_sync_en is set by the PHY Control function to enable low power idle quiet-refresh cycling.
Values:TRUE: LPI quiet-refresh cycling is enabled.
FALSE: LPI quiet-refresh cycling is disabled.”

P136, L17
Replace “lpi_sleep_timer
A timer used to determine how long the SLEEP signal (IDLE symbols with loc_lpi_req set) is being sent, before the transmitter of the local PHY goes to sleep. The timer shall expire 205 □s ± 5 □s after being started.”
With “lpi_sleep_timer
A timer used to determine the duration of the SEND SLEEP state, where transmission comprises IDLE symbols with loc_lpi set. The timer shall expire 20 µs (150 TX_TCLK periods) after being started.”

P136, L22
Delete “lpi_quiet_timer
A timer used to determine how long the transmitter of the local PHY stays in QUIET mode, before a REFRESH is performed. The timer shall expire 6150 □s ± 150 □s after being started.
lpi_refresh_timer
A timer used to determine how long the REFRESH signal is being sent to the remote PHY. The timer shall expire 205 □s ± 5 □s after being started.”

P137, Figure 146-14
Replace current Figure 146-14 – PHY Control state diagram (part a) with that shown on Slide 4 of http://www.ieee802.org/3/cg/public/May2019/mccarthy_3cg_02b_0519.pdf

P138, Figure 146-15
Replace current Figure 146-15 – PHY Control state diagram (part b) with that shown on Slide 5 of http://www.ieee802.org/3/cg/public/May2019/mccarthy_3cg_02b_0519.pdf
Note to editor: as this relates to EEE capability, the dashed box is required.

P138, L40:
Insert new figure 146-16 with appropriate title: “Figure 146-16 – PHY Control state diagram (part c)” and note regarding EEE capability “Note – Transitions inside dashed boxes are only required for the EEE capability”, with associated dashed box from right hand side of Slide 9 of http://www.ieee802.org/3/cg/public/May2019/mccarthy_3cg_02b_0519.pdf
P139, L3
Replace “state diagram of Figure 146–16, shall”
With “state diagram of Figure 146–17, shall”

P139, L40
Renumber Figure 146-16 to 146-17.

P139, L47
Insert new clause 146.4.7 as follows:
146.4.7 LPI quiet-refresh cycling
LPI quiet-refresh cycling is initiated on direction from the PHY Control function using the LPI synchronization mechanism.
Once initiated, LPI quiet-refresh cycling runs freely for the lifetime of the link.
The SLAVE PHY is required to implement an initial offset delay, to ensure that refresh intervals of MASTER and SLAVE are not coincident.
The quiet-refresh cycle timing is defined in terms of transmit symbol periods (TX_TCLK periods). As the SLAVE must maintain timing lock with the MASTER, the timing relationship between the LPI quiet-refresh cycling of the two PHYs must remain fixed for the lifetime of the link.
LPI quiet-refresh cycling shall comply with the state diagram of Figure 146-18.
146.4.7.1 Variables
loc_lpi_timer_sync_en
The variable loc_lpi_timer_sync_en is set by the PHY Control function to enable low power idle quiet-refresh cycling.
Values:TRUE: LPI quiet-refresh cycling is enabled.
FALSE: LPI quiet-refresh cycling is disabled.
loc_lpi_state
The variable loc_lpi_state sets the quiet/refresh state when the PHY is in low power idle mode.
Values:IDLE: LPI quiet-refresh cycling is not enabled.
REFRESH: The PHY is in the low power idle refresh phase.
QUIET: The PHY is in the low power idle quiet phase.

146.4.7.2 Timers
lpi_init_timer
A timer used to set the duration of the LPI TIMER INIT state, which is intended to introduce a fixed offset between LPI refresh phases of the MASTER and SLAVE PHYs.
If config = MASTER, this timer shall expire after 0 TX_TCLK periods.
If config = SLAVE, this timer shall expire after 22500 TX_TCLK periods (nominally 3000 µs).
lpi_refresh_timer
A timer used to set the duration of the LPI refresh phase.
This timer shall expire after 1875 TX_TCLK periods (nominally 250 µs).
lpi_quiet_timer
A timer used to set the duration of the LPI quiet phase.
This timer shall expire after 45000 TX_TCLK periods (nominally 6000 µs).
146.4.7.2 State diagram
[EDITOR NOTE: DIAGRAM is from Slide 7 of http://www.ieee802.org/3/cg/public/May2019/mccarthy_3cg_02b_0519.pdf]
Figure 146-18 – LPI quiet-refresh cycling state diagram

Cl **146** *SC* **146.4.4.3** *P* **137** *L* **1** # i-106

Graber, Steffen PepperI+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

The usage of the brackets in the conditional branches of Figure 146-14 is not consistent within the Figure itself and with other Clauses of 802.3cg

SuggestedRemedy

Remove all "(" and ")" brackets within the conditional branches as they are not needed.
Convert the remaining "[" and "]" brackets to "(" and ")" brackets afterwards, if there is only one level of brackets; keep the "[" and "]" on the outer brackets, if there are encapsulated brackets.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE. Accommodated by comment i-83.
Response to Comment i-83 is:
Order of precedence of operators is not defined in IEEE Std 802.3, so brackets are used when there are multiple operations (see clause 145 IEEE Std 802.3bt-2019 which needed to define these).
Brackets provide clarity to the reader when evaluating combined actions.

Review of other diagrams in clause 146 suggests the following change needed:
P120 L10 (Figure 146-5) change left-hand exit from SEND IDLE to "STD * (!tx_enable_mii) "
P128 L1 (Figure 146-8) change entry condition to WAIT_SCRAMBLER to add parens around the compound term of the "or":
"pcs_reset +
((!receiving) *
[(loc_rcvr_status = NOT_OK) +
(link_status = FAIL) +
(rcv_jab_detected)])"

P130 L21 (Figure 146-10) change left-hand exit condition of RECEIVE state to add parens around !receiving:
"(!receiving) +
(link_status = FAIL)"

Editor to review other added clauses for consistency and revise accordingly to add brackets/parens where needed.

Cl **146** *SC* **146.4.4.3** *P* **137** *L* **3** # i-176

Lewis, Jon Dell EMC

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

Arrows and Lines in Figure 146-14 (part a and b) are not connsistent.

SuggestedRemedy

Change the figure to align the thickness of the lines and the size of the arrows.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.4.4.2** *P* **137** *L* **17** # i-107

Graber, Steffen Pepperl+Fuchs GmbH

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

Initializing of variable "loc_lpi_req" in TRAINING state is missing. This is necessary because loc_lpi_req is used in the PCS scrambler definition, which can change the SEND_I encoding used in SEND IDLE, thus this variable needs to be initialized before starting to transmit idle data.

SuggestedRemedy

Add "loc_lpi_req <= FALSE" to TRAINING state.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add "loc_lpi <= FALSE" to TRAINING state.

Cl **146** *SC* **146.4.4.2** *P* **137** *L* **19** # i-108

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

According to the style guide the arcs from state exit conditions need to go directly to the destination state and should not be connected to another arc.

SuggestedRemedy

Connect the exit condition "silent_timer_done" of state SILENT directly to the input side of state SLAVE SILENT and not to the line of the exit condition of state SEND IDLE.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.4.4.3** *P* **138** *L* **1** # i-109

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

The usage of the brackets in the conditional branches of Figure 146-15 is not consistent with other Clauses of 802.3cg.

SuggestedRemedy

Remove all "(" and ")" brackets within the conditional branches as they are not needed.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accommodated by comment i-83.
Response to Comment i-83 is:
Order of precedence of operators is not defined in IEEE Std 802.3, so brackets are used when there are multiple operations (see clause 145 IEEE Std 802.3bt-2019 which needed to define these).
Brackets provide clarity to the reader when evaluating combined actions.

Review of other diagrams in clause 146 suggests the following change needed:
P120 L10 (Figure 146-5) change left-hand exit from SEND IDLE to "STD * (!tx_enable_mii)
"
P128 L1 (Figure 146-8) change entry condition to WAIT_SCRAMBLER to add parens around the compound term of the "or":
"pcs_reset +
((!receiving) *
[(loc_rcvr_status = NOT_OK) +
(link_status = FAIL) +
(rcv_jab_detected)])"

P130 L21 (Figure 146-10) change left-hand exit condition of RECEIVE state to add parens around !receiving:
"(!receiving) +
(link_status = FAIL)"

Editor to review other added clauses for consistency and revise accordingly to add brackets/parens where needed.

Cl **146** *SC* **146.4.5.2** *P* **139** *L* **21** # i-110

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

The usage of the brackets in the conditional branches of Figure 146-16 is not consistent within the Figure itself and with other Clauses of 802.3cg.

SuggestedRemedy

Remove all "(" and ")" brackets within the conditional branches as they are not needed.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE. Accommodated by comment i-83.
Response to Comment i-83 is:
Order of precedence of operators is not defined in IEEE Std 802.3, so brackets are used when there are multiple operations (see clause 145 IEEE Std 802.3bt-2019 which needed to define these).
Brackets provide clarity to the reader when evaluating combined actions.

Review of other diagrams in clause 146 suggests the following change needed:
P120 L10 (Figure 146-5) change left-hand exit from SEND IDLE to "STD * (!tx_enable_mii)
"
P128 L1 (Figure 146-8) change entry condition to WAIT_SCRAMBLER to add parens around the compound term of the "or":
"pcs_reset +
((!receiving) *
[(loc_rcvr_status = NOT_OK) +
(link_status = FAIL) +
(rcv_jab_detected)])"

P130 L21 (Figure 146-10) change left-hand exit condition of RECEIVE state to add parens around !receiving:
"(!receiving) +
(link_status = FAIL)"

Editor to review other added clauses for consistency and revise accordingly to add brackets/parens where needed.

Cl **146** *SC* **146.5.3** *P* **141** *L* **25** # i-179

Hoglund, David Johnson Controls Inc

Comment Type **E** *Comment Status* **A** *Editorial*

Suggest stronger punctuation such as a semicolon for clarity.

SuggestedRemedy

Change "For a MASTER PHY this is the output of the (divided) clock oscillator, for the SLAVE PHY this is the recovered clock." to "For a MASTER PHY this is the output of the (divided) clock oscillator; for the SLAVE PHY this is the recovered clock."

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.5.4.1** *P* **141** *L* **49** # i-166

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

Comment Type **E** *Comment Status* **A** *AutoNeg*

The information about existence of two transmitter output voltage modes and the rules for selection between them using auto-negotiation appears here for the first time. This information is somewhat out of
place in the transmitter electircal specification subclause. Note that the resolution rules are repeated in 146.6.4, but that subclause is about the management interface and should not discuss AN at all. The appropriate place for AN rules is in clause 98 where similar rules for master/slave configuration are described.

SuggestedRemedy

Add text about the two voltage modes in 146.1.2 where similar features like MASTER/SLAVE modes and AN are described, as a new 4th paragraph (P104 L43, after the paragraph on PAM3 mapping) "The 10BASE-T1L PHY may optionally support an increased transmit and receive capability, supporting 2.4 Vpp. See 146.5.4.1. Insert new subclause 98B.3.1 10BASE-T1L-specific bit assignments with text: "Configuration for 10BASE-T1L specific bits A23, A24, and A25 are specified in 146.6. Move the management interface information (2nd para (not note) of 146.5.4.1, P142 L4-7) to 146.6.4 (P146 L15) as a new first paragraph.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add text about the two voltage modes in 146.1.2 where similar features like MASTER/SLAVE modes and AN are described, as a new 4th paragraph (P104 L43, after the paragraph on PAM3 mapping) "The 10BASE-T1L PHY may optionally support an increased transmit and receive capability, supporting 2.4 Vpp differential. See 146.5.4.1.

Insert new subclause 98B.3.1 10BASE-T1L-specific bit assignments with text: "Configuration for 10BASE-T1L specific bits A23, A24, and A25 are specified in 146.6."

Move the management interface information (2nd para (not note) of 146.5.4.1, P142 L4-7) to 146.6.4 (P146 L15) as a new first paragraph.

Cl **146** *SC* **146.5.5.1** *P* **144** *L* **15** # i-167

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

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

The BER is not purely an electrical specification. Bits are only available after PCS processing and any required performance can only be achieved after training is complete. There is no way to verify this requirement as written as the PCS doesn't have bit level error testing. Clause 113 has more complete text which may be used here.

SuggestedRemedy

Insert at the end of P144 L17, continuing the sentence ending in 10^-7: "after PCS processing and sent to the MII after completion of link training."
This specification can be verified by a frame error ratio less than 1.0x10^-6 for 800 octet frames.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Insert at the end of P144 L17, continuing the sentence ending in 10^-9:

"after PCS processing and sent to the MII after completion of link training. This specification can be verified by a frame error ratio less than 1x10^-6 for 125 octet frames."

Cl **146** *SC* **146.5.5.3** *P* **144** *L* **28** # i-297

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **T** *Comment Status* **R** *PMA Electrical*

There are 2 link equations either use one or define for both.

SuggestedRemedy

Insert after 146.7 with Il from equation 146-10

Response *Response Status* **C**

REJECT.
The existing reference to 146.7 is clear. When the link is using the optional 2.4 Vpp mode, the insertion loss limit of a link compliant to 146.7 is equation 146-10, when the transmitters are in 1.0 Vpp mode, the limit is equation 146-11.

Cl **146** *SC* **146.5.5.3** *P* **144** *L* **28** # i-168

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

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

"The BER is expected to be less than 10^-9, and, to satisfy this specification, the frame loss..." an expectation is not a specification.

SuggestedRemedy

Change to "The BER shall be less than 10^-9. This specification is satisfied when the frame loss..."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change to "The BER shall be less than 10^-9. This specification may be considered satisfied when the frame loss..."
Change PICS PMAE22 (Page 164 L43) to:
"BER < 10^-9 with an alien crosstalk noise of magnitude of -106 dBm/Hz and bandwidth of 10 MHz at the MDI."

Cl **146** *SC* **146.5.5.3** *P* **144** *L* **48** # i-180

Hoglund, David Johnson Controls Inc

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

Replace "may be adopted" with "may be adapted" if the intent is to permit change to the resistor values. (There is no such note for figure 147-19.)

SuggestedRemedy

Replace "may be adopted" with "may be adapted".

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.5.6** *P* **145** *L* **3** # i-234

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **A** *PMA Electrical*

The word "unterminated" here implies that loopback only works if there is no compliant link segment and other MAU connected but there is a requirement of some sort for some circuit characteristics at the MDI to guarantee the echo.

SuggestedRemedy

Clarify and specify

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change "unterminated" to "open"
(this is what is shown in the figure)

Cl **146** *SC* **146.6.3** *P* **146** *L* **1** # i-235

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **A** *AutoNeg*

It would seem that this text and the text in the referenced claused don't actually have a resolution process.

SuggestedRemedy

Add a reference to 32.5.1 which tells what action to take when the process fails.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add new first sentence to first paragraph of 146.6.1 Support for Auto-Negotiation (P145 L40):
"If Auto-Negotiation is supported and enabled the mechanism described in Clause 98 shall be used."

(Clause 98 specifies the requested MASTER/SLAVE resolution for BASE-T1 PHYs when not in a forced configuration)

Cl **146** *SC* **146.6.4** *P* **146** *L* **15** # i-236

Thompson, Geoffrey Independent Consultant

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

Is this guaranteed to work on a max length link which normally requires 2.4v to communicate? Please clarify.

SuggestedRemedy

If so please clarify. If not, please clarify how to operate with or without auto-negotation on a max length segment.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

The commenter asks for a tutorial and the standard is not a tutorial - no change required.

The PHY clause is an inappropriate place to discuss the detection characteristics of the auto-negotiation signal and such a discussion is not necessary for interoperability.

The autonegotiation signal used is 625 kbps DME (2 level) whereas the 10BASE-T1L signal is 7.5 MBd PAM-3, more than making up for the 8 dB difference between the 1Vpp and 2.5Vpp transmit power levels.

Cl **146** *SC* **146.7** *P* **146** *L* **40** # i-238

Thompson, Geoffrey Independent Consultant

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

The text "A link segment is specified based on process control application requirements..." would seem to be directed at all link segments where it should be properly directed specifically at the link segment discussed above.

SuggestedRemedy

Change the text to read: "The link segment specified in this clause is based on process control application requirements..."

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.7** *P* **146** *L* **40** # i-237

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **D** *Link Segment*

The term "link segment" used in this clause is insufficiently precise. Since this text is effectively overriding the definition in 1.4 it needs to be complete.

SuggestedRemedy

Change the sentence to read: The term "link segment" used in this clause refers to the MDI to MDI connection of a single balanced pair of conductors operating in full duplex.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **146** *SC* **146.7.1** *P* **147** *L* **28** # i-20

Anslow, Peter Ciena

Comment Type **ER** *Comment Status* **A** *EZ*

This editor's note just describes work going on in another standards body. This is not appropriate in a draft that is suitable for submission to RevCom

SuggestedRemedy

Delete the editor's note.

Response *Response Status* **W**

ACCEPT.

Cl **146** *SC* **146.7.1.1** *P* **147** *L* **37** # i-169

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

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

"For PHYs in the 2.4 Vpp operation mode, the insertion loss of each 10BASE-T1L link segment shall meet..." The link segment is not a part of the PHY and does not know in what operation mode the PHY is. Similarly in P148 L26.

SuggestedRemedy

There should be two specifications for link segments, a high--loss link segment that is only supported when the link (both PHYs) is in 2.4 Vpp mode and a low-loss segment that is supported regardless of the mode.

Divide existing 146.7.1.1 into 2 subclauses: 146.7.1.1.1 Insertion loss for PHYs in the 2.4 Vpp operation mode (starts at P147 L36) and 146.7.1.1.2 Insertion loss supported for PHYs in 1.0 Vpp operation mode (starts at P148 L25, with "For PHYs in the 1.0..."). Add text to 146.7.1 "There are two link segment insertion loss specifications supported, depending on whether the 2.4 Vpp mode is supported abd selected, as specified in 146.6.4. All 10BASE-T1L PHYs support the insertion loss specified in 146.7.1.2, but support of the insertion loss specified in 146.7.1.1 is only required when the 2.4 Vpp transmit/receive ability is operational."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Fix typo "abd" in commenters suggested remedy:

Divide existing 146.7.1.1 into 2 subclauses:
146.7.1.1.1 Insertion loss for PHYs in the 2.4 Vpp operation mode (starts at P147 L36) and 146.7.1.1.2 Insertion loss supported for PHYs in 1.0 Vpp operation mode (starts at P148 L25, with "For PHYs in the 1.0...").

Add text to 146.7.1 "There are two link segment insertion loss specifications supported, depending on whether the 2.4 Vpp mode is supported and selected, as specified in 146.6.4. All 10BASE-T1L PHYs support the insertion loss specified in 146.7.1.2, but support of the insertion loss specified in 146.7.1.1 is only required when the 2.4 Vpp transmit/receive ability is operational.

Cl **146** *SC* **146.7.1.1** *P* **148** *L* **26** # i-298

Schicketanz, Dieter University of Applied Science Reutlingen

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

How does the cabling knows that the PHY is in the 1 Volt Mode? Especially because it is not set automatically fort shorter links!

SuggestedRemedy

Tod avoid this issue it is proposed that the PHY switches to the 1 Volt Mode automatically if the Link has an IL less than 15 dB at 3.75 MHz

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Accommodated by comment i-169. The resolution to comment i-169 is:

Divide existing 146.7.1.1 into 2 subclauses:
146.7.1.1.1 Insertion loss for PHYs in the 2.4 Vpp operation mode (starts at P147 L36) and 146.7.1.1.2 Insertion loss supported for PHYs in 1.0 Vpp operation mode (starts at P148 L25, with "For PHYs in the 1.0...").

Add text to 146.7.1 "There are two link segment insertion loss specifications supported, depending on whether the 2.4 Vpp mode is supported and selected, as specified in 146.6.4. All 10BASE-T1L PHYs support the insertion loss specified in 146.7.1.2, but support of the insertion loss specified in 146.7.1.1 is only required when the 2.4 Vpp transmit/receive ability is operational.

Cl **146** *SC* **146.7.1.2** *P* **149** *L* **27** # i-299

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **TR** *Comment Status* **A** *Link Segment*

Return loss limits were changed often. The latest values were from a measured cable. Due to the high insertion loss the reach is much less then 1000m violating the 1000m objective. But there is an installed base and it should be a better route to capture this.

SuggestedRemedy

As the majority of the cables have an impedance around 100 ohm as a compromise return loss should be 15 dB from 1 MHz to 20 MHz and below 9+9f. To capture the special cable with high insertin loss there would be 2 exceptions. Long links could go down to 13 dB. The critical 10m should be avoided in short runs.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Accomodated by i-111. The resolution to i-111 is:

Change the value 13.5 dB to 13 dB within Equation 146-13. Change the frequency dependency of the RL below 0.5 MHz from 9 + 9 x f to 9 + 8 x f.

Cl **146** *SC* **146.7.1.2** *P* **149** *L* **36** # i-111

Graber, Steffen Pepperl+Fuchs GmbH

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

The current return loss specification does not support cables with a tolerance of 80 to 120 ohms under worst-case conditions (short cables).

SuggestedRemedy

Change the value 13.5 dB to 13 dB within Equation 146-13. Change the frequency dependency of the RL below 0.5 MHz from 9 + 9 x f to 9 + 8 x f.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.7.1.3** *P* **150** *L* **30** # i-367

Law, David Hewlett Packard Enterprise

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

The abbreviation 'NVP is used subclause 146.7.1.3 'Maximum link delay' without definition in Clause 146, nor anywhere else in IEEE P802.3cg. I would imagine it is meant to be 'Nominal Velocity of Propagation', however I note that NVP is used in this subclause in reference to Equation (80-1) which uses the parameter n to represents the ratio of the speed of electromagnetic propagation in the cable to the speed of light in a vacuum, not NVP.

SuggestedRemedy

Change '... using Equation (80-1) with an NVP of 0.6.' to read '... using Equation (80-1) with an n of 0.6.' with 'n' italicised.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.7.1.4** *P* **150** *L* **39** # i-301

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **TR** *Comment Status* **A** *Link Segment*

As conducted immunity is the same for E1 and E2 TCL should be the same fort E1 and E2 too.

SuggestedRemedy

in table 146-5 change from .1 to 10 MHz to >50 and from 10 to 20 MHz to 50-20log(f/10) for E1 and E2.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Accommodate by comment i-112. The resolution to comment i-112 is:
ACCEPT IN PRINCIPLE.

Remove table 146-5 and replace this table by a table with the following entries for the TCL values: first row: of 0.1 MHz <= f <= 10 MHz: for E1: >= 50 dB; for E2: >= 50 dB, second row: 10 MHz < f <= 20 MHz: for E1: >= 50 - 20 log10(f / 10) dB; for E2: >= 50 - 20 log10(f / 10) dB. Remove the specification of the ELTCTL values.

Grant editorial license to adjust text to accommodate removal of the ELTCTL values.

Change 146.7.1 to recognize UTP for 10BASE-T1L, change last sentence of first paragraph of 146.7.1 (P146 L50) as shown:
The transmission characteristics for the 10BASE-T1L link segment are specified to support applications requiring long reach such as industrial and process control, for up to at least 1000 m. 10BASE-T1L link segments may be shielded or screened, consistent with the specification in 146.7.1.6 and 146.7.2 or unshielded consistent with the specifications in 146.7.1.6 and 146.7.1.4.

Change 146.8.2 MDI electrical specification (P155 L11)
Change: The MDI connector mated with a specified single balanced-pair connector shall meet the electrical requirements specified in 146.7.
To: The electrical requirements specified in 146.5.4 and 146.5.5 shall be met when the PHY is connected to the MDI connector mated with the specified plug connector.

Insert new subclause 146.8.4 MDI mode conversion loss, following 146.8.3 (P155 L13) and renumber subsequent subclauses as shown:
146.8.4 MDI mode conversion loss
Mode conversion LCL (Sdc11) or TCL (Scd11) of the PHY measured at the MDI shall meet the values determined using Equation (146-xx) at all frequencies from 0.1 MHz to 20 MHz.

ConversionLoss(f)≥{ 25 for 0.1 MHz ≤f≤10 MHz
25-20×log_10 (f/10) for 10 MHz<f≤20 MHz} dB

where f is the frequency in MHz.
PICS:

Add new PICS item after MDI2 (P166 L9) and renumber subsequent PICS items
MDI3 MDI mode conversion loss Shall meet Equation 146-xx M Yes []

Cl **146** *SC* **146.7.1.4** *P* **150** *L* **39** # i-302

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **TR** *Comment Status* **A** *Link Segment*

No specific limit could be elaborated for ELTCTL

SuggestedRemedy

Delete this requirement in table 146-5

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Accommodate by comment i-112. The resolution to comment i-112 is:
ACCEPT IN PRINCIPLE.

Remove table 146-5 and replace this table by a table with the following entries for the TCL values: first row: of 0.1 MHz <= f <= 10 MHz: for E1: >= 50 dB; for E2: >= 50 dB, second row: 10 MHz < f <= 20 MHz: for E1: >= 50 - 20 log10(f / 10) dB; for E2: >= 50 - 20 log10(f / 10) dB. Remove the specification of the ELTCTL values.

Grant editorial license to adjust text to accommodate removal of the ELTCTL values.

Change 146.7.1 to recognize UTP for 10BASE-T1L, change last sentence of first paragraph of 146.7.1 (P146 L50) as shown:
The transmission characteristics for the 10BASE-T1L link segment are specified to support applications requiring long reach such as industrial and process control, for up to at least 1000 m. 10BASE-T1L link segments may be shielded or screened, consistent with the specification in 146.7.1.6 and 146.7.2 or unshielded consistent with the specifications in 146.7.1.6 and 146.7.1.4.

Change 146.8.2 MDI electrical specification (P155 L11)
Change: The MDI connector mated with a specified single balanced-pair connector shall meet the electrical requirements specified in 146.7.
To: The electrical requirements specified in 146.5.4 and 146.5.5 shall be met when the PHY is connected to the MDI connector mated with the specified plug connector.

Insert new subclause 146.8.4 MDI mode conversion loss, following 146.8.3 (P155 L13) and renumber subsequent subclauses as shown:
146.8.4 MDI mode conversion loss
Mode conversion LCL (Sdc11) or TCL (Scd11) of the PHY measured at the MDI shall meet the values determined using Equation (146-xx) at all frequencies from 0.1 MHz to 20 MHz.

ConversionLoss(f)≥{ 25 for 0.1 MHz ≤f≤10 MHz
25-20×log_10 (f/10) for 10 MHz<f≤20 MHz} dB

where f is the frequency in MHz.
PICS:
Add new PICS item after MDI2 (P166 L9) and renumber subsequent PICS items
MDI3 MDI mode conversion loss Shall meet Equation 146-xx M Yes []

Cl **146** *SC* **146.7.1.4** *P* **150** *L* **44** # i-112

Graber, Steffen Pepperl+Fuchs GmbH

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

Table 146-5 provides different TCL and ELTCTL values for E1 and E2. As the conducted immunity test has the same test levels for E1 and E2 the TCL values should also be the same. As the conducted immunity test levels are significantly higher than the disturbance by alien disturbers, there is no need to distinguish between 1.0 Vpp and 2.4 Vpp operating mode.

SuggestedRemedy

Remove table 146-5 and replace this table by a table with the following entries for the TCL values: first row: of 0.1 MHz <= f <= 10 MHz: for E1: >= 50 dB; for E2: >= 50 dB, second row: 10 MHz < f <= 20 MHz: for E1: >= 50 - 20 log10(f / 10) dB; for E2: >= 50 - 20 log10(f / 10) dB. Remove the specification of the ELTCTL values.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Remove table 146-5 and replace this table by a table with the following entries for the TCL values: first row: of 0.1 MHz <= f <= 10 MHz: for E1: >= 50 dB; for E2: >= 50 dB, second row: 10 MHz < f <= 20 MHz: for E1: >= 50 - 20 log10(f / 10) dB; for E2: >= 50 - 20 log10(f / 10) dB. Remove the specification of the ELTCTL values.

Grant editorial license to adjust text to accommodate removal of the ELTCTL values.

Change 146.7.1 to recognize UTP for 10BASE-T1L, change last sentence of first paragraph of 146.7.1 (P146 L50) as shown:
The transmission characteristics for the 10BASE-T1L link segment are specified to support applications requiring long reach such as industrial and process control, for up to at least 1000 m. 10BASE-T1L link segments may be shielded or screened, consistent with the specification in 146.7.1.6 and 146.7.2 or unshielded consistent with the specifications in 146.7.1.6 and 146.7.1.4.

Change 146.8.2 MDI electrical specification (P155 L11)
Change: The MDI connector mated with a specified single balanced-pair connector shall meet the electrical requirements specified in 146.7.
To: The electrical requirements specified in 146.5.4 and 146.5.5 shall be met when the PHY is connected to the MDI connector mated with the specified plug connector.

Insert new subclause 146.8.4 MDI mode conversion loss, following 146.8.3 (P155 L13) and renumber subsequent subclauses as shown:
146.8.4 MDI mode conversion loss
Mode conversion LCL (Sdc11) or TCL (Scd11) of the PHY measured at the MDI shall meet the values determined using Equation (146-xx) at all frequencies from 0.1 MHz to 20 MHz.

ConversionLoss(f)≥{ 25 for 0.1 MHz ≤f≤10 MHz
25-20×log_10 (f/10) for 10 MHz<f≤20 MHz} dB
where f is the frequency in MHz.
PICS:
Add new PICS item after MDI2 (P166 L9) and renumber subsequent PICS items
MDI3 MDI mode conversion loss Shall meet Equation 146-xx M Yes []

Cl **146** *SC* **146.7.1.5** *P* **151** *L* **8** # i-300

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **TR** *Comment Status* **A** *Link Segment*

As conducted immunity is the same fort E1 and E2 the coupling attenuation should be the same fort E1 and E2 too.

SuggestedRemedy

Change the E1 value in Table 146-6 from 40 to 50

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Accomodated by comment i-113. The resolution to i-113 is:

Change the coupling attenuation value for E1 from >= 40 dB to >= 50 dB.

Cl **146** *SC* **146.7.1.5** *P* **151** *L* **13** # i-113

Graber, Steffen Pepperl+Fuchs GmbH

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

The coupling attenuation for E1 is 10 dB lower than the coupling attenuation specified for E2. For both E1 and E2 during conducted immunity testing the same test levels are used. Therefore E1 should also have the same coupling attenuation value as E2.

SuggestedRemedy

Change the coupling attenuation value for E1 from >= 40 dB to >= 50 dB.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

E2 should be 50 dB based on 10 dB difference from E3 and E1 should be same as same as E2 as same test level used.
Change the coupling attenuation value for E1 from >= 40 dB to >= 50 dB.

Cl **146** *SC* **146.7.2** *P* **151** *L* **33** # i-114

Graber, Steffen Pepperl+Fuchs GmbH

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

To ensure the total alien NEXT loss and alien FEXT loss coupled between 10BASE-T1L link segments is limited, multiple disturber alien near-end crosstalk (MDANEXT) loss and multiple disturber alien FEXT (MDAFEXT) loss is specified. (use relative pronoun after "ensure", use plural before "limited", use far-end cosstalk instead of FEXT (to be similar to near-end crosstalk just before), and use plural before "specified")

SuggestedRemedy

To ensure that the total alien NEXT loss and alien FEXT loss coupled between 10BASE-T1L link segments are limited, multiple disturber alien near-end crosstalk (MDANEXT) loss and multiple disturber alien far-end crosstalk (MDAFEXT) loss are specified.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.7.2.1** *P* **151** *L* **37** # i-171

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

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

There are two subclauses for NEXT, one referring to MDANEXT and another to PSANEXT, but only one subclause for FEXT which includes both. In practice, PSANEXT/PSAFEXT are specified, and MDANEXT and MDAFEXT are definitions used.

SuggestedRemedy

Merge 146.7.2.2 into 146.7.2.1. with the title used in 146.7.2.2. Change the title of 146.7.2.3 (now 146.7.2.2) from "Multiple disturber alien far-end crosstalk (MDAFEXT) loss" to "Multiple disturber power sum alien far-end crosstalk (PSAFEXT) loss"

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.7.2.1** *P* **151** *L* **41** # i-115

Graber, Steffen Pepperl+Fuchs GmbH

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

To ensure the total alien NEXT ... (use relative pronoun after "ensure")

SuggestedRemedy

To ensure that the total alien NEXT ...

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.7.2.2** *P* **152** *L* **7** # i-116

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **T** *Comment Status* **A** *Editorial*

With Equation 146-13 the PSANEXT is calculated, it is not a limit, so it should be a "=" instead of a ">=". The same is valid for Equation 146-15 on the same page.

SuggestedRemedy

Change ">=" to "=" in Equation 146-13. Do the same for Equation 146-15 on the same page.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.7.2.2** *P* **152** *L* **7** # i-170

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

Comment Type **E** *Comment Status* **A** *Editorial*

Equation 146-13 is a definition and should be an equality, not an inequality. Similarly in Equation 146-15.

SuggestedRemedy

Replace the inequality in equations 146-13 and 146-15 with "=".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE. Resolved with comment#116

Cl **146** *SC* **146.7.2.3** *P* **152** *L* **28** # i-117

Graber, Steffen Pepperl+Fuchs GmbH

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

To ensure the total alien FEXT ... (use relative pronoun after "ensure")

SuggestedRemedy

To ensure that the total alien FEXT ...

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.7.2.3** *P* **152** *L* **29** # i-118

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

... coupled into a 10BASE-T1L link segment, multiple ... ("is limited" is missing after "segment")

SuggestedRemedy

... coupled into a 10BASE-T1L link segment is limited, multiple ...

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.7.2.3** *P* **152** *L* **46** # i-175

Graber, Steffen Pepperl+Fuchs GmbH

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

f / 20 in Equation 146-16 is not written in fraction style.

SuggestedRemedy

Use for f / 20 writing in fraction style, as it is done in Equation 146-14 on the same page.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.8** *P* **153** *L* **1** # i-239

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **D** *Big Ticket Item MDI*

Since the MDI connector that is called out is not required there is no standardized way or specifically characterized test point where specification or conformance testing can be done on a multi-vendor repeatable basis.

SuggestedRemedy

Add text that permits alternate connections/connectors can be used in the application environment, that the compliance requirements (like other Ethernet PHYs) are specified and tested at the mating surface of the specified MDI connector.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **146** *SC* **146.8** *P* **153** *L* **1** # i-410

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *Big Ticket Item MDI*

The connectors described MAYBE used at the interface to the medium. This is an allowance. MDI is a normative conformance test point. The title of this subclause say "148.8 MDI specifications". It's not.

SuggestedRemedy

Change the title to "MDI Considerations" or "Medium Interface Connectors" or something else that avoids wrong inference that any of these connectors are normative interoperability test points.

Response *Response Status* **W**

REJECT.

The CRG disagrees with the commenter. The commenter appears to be confusing the MDI and the MDI connector.

The subclause, in its subordinate subclauses, spells out specifications for the MDI.

The second sentence of 146.8 states this - "It also specifies electrical requirements, including fault tolerance, at the MDI."

While connectors that may be used (and references to their specifications) are called out in 146.8.1, electrical, power, and fault tolerance specifications for the MDI are provided in subordinate subclauses 146.8.2, 146.8.3, 146.8.4, and 146.8.5.

Cl **146** *SC* **146.8.1** *P* **153** *L* **12** # i-196

Maguire, Valerie The Siemon Company

Comment Type **TR** *Comment Status* **A** *Big Ticket Item MDI*

The P802.3cg example text is no longer aligned with the TIA and ISO/IEC single-pair interface recommendations. Specifically, TIA and ISO/IEC recommended different connectors for different MICE environments. The results of the TIA and ISO/IEC evaluation would likely have been different (perhaps, even limited to one connector style) if it was agreed that operation across MICE1 to MICE3 was desired. As a result, there is no longer a basis for selecting these two connectors as the examples.

P802.3cg is close to publication and some of the example products are not commercially available.

SuggestedRemedy

On page 153, line 12: Replace, "Specific systems or applications can use connectors or terminals, in addition to those listed below, that support the link segment specification defined in 146.7." with, "Specific systems or applications can use connectors or terminals that support the link segment specification defined in 146.7.

Delete lines 15-54, including Figure 146-26 and Figure 146-27, on page 153.

Delete Figure 146-28, Figure 146-29, Figure 146-30, and Figure 146-31 on page 154.

Delete Table 146-8 on page 155.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

P 153, Line 15; Replace, “Connectors meeting the requirements of IEC 63171-1 or IEC 61076-3-125 may be used as the mechanical interface to the balanced cabling.”

With, “Connectors meeting the requirements of IEC 63171-1 may be used as the mechanical interface to the balanced cabling in environments meeting the E1 and E2 electromagnetic classifications specified in Table 146-7. Connectors meeting the requirements of IEC 63171-6 may be used as the mechanical interface to the balanced cabling in environments meeting the E3 electromagnetic classifications specified in Table 146-7.”

Editor’s implementation note: The 1, 2, and 3 in E1, E2, and E3 are subscript.

Straw poll
Comment i-196 (to get direction, separate action will resolve comment):
I support the following response: (Chicago rules)
A: ACCEPT the commenter’s remedy
B: REJECT with explanatory text and liaison per the editor’s published proposed response.
C: ACCEPT IN PRINCIPLE with the proposed response:
–Align the text for the two example connector types with the guidance provided by TIA and ISO/IEC (e.g.,, IEC 63171-1 for E1 and E2 per Table 146-7 and IEC 61076-3-125 for E3 per Table 146-7).
–A: 10
–B: 8
–C: 21

Move to accept the following response to comment i-196:
M: M. Shariff
S: V. Maguire

ACCEPT IN PRINCIPLE
Replace, “Connectors meeting the requirements of IEC 63171-1 or IEC 61076-3-125 may be used as the mechanical interface to the balanced cabling.”

With, “Connectors meeting the requirements of IEC 63171-1 may be used as the mechanical interface to the balanced cabling in environments meeting the E1 and E2 electromagnetic classifications specified in Table 146-7. Connectors meeting the requirements of IEC 63171-6 may be used as the mechanical interface to the balanced cabling in environments meeting the E3 electromagnetic classifications specified in Table 146-7.”

Editor’s implementation note: The 1, 2, and 3 in E1, E2, and E3 are subscript.

Y:16
N: 5
A: 16

–

Cl **146** *SC* **146.8.1** *P* **153** *L* **15** # i-46

Tillmanns, Ralf

Comment Type **T** *Comment Status* **R** *Big Ticket Item MDI*

The sentence 'Connectors meeting the requirements of IEC 63171-1 or IEC 61076-3-125 may be used as the mechanical interface to the balanced cabling.' gives the impression that the mechanical interfaces given are the ones that have to be used. The sentence above, however, indicates that others may be used as well. Therefore the intention of this comment is to clarify that, if other mechanical interfaces are used, they still have to meet requirements in accordance with IEC 63171.

SuggestedRemedy

Change the sentence 'Connectors meeting the requirements of IEC 63171-1 or IEC 61076-3-125 may be used as the mechanical interface to the balanced cabling.' to 'Connectors meeting the requirements of IEC 63171-1 or IEC 61076-3-125 and other connector types suitable for 1-pair applications meeting the requirements of IEC 63171 may be used as the mechanical interface to the balanced cabling.'

Response *Response Status* **C**

REJECT.
According to IEEE Standards style, 'may' can be replaced by 'is/are allowed'. The text "may be used" would therefore be understood as "are allowed to be used", which does not convey that these "have to be used" as the commenter suggests.
Further, the additional text that the connectors meet IEC 63171 would levy new requirements on the MDI connector without justification.

Motion: Move to accept the response for comment i-46 as:
REJECT.
According to IEEE Standards style, 'may' can be replaced by 'is/are allowed'. The text "may be used" would therefore be understood as "are allowed to be used", which does not convey that these "have to be used" as the commenter suggests.
Further, the additional text that the connectors meet IEC 63171 would levy new requirements on the MDI connector without justification.

M: Jon Lewis
S: Masood Shariff
Y:29
N:1
A:4
MOTION PASSES

Cl **146** *SC* **146.8.4** *P* **155** *L* **33** # i-240

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **A** *MDI*

The phrasing of this clause and the next one make it appear that this is a requirement for testing the wiring rather than as a test access point for testing the DTE. Further, the test limit for a withstand voltage has absolutely zero margin with respect to PoDL which is contrary to usual practice for withstand voltage requirements. Additionally, consideration should be given to the possibility of there being other voltages in a sheath shared with this instance of 10BASE-T1L such as PoE.

SuggestedRemedy

Change the text to make it clearer that this test is a test of the DTE as tested from the MDI. Raise the test limit to be more appropriate with traditional withstand limits (ref e.g. cl. 14, 10BASE-T) and real world requirements such as static discharge.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Accomodated by i-42. The resolution to i-42 is:

Replace, "The wire pair of the MDI shall withstand without damage the application of positive voltages of up to 60 V dc with the source current limited to 2000 mA, under all operating conditions, for an indefinite period of time."

with,"The DTE shall withstand without damage the application of any voltages between 0 V DC and 60 V DC with the source current limited to 2000 mA, applied across BI_DA+ and BI_DA-, in either polarity, under all operating conditions, for an indefinite period of time."

(Editor's note: Make sure the "-" in BI_DA- is an en-dash)

Cl **146** *SC* **146.8.4** *P* **155** *L* **34** # i-42

Yseboodt, Lennart Signify

Comment Type **TR** *Comment Status* **A** *PoDL*

146.8.4:
"The wire pair of the MDI shall withstand without damage the application of positive voltages of up to 60 V dc with the source current limited to 2000 mA, under all operating conditions, for an indefinite period of time."

146.8.5:
"The wire pair of the MDI shall withstand without damage the application of short circuits of any wire to the other wire of the same pair or ground potential, as per Table 146-9, under all operating conditions, for an indefinite period of time."

- Why does 146.8.4 only cover positive voltages ?
- ... and 146.8.5 covers both polarities ?
- why is the subject of the sentence 'the wire pair of the MDI' when it should be the device itself ?

SuggestedRemedy

Change the quoted text in 146.8.4 to read:
"The device shall withstand without damage the application of any voltages between 0 V dc and 60 V dc with the source current limited to 2000 mA, applied across BI_DA+ and BI_DA-, in either polarity, under all operating conditions, for an indefinite period of time."

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

On page 155, line 34:

Replace, "The wire pair of the MDI shall withstand without damage the application of positive voltages of up to 60 V dc with the source current limited to 2000 mA, under all operating conditions, for an indefinite period of time."

with,"The DTE shall withstand without damage the application of any voltages between 0 V DC and 60 V DC with the source current limited to 2000 mA, applied across BI_DA+ and BI_DA-, in either polarity, under all operating conditions, for an indefinite period of time."

(Editor's note: Make sure the "-" in BI_DA- is an en-dash)

Cl **146** *SC* **146.8.5** *P* **155** *L* **43** # i-124

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **R** *Editorial*

..., for an indefinite period of time. (redundant wording)

SuggestedRemedy

..., for an indefinite time.

Response *Response Status* **C**

REJECT.
Wording is clear.

Cl **146** *SC* **146.9.1** *P* **156** *L* **28** # i-21

Anslow, Peter Ciena

Comment Type **ER** *Comment Status* **A** *Safety*

This editor's note is not appropriate in a draft that is suitable for submission to RevCom

SuggestedRemedy

Change the text as appropriate and delete the editor's note.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Delete the editor's note.

Cl **146** *SC* **146.9.2** *P* **156** *L* **35** # i-181

Hoglund, David Johnson Controls Inc

Comment Type **E** *Comment Status* **R** *Editorial*

Replace "secure" with past particple "secured" for parallelism with respect to the sentance that follows. If the comment is accepted, it also applies to identical text on page 204 line 30 in 147.10.2.

SuggestedRemedy

Replace "secure" with "secured".

Response *Response Status* **C**

REJECT.
The intended meaning is not "secured" (fixed to its location), but actually is "secure".

Cl **146** *SC* **146.9.2** *P* **156** *L* **37** # i-125

Graber, Steffen Pepperl+Fuchs GmbH

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

... to any applicable local, state or national standards ... (add missing serial comma after "state")

SuggestedRemedy

... to any applicable local, state, or national standards ...

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.11.4.2.2** *P* **164** *L* **31** # i-119

Graber, Steffen Pepperl+Fuchs GmbH

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

7.5 MBd +/- 50 ppm has the wrong font size and/or style.

SuggestedRemedy

Use correct font size and style.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change "MBd ± 50 ppm" to font Times New Roman on P146 L31 and P146 L40

Cl **146** *SC* **146.11.4.2.2** *P* **164** *L* **40** # i-120

Graber, Steffen Pepperl+Fuchs GmbH

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

7.5 MBd +/- 50 ppm has the wrong font size and/or style.

SuggestedRemedy

Use correct font size and style.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accomodated by comment i-119
Response to comment i-119 is:

ACCEPT IN PRINCIPLE.
Change "MBd ± 50 ppm" to font Times New Roman on P146 L31 and P146 L40

Cl **146** *SC* **146.11.4.3** *P* **165** *L* **9** # i-241

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **A** *AutoNeg*

The statement is about a 2 DTE end-to-end system. The PICS is for a single DTE. The text here addresses a pair.

SuggestedRemedy

The text and result need to be restated for an appropriate test and result for a single transceiver.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.
The basic requirement (146.6.2) is a requirement on the user, and inappropriate.

Change "shall be configured" to "should be configured" in two places on P145 L46.

Delete PICS item MI2.

Cl **146** *SC* **146.11.4.3** *P* **165** *L* **17** # i-121

Graber, Steffen Pepperl+Fuchs GmbH

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

45.2.1.185 has the wrong font size and/or style.

SuggestedRemedy

Use correct font size and style.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change cross reference to 45.2.1.185 to 9 pt Times New Roman.

Cl **146** *SC* **146.11.4.3** *P* **165** *L* **18** # i-122

Graber, Steffen Pepperl+Fuchs GmbH

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

... when MDIO implemented, ... ("is" is missing)

SuggestedRemedy

... when MDIO is implemented, ...

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.11.4.4** *P* **165** *L* **26** # i-126

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **T** *Comment Status* **A** *PICS*

Clause 146.11.4.4 requires mandatory ticking of most of the items (besides LMF2) for a PHY. The link segment Clause provides requirements for the link segment (which are in principle not testable by the PHY) and not for the PHY itself. The PHY needs to be designed to work in conjunction with the (worst-case) link segment definition, but not meet the link segment definition by itself.

SuggestedRemedy

Please add for each support field also a N/A [ ] option (so that ticking this N/A field is allowed for a PHY), as e.g. done in IEEE802.3bp or make otherwise clear, that the PHY itself does not need to fulfil the link segment spec itself, but only need to work with a link segment meeting the link segment specification with the BER specified for the PHY.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add new row to table of Major Capabilities and Options (146.11.3) P159 L21:
Item: *INS
Feature: Installation / cabling
Subclause: 146.7
Value/Comment: Items marked with INS include installation practices and cabling specifications not applicable to a PHY manufacturer.
Status: O
Support: Yes [ ] No [ ]

Change Status of items in 146.11.4.4 (Link Segment Characteristics) to INS:M
(LMF2 becomes INS:O, RTDL:M)

Make similar changes to 147.12.3 and 147.12.4.6 and 147.12.4.7

Cl **146** *SC* **146.11.4.4** *P* **165** *L* **31** # i-123

Graber, Steffen Pepperl+Fuchs GmbH

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

Insertion loss (1 Vpp operating mode) (the mode is called 1.0 Vpp operating mode)

SuggestedRemedy

Insertion loss (1.0 Vpp operating mode)

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.11.4.5** *P* **166** *L* **9** # i-127

Graber, Steffen Pepperl+Fuchs GmbH

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

Support MDI2 status field is empty and tick box for MDI2 is missing.

SuggestedRemedy

Please add "M" in the status field for MDI2 and "Yes [ ]" in the support field for MDI2.

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.1** *P* **167** *L* **12** # i-391

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *Modes*

[CSD] CSD/Broad Market Potential is no longer assured in this project when the half-duplex point to point link segment PHY operation, traditionally associated with broad market with use of star-wired multi-port repeaters (e.g. 10BASE-T hubs/repeaters) is not supported.

An explicit statement of mandatory operation of this PHY:
"The 10BASE-T1S PHY is specified to be capable of operating at 10 Mb/s in several modes. All 10BASE-T1S PHYs can operate as a half-duplex PHY with a single link partner over a point-to-point link segment defined in 147.7..."

An explicit statement of non-support of repeaters:
Pg 30, CL9.1 proposed change states "This clause specifies a repeater for use with IEEE 802.3 10 Mb/s baseband networks, with the exceptions of
10BASE-T1L (Clause 146) and 10BASE-T1S (Clause 147)...."

Repeating the concern -- only PHY operation that is mandatory is point-to-point link without any allowance for repeaters (i.e. exactly two node network) operating in half-duplex, contention resolution network does NOT have broad market potential.

SuggestedRemedy

Delete market-potential irrelevant PHY that supports exactly two node network over a point-to-point link, and make one of the more market-potential-relevant PHYs from
"...additionally, there are two mutually exclusive optional operating modes: a
full-duplex point-to-point mode over the link segment defined in 147.7, and a half-duplex shared-medium
mode, referred to as multidrop mode,..."
and update the CSD/Broad Market Potential as appropriate.

Response *Response Status* **W**

REJECT.

CRG disagrees with the commenter. The clause contains one PHY with three modes, with a common-denominator for interoperability. CRG disagrees with the commenter on the relevance of the mandatory mode of operation (half-duplex point-to-point). There are multiple methods of inter-linking point-to-point half-duplex segments, without the use of clause 9 repeaters using multiple topologies of choice, allowing larger networks (with more than 2 stations). A bridge is considered to be an element in common networks. Bridges have functionally replaced repeaters in most networks.

Cl **147** *SC* **147.1** *P* **167** *L* **12** # i-30

Marris, Arthur Cadence Design Systems, Inc.

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

"several modes" is not very precise

SuggestedRemedy

Change the word "several" to "three different"

Response *Response Status* **C**

REJECT.

The CRG disagrees with the commenter. The current text is adequate and the paragraph provides the additional detail.

Cl **147** *SC* **147.1** *P* **167** *L* **12** # i-411

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *Modes*

Chater and scope of this PHY clause and CSD concern.

This clause has three separate PHYs that should not be considered as one PHY with two options.

1. Full-Duplex P2P PHY: Performs echo cancellation, full-duplex over one transmission line. This is an optional PHY in CL147.

2. Half-Duplex P2P PHY: Traditiionally used with multi-port CL9 repeaters, this allows exactly two node network (one link, two link partners) and only such network, because the Clause 9 repeater is not supported as per proposed text in CL9. This is not a network. Two and only two node connection is a dedicated link. This is only mandatory PHY operation in CL147.

3. Half-Duplex Shared Medium PHY: Does NOT perform echo cancellation, half-duplex over shared medium. This is an optional PHY in CL147.

And the text says #1 and #3 are NOT interoperable -- CL147.1 says "..there are two mutually exclusive optional operating modes...".

The only mandatory PHY (Half-Duplex P2P) is useless. Two other PHYs are optional, but they are not optional to each other (mutually exclusive), yet all three PHYs are referred to as type 10BASE-T1S.

This clause organization is grossly in error. Each distinct PHY should has its own type designation (possibly its own clause, but only for clarity), #2 Half-duplex P2P PHY should be deleted for the stated reason of not being useful as a 'network'.

SuggestedRemedy

Pick the one PHY that meets CSD and objectives as written, or split this clause into at least two (one for P2P and one for Shared medium) separate PHY clauses and re-state the respective CSD as appropirate.

Response *Response Status* **W**

REJECT.

CRG disagrees with the commenter. The clause contains one PHY with three modes, with a common-denominator for interoperability. CRG disagrees with the commenter on interest in the mandatory mode of operation (half-duplex point-to-point). There are multiple methods of inter-linking point-to-point half-duplex segments, without the use of clause 9 repeaters using multiple topologies of choice, allowing larger networks (with more than 2 stations). A bridge is considered to be an element in common networks.

Cl **147** *SC* **147.1** *P* **167** *L* **13** # i-392

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *Modes*

[CSD] CL147 title states a single PCS/PMA type 10BASE-T1S. But in reality, it has three PHYs. Two of the three PHYs not compatible and do not interoperate. This issue is explicitly stated with "mutually exclusive" operation, which equals not-compatible and not interoperate.

"All 10BASE-T1S PHYs can operate as a half-duplex PHY with a single link partner over a point-to-point link segment defined in 147.7, and, additionally, there are two mutually exclusive optional operating modes: a full-duplex point-to-point mode over the link segment defined in 147.7, and a half-duplex shared-medium mode, referred to as multidrop mode, capable of operating with multiple stations connected to a mixing segment, defined in 147.8."

Full-duplex P2P PHY implements echo cancelation. Half-duplex shared meidum does not. They do not interoperate with each other. These may share the similar or substantially same PCS, these do not share PMAs. They do not interoperate; PMAs are substantially different; they are differnet PHYs. These two PHYs should be, at least, designated as different type.

If the argument is made that these two PHYs must support P2P half-duplex (therefore interoperate), and in such case, they interoperate, then we should also be reminded that P2P half-duplex (with no provision for repeaters) allow for exactly two node network collision based network. Exactly two node, and only two node, connectivity does not network make.

SuggestedRemedy

Either structure CL147 to specify two different PHY types, P2P full-duplex PHY, and 'multi-drop' half-duplex PHY. They do not interoperate with each other, therefore they are not the same type of PHY.
Or split CL147 into a CL on common PCS, and two more CLs, one for each of the two separate PMA for respective PHYs.

With regards to the P2P half-duplex PHY, please delete it from this draft. The value and use of exactly two (and only two) node network is very limited to say the least.

Response *Response Status* **W**

REJECT.

The CRG disagrees with the commenter. The clause contains one PHY with a common-denominator for interoperability. CRG disagrees with the commenter that the modes do not interoperate.

The commenter seems to make multiple incorrect interpretations of the text. Mutual exclusivity is with regards to the fact that a single PHY cannot operate in half-duplex and full-duplex at the same time. The PHY contains a single PCS, and a single PMA is specified along with options.

Regarding the half-duplex point-to-point functionality, there are multiple methods of inter-linking point-to-point half-duplex segments, without the use of clause 9 repeaters using multiple topologies of choice, allowing larger networks (with more than 2 stations). A bridge is considered to be an element in common networks. Bridges have functionally replaced repeaters in most networks.

Cl **147** *SC* **147.1** *P* **167** *L* **17** # i-31

Marris, Arthur — Cadence Design Systems, Inc.

Comment Type **T** *Comment Status* **A** *MDI*

The 10BASE-T1S PHY can operate over media other than cables.

SuggestedRemedy

Make the following a new paragraph and change to:
"The medium supporting the operation of the 10BASE-T1S PHY is defined in terms of performance requirements between the attachment points (Medium Dependent Interface (MDI)), allowing implementers to specify their own media to operate the 10BASE-T1S PHY as long as the normative requirements included in this clause are met."

That is replace the word "cabling" with "medium" and "media"

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.1** *P* **167** *L* **19** # i-304

Schicketanz, Dieter — University of Applied Science Reutlingen

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

How can an implementer specify own cabling with so many option fort T1S?

SuggestedRemedy

This general statement should be elaborated with examples or just mention the most important: 25m multidrop with the relevant equations.

Response *Response Status* **C**

REJECT.
Commenter provides insufficient information to determine a specific remedy.
It is unclear what commenter is referring to by "so many options".
The purpose of this sentence is to clearly state that anyone implementing cabling should focus mainly to the normative requirements for the link segment or mixing segment, as appropriate (i.e. 147.7 or 147.8).

Cl **147** *SC* **147.1** *P* **167** *L* **22** # i-200

Griffiths, Scott — Rockwell Automation

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

Clause 148 describes PLCA, not how it is optionally supported.

SuggestedRemedy

Change first sentence on line 22 to "10BASE-T1S PHYs optionally support PHY Level Collision Avoidance (PLCA), described in Clause 148."

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.1** *P* **167** *L* **23** # i-242

Thompson, Geoffrey — Independent Consultant

Comment Type **ER** *Comment Status* **A** *EZ*

Grammer, this is a comparative sentence that doesn't actually have two things to compare.

SuggestedRemedy

Either actually do a comparison or get rid of the sentence.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.
Remove the following sentence
====
PLCA provides improved performance in terms of effective throughput and maximum transmission latency when operating in half-duplex mode over a mixing segment network.
====

Cl **147** *SC* **147.1.1** *P* **167** *L* **29** # i-243

Thompson, Geoffrey — Independent Consultant

Comment Type **ER** *Comment Status* **R** *EZ*

Title is incorrect wrt clause contents. What is claimed in the title and what is stated in the first sentence are two different things.

SuggestedRemedy

Change title to: Relationship of 10BASE-T1S to other portions of this standard

Response *Response Status* **C**

REJECT.

The CRG disagrees with the commenter. "Relationship of 10BASE-T1S to other standards" is aligned with current text for similar instances in 802.3-2018 (e.g., clause 23.1.3).

Cl **147** *SC* **147.1.1** *P* **167** *L* **35** # i-244

Thompson, Geoffrey Independent Consultant

Comment Type **E** *Comment Status* **A** *Management*

Sentence order could be clearer.

SuggestedRemedy

Change to read: Management Entity is required using MDIO or other function. Optional MDIO is defined in 35 Clause 45.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change this:
====
Optional MDIO is defined in Clause 45. Management Entity is required using MDIO or other function.
====
to this:
====
A Management Entity is required using MDIO or equivalent functionality. Optional MDIO is defined in Clause 45.
====

Cl **147** *SC* **147.1.1** *P* **167** *L* **36** # i-201

Griffiths, Scott Rockwell Automation

Comment Type **E** *Comment Status* **A** *Management*

"Management Entity is required using MDIO or other function." is not gramatically correct.

SuggestedRemedy

Change to "A Management Entity is required using MDIO or other functionality."

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.1.2** *P* **167** *L* **42** # i-368

Law, David Hewlett Packard Enterprise

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

Suggest that '... effective rate of 10 Mb/s ..' should read '... an effective data rate of 10 Mb/s ..' here and on line 44 and 50.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.1.2** *P* **167** *L* **47** # i-245

Thompson, Geoffrey Independent Consultant

Comment Type **E** *Comment Status* **A** *Editorial*

"Additionally..., additionally..." is clumsy grammar and unnecessary.

SuggestedRemedy

Change start of paragraph 2 to read: "The 10BASE-T1S PHY may also operate using half-duplex..."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change this:
====
Additionally, 10BASE-T1S PHYs supporting the full-duplex point-to-point
====
to this:
====
10BASE-T1S PHYs supporting the option of full-duplex point-to-point
====

Cl **147** *SC* **147.1.2** *P* **167** *L* **50** # i-246

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **R** *Modes*

Text allows unlimited # of PHYs on a mixing segment. I believe this is not true or that it only depends on the segment electrical characteristics.

SuggestedRemedy

Add text toreflect the actual limiting characteristics for CSMA/CD and for PLCA (size of address field? Cycle time?)

Response *Response Status* **C**

REJECT.

CRG disagrees with the commenter. The text states that the electrical characteristics of the mixing segment limits the number of nodes (i.e., "Larger PHY count and reach may be achieved provided the mixing segment specifications in 147.8 are met."). This covers limitations for the clause 147 PHY. Additional functionality, such as PLCA in clause 148, may be limited in the number of nodes it can support for that specific functionality.

Cl **147** *SC* **147.2** *P* **169** *L* **22** # i-43

Yseboodt, Lennart Signify

Comment Type **E** *Comment Status* **A** *Editorial*

In Figure 147-2, the "PCS" and "PMA" text fields have been scaled incorrectly (probably the text field was grouped with the box and scaled as a group).

SuggestedRemedy

Reformat the text to have a correct width/height ratio.

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.2.1.1** *P* **170** *L* **11** # i-280

Huszak, Gergely Kone

Comment Type **T** *Comment Status* **A** *Primitives*

It is not clearly specified what PMA_RX should do when line is idle and if it is implemented so that it does nothing, it may leave PCS_RX FSM stranded (stuck in an unintended state, e.g. DATA) e.g. if transmitting station gets powered down unexpectedly.

SuggestedRemedy

Add the following new sentence to the end of paragraph that ends at 170/17: "If the PMA Receive function does not detect activity on the line, it conveys the special 5B symbol SILENCE by the means of this primitive."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add new third paragraph to 147.4.3 PMA Receive function (page 191 line 54):
====
The PMA Receive function interprets the signals at the MDI using the inverse mapping described in 147.4.2 for the PMA Transmit function and transfers the 5B code groups by the means of the PMA_UNITDATA.indication. When the PMA Receive function does not detect activity on the line, it shall convey the symbol 'I' (meaning SILENCE).
====

Cl **147** *SC* **147.2.2.1** *P* **170** *L* **35** # i-202

Griffiths, Scott Rockwell Automation

Comment Type **E** *Comment Status* **A** *Primitives*

"Simultaneously" is unclear here.

SuggestedRemedy

Either specify what is occuring simultaneously, or remove the word "simultaneously".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Remove the word simultaneously, by changing this:
====
During transmission, the PMA_UNITDATA.request simultaneously conveys to the PMA, via the parameter
tx_sym, the value of the symbol to be sent over the MDI.
====
to this:
====
During transmission, the PMA_UNITDATA.request conveys the value of the symbol to be sent over the MDI, via the parameter tx_sym.
====

Cl **147** *SC* **147.2.4.1** *P* **171** *L* **28** # i-203

Griffiths, Scott Rockwell Automation

Comment Type **T** *Comment Status* **R** *Primitives*

Shouldn't link_control disable/enable only the PMA, and not the entire PHY? If there is there no reason to not disable the PCS when disabling the PMA, then the distinction is unimporant, but this is not clear to me.

SuggestedRemedy

Change PHY on lines 28 and 29 to PMA.

Response *Response Status* **C**

REJECT.
CRG disagrees with the commenter. Link_control is intended to control the entire PHY. If the PMA gets no input from the PCS (that is being reset), the PHY is disabled.

Cl **147** *SC* **147.3.2.1** *P* **175** *L* **1** # i-156

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

Comment Type **E** *Comment Status* **A** *Editorial*

The PCS transmit state diagram should be in its own subclause, after the definitions of variables, constants, functions, abbreviations, and timers.

SuggestedRemedy

Create new Subclause 147.3.2.8 after 147.3.2.7 Timers, and anchor Figures 147-4 and 147-5 there.

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.2.1** *P* **175** *L* **7** # i-286

Beruto, Piergiorgio Canova Tech S.r.l.

Comment Type **E** *Comment Status* **A** *State Diagram*

In Figure 147-4 in the SILENT state, the tx_sym variable is assigned to the tx_cmd variable. However, if the tx_cmd variable changes to a value other than COMMIT, the tx_sym variable is not updated
as a result of a missing recirculating arc on the SILENT state.
This is not the intended behavior as the tx_cmd is used to convey HB or BEACON signaling while
the PCS Transmit State Diagram is still in SILENT state.

SuggestedRemedy

In Figure 147-4 add a recirculating arc to the silent state with the following condition:
STD * !pcs_txen * tx_cmd != COMMIT
with editorial license to format the expression according to IEEE style manual.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
In Figure 147-4 add a recirculating arc to the silent state with the following condition:
STD * (!pcs_txen) * (tx_cmd != COMMIT)

(use not-equal symbol for !=)

Cl **147** *SC* **147.3.2.1** *P* **176** *L* **25** # i-317

Baggett, Tim Microchip Technology, Inc.

Comment Type **E** *Comment Status* **A** *State Diagram*

The exit conditions from state BAD_ESD in the PCS transmit state diagram in Figure 147-5 has caused some confusion and could be clarified. The exit condition from BAD_ESD to UNJAB_WAIT is: (STD * !err * xmit_max_timer_done). However, the exit condition from BAD_ESD to connector [B] is simply STD. Some readers have interpreted that the transition from BAD_ESD to [B] would always be taken, rather than and "ELSE" type condition.

The exit conditions could be made more clear by changing the condition to transition from BAD_ESD to [B] to be the complement of the transition condition from BAD_ESD to UNJAB_WAIT. Essentially, we only want to transition from BAD_ESD:

* to UNJAB_WAIT if xmit_max_timer_done is true (indicating a jabber and transmitting ESDJAB)
* to [B] if there was an error (and transmitting ESDERR).

SuggestedRemedy

Change the transition condition from BAD_ESD to the connector [B] from "STD" to "STD * err"

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.2.1** *P* **176** *L* **31** # i-420

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *State Diagram*

Suggest that an approach similar to that found in IEEE Std 802.3-2018 Figure 28-18 'Arbitration state diagram' is used to mark the optional transition in Figure 147-5 'PCS Transmit state diagram'.

SuggestedRemedy

[1] Delete the text '(optional)'.
[2] Place a dashed box around the transition out of the UNJAB_WAIT and mark the box 'Optional Implementation'.

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.2.2** *P* **177** *L* **22** # i-369

Law, David Hewlett Packard Enterprise

Comment Type **TR** *Comment Status* **A** *PCS*

The description for tx_cmd as '5B symbol to be transmitted' doesn't seem to match some of its uses in Figure 147-4 'PCS Transmit state diagram' where it is used as part of the condition for a state transition and in an IF-THEN-ELSE is a state. These are the transition from the SILENT state to the COMMIT state that includes tx_cmd = COMMIT, and in the ESD state where actions depend on tx_cmd != COMMIT. In these cases, tx_cmd would appear to be the command being conveyed from a PLCA RS to the PHY via the MII. This seems to be confirmed by the text 'The tx_cmd variable is assigned according to the RS signaling over MII interface ...' in the tx_cmd variable description.

There is then the action tx_sym <= tx_cmd in the SILENT state but that seems to need a function to translate the value of tx_cmd, as well as hb_cmd, to determine the symbol to send.

Finally, I can't find the COMMAND state mentioned in the text '... when the PCS Transmit function is in COMMAND state.' of the tx_cmd variable description.

SuggestedRemedy

[1] Change the definition of tx_cmd to read:

tx_cmd
Encoding present on TXD<3:0>, TX_ER, and TX_DV as defined in Table 22-1.
Values:
BEACON: PLCA BEACON indication encoding present on TXD<3:0>, TX_ER, and TX_DV.
COMMIT: PLCA COMMIT indication encoding present on TXD<3:0>, TX_ER, and TX_DV.

[2] Define when tx_cmd is set to SILENCE.

[3] Add the following to 147.3.2.4 changing the title to 'Functions':

TXCMD_ ENCODE
In the PCS transmit process, this function takes as its arguments the values of tx_cmd and hb_cmd variables and returns a 5B symbol based on the following mapping:

'N' when the tx_cmd variable is set to BEACON,
'J' when the tx_cmd variable is set to COMMIT,
'T' when the hb_cmd variable is set to HEARTBEAT and the tx_cmd variable is not set to BEACON or COMMIT,
'I' otherwise.

[4] Change the action 'tx_sym <= tx_cmd' in the SILENT state of Figure 147-4 'PCS Transmit state diagram' to read 'tx_sym <= TXCMD_ ENCODE(tx_cmd, hb_cmd)'.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
1. Change the definition of tx_cmd to read:
====
tx_cmd
Encoding present on TXD<3:0>, TX_ER, and TX_EN as defined in Table 22-1.
Values:
BEACON: PLCA BEACON indication encoding present on TXD<3:0>, TX_ER, and TX_EN.
COMMIT: PLCA COMMIT indication encoding present on TXD<3:0>, TX_ER, and TX_EN.
SILENCE: TXD<3:0> does not encode any of the above requests, or TX_ER = FALSE, or TX_ER = TRUE.
====
2. Add the following to 147.3.2.4 changing the title to 'Functions':
====
TXCMD_ ENCODE
In the PCS transmit process, this function takes as its arguments the values of tx_cmd and hb_cmd variables and returns a 5B symbol based on the following mapping:
'N' when the tx_cmd variable is set to BEACON,
'J' when the tx_cmd variable is set to COMMIT,
'T' when the hb_cmd variable is set to HEARTBEAT and the tx_cmd variable is not set to BEACON or COMMIT,
'I' otherwise.
====
3. Change the action 'tx_sym <= tx_cmd' in the SILENT state of Figure 147-4 'PCS Transmit state diagram' to read 'tx_sym <= TXCMD_ ENCODE(tx_cmd, hb_cmd)'.

Cl **147** *SC* **147.3.2.2** *P* **177** *L* **22** # i-183

Xu, Dayin — Rockwell Automation

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

There is no definition of "COMMAND" state in PCS Transmit function.

SuggestedRemedy

Delete the sentence "5B symbol to be transmitted when the PCS Transmit function is in COMMAND state."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
RESOLVED BY COMMENT i-369, THE PROPOSED RESPONSE OF WHICH IS AS FOLLOWS:
>>>>
PROPOSED ACCEPT IN PRINCIPLE.
1. Change the definition of tx_cmd to read:
====
tx_cmd
Encoding present on TXD<3:0>, TX_ER, and TX_EN as defined in Table 22-1.
Values:
BEACON: PLCA BEACON indication encoding present on TXD<3:0>, TX_ER, and TX_EN.
COMMIT: PLCA COMMIT indication encoding present on TXD<3:0>, TX_ER, and TX_EN.
SILENCE: TXD<3:0> does not encode any of the above requests, or TX_ER = FALSE, or TX_ER = TRUE.
====
2. Add the following to 147.3.2.4 changing the title to 'Functions':
====
TXCMD_ ENCODE
In the PCS transmit process, this function takes as its arguments the values of tx_cmd and hb_cmd variables and returns a 5B symbol based on the following mapping:
'N' when the tx_cmd variable is set to BEACON,
'J' when the tx_cmd variable is set to COMMIT,
'T' when the hb_cmd variable is set to HEARTBEAT and the tx_cmd variable is not set to BEACON or COMMIT,
'I' otherwise.
====
3. Change the action 'tx_sym <= tx_cmd' in the SILENT state of Figure 147-4 'PCS Transmit state diagram' to read 'tx_sym <= TXCMD_ ENCODE(tx_cmd, hb_cmd)'.
<<<<

Cl **147** *SC* **147.3.2.2** *P* **177** *L* **34** # i-184

Xu, Dayin — Rockwell Automation

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

It is not 100% correct to say "... directly passed from tx_cmd in SILENT state ..." because tx_cmd is also used in "COMMIT", "SYNC" state.

SuggestedRemedy

Delete " in SILENT state" from the sentence "... directly passed from tx_cmd in SILENT state ...".

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.2.2** *P* **177** *L* **38** # i-128

Graber, Steffen — Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **R** *Editorial*

..., it indicates a transmission is ongoing. (add "that")

SuggestedRemedy

..., it indicates that a transmission is ongoing.

Response *Response Status* **C**

REJECT.
CRG disagrees with the commenter.
Current text is correct.
According to the IEEE style guide, 'that' is best reserved for essential clauses.

Cl **147** *SC* **147.3.2.2** *P* **177** *L* **49** # i-172

Zimmerman, George — ADI, APL Group, Aquantia, BMW, Cisco, Commscop

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

"When Auto-Negotiation is not present or enabled" seems logically incorrrect.

SuggestedRemedy

Change to "When Auto-Negotiation is not present or Auto-Negotiation is disabled,"

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.2.3** *P* **178** *L* **3** # i-129

Graber, Steffen Pepperl+Fuchs GmbH

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

'J' is not only used for SYNC, but also for COMMIT

SuggestedRemedy

Change SYNC to SYNC / COMMIT.

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.2.3** *P* **178** *L* **3** # i-185

Xu, Dayin Rockwell Automation

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

The constant COMMIT is not defined in 147.3.2.3.

SuggestedRemedy

Change "SYNC" to "SYNC/COMMIT" to match the definition in Table 147-1

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
RESOLVED BY COMMENT i-129, THE RESPONSE OF WHICH IS AS FOLLOWS:

ACCEPT.

Suggested remedy to comment i-129 is:
Change SYNC to SYNC / COMMIT.

Cl **147** *SC* **147.3.2.3** *P* **178** *L* **8** # i-130

Graber, Steffen Pepperl+Fuchs GmbH

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

'T' is not only used for ESD, but also for HB.

SuggestedRemedy

Change ESD to ESD / HB.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **147** *SC* **147.3.2.4** *P* **179** *L* **10** # i-247

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *PCS*

The non-data entries in his table should be conditional on access method and marked as such.

SuggestedRemedy

Those codes not used in CSMA/CD should be marked as "Reserved" when in CSMA/CD mode.

Response *Response Status* **C**

REJECT.
As a PHY, proper implementation of layering requires support of the codes provided via the MII, and the table indicates encoding of the various codes which may be present at the MII, as specified in Clause 22 of this amendment.
It would break layering by specifying the PHY act differently based on what would be a MAC-layer parameter in other comments.

Cl **147** *SC* **147.3.2.5** *P* **179** *L* **22** # i-370

Law, David Hewlett Packard Enterprise

Comment Type **TR** *Comment Status* **A** *PCS*

As illustrated in Figure 147-2 '10BASE-T1S PHY interfaces' and Figure 147-3 'PCS reference diagram', and defined in IEEE Std 802.3-2018 subclause 22.2.2.1, TX_CLK is sourced from the PHY to the RS. Despite this, I was unable to find a specification of TX_CLK in Clause 146. Suggest that TX_CLK is generated from a symb_timer and STD is an alias for symb_timer_done.

SuggestedRemedy

[1] Insert a new subclause 147.3.2.5 titled 'Timer' that reads as follows, renumber subsequent subclauses as required.

5B_symb_timer
A continuous free-running timer. PMA_UNITDATA.request messages are is issued by the PCS concurrently with 5B_symb_timer_done. TX_CLK (see 22.2.2.1) shall be generated from 5B_symb_timer with the rising edge of TX_TCLK generated synchronously with 5B_symb_timer_done.
Duration: Five DME clock transition to clock transition times (see Table 147-3)

[2] Change current subclause 147.3.2.5 'Abbreviations' to read:

STD
Alias for 5B_symb_timer_done.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accomodated by comment i-423. Response to comment i-423 is:
ACCEPT IN PRINCIPLE.
Multiple editorial changes are required in both the PCS Receive and PCS Transmit functions subclauses to address the lack of clarity pointed out by the commenter.

Editorial license to align other comments with the variable name changes in this comment response, and to re-alphabetize variable names in lists as necessary.

Throughout the whole subclause 147.3.2 (including figures) apply the following changes:
- replace all occurrences of "pcs_txen" with "TX_EN"
- replace all occurrences of "pcs_txer" with "TX_ER"
- replace all occurrences of "pcs_txd" with "TXD"

Throughout the whole subclause 147.3.3 (including figures) apply the following changes:
- replace all occurrences of "pcs_rxdv" with "RX_DV"
- replace all occurrences of "pcs_rxer" with "RX_ER"
- replace all occurrences of "pcs_rxd" with "RXD"

At page 170, line 42 replace "with every PCS transmit clock cycle" to
"with every symb_timer expiration. The symb_timer is defined in 147.3.2.7."

At page 177, line 33 change the description of the "tx_sym" variable to:
"5B symbol to be conveyed to the PMA Transmit function by the means of the PMA_UNITDATA.request primitive specified in 147.2.2."

At page 178, line 24 change the description of the "ENCODE" function to:
"This function takes a 4 bit input parameter Scn<3:0> and returns a 5B symbol according to the following procedure:
1. Convert Scn<3:0> into Sdn<3:0> as specified in 147.3.2.6.
2. Convert Sdn<3:0> (4B symbol) into the corresponding 5B symbol defined in Table 147-1."

At page 179, line 24 change the description of the "STD" abbreviation to:
"Alias for symbol timer done."

At page 179, line 32, change the second paragraph (starting with "An implementation of ..." to read:
"An implementation of a self-synchronizing scrambler by a linear-feedback shift register is shown in Figure 147–6. The bits stored in the shift register delay line at time n are denoted by Scrn<16:0>. The '+' symbol denotes the exclusive OR logical operation. When Scn<3:0> is presented at the input of the scrambler, Sdn<3:0> is produced by shifting in each bit of Scn<3:0> as Scn<i>, with i ranging from 0 to 3 (i.e., LSB first). The scrambler is reset upon execution of the PCS Reset function. If the PCS Reset is executed, all bits of the 17-bit vector representing the self-synchronizing scrambler state are arbitrarily set. The initialization of the scrambler state is left to the implementer. In no case shall the scrambler state be initialized to all zeroes. At every STD, if no data is presented at the scrambler input via Scn<3:0>, the scrambler may be fed with arbitrary inputs."

At page 180, line 8, append the following text to subclause 147.3.2.7:
"symb_timer
A continuous free-running timer. PMA_UNITDATA.request messages are issued by the PCS concurrently with symb_timer_done (see 147.2.2). TX_CLK (see 22.2.2.1) shall be generated from 5B_symb_timer with the rising edge of TX_TCLK generated synchronously with 5B_symb_timer_done.
Continuous timer: The condition symb_timer_done becomes true upon timer expiration.
Restart time: Immediately after expiration.
Duration: 400 ns ± 100 ppm (see 22.2.2.1)"

At page 179 in Figure 147-6 perform the following changes:
- replace "TXDn[i]" with "Scn<i>". Please note the 'n' is a subscript
- replace all square brackets '[]' with angular brackets '<>'

At page 180, line 9, change the description of the "RXn" variable to read:
"The rx_sym parameter of the PMA_UNITADATA.indication primitive defined in 147.2.1.
The 'n' subscript denotes the rx_sym conveyed in the most recent recv_symb_conv_timer cycle.
The 'n-x' subscript indicates the rx_sym conveyed 'x' cycles behind the most recent one."

At page 181, line 18, change the description of the "DECODE" function to read:
"This function takes a 5B symbol input parameter and returns a 4 bit value Dcn<3:0> value

according to the following procedure:
1. Convert the 5B input symbol into Drn<3:0> by performing a reverse lookup of Table 147-1. If no 4B value is associated to the given 5B symbol, the PCS Receive function shall assert RX_ER for at least one symbol period and Drn<3:0> may be set arbitrarily.
2. Convert Drn<3:0> to Dcn<3:0> as specified in 147.3.3.7."

Please not that the 'n' in the Dcn and Drn variables name is a subscript.

At page 181, line 26, change the description of the "RSCD" abbreviation to read:
"Alias for recv_symb_conv_timer_done."

At page 183, line 48, insert a new subclause 147.3.3.x with name "Timers" between existing subclauses 147.3.3.7 and 147.3.3.8.
Add the following text to the newly created subclause:
"recv_symb_conv_timer
A continuous timer which expires when the PMA_UNITDATA.indication message is generated (see 147.2.1).
Continuous timer: The condition recv_symb_conv_timer_done becomes true upon timer expiration.
Restart time: Immediately after expiration.
Duration: timed by the PMA_UNITDATA.indication message generation."

Perform renumbering of the subclauses accordingly.

At page 183, line 28 change the whole paragraph starting with "The PCS receive function shall ..." to read:
"The PCS Receive function descrambles the 5B/4B decoded data stream and returns the value of RXD<3:0> to the MII. The descrambler shall employ the polynomial defined in 147.3.2.6. The implementation of the self-synchronizing descrambler by linear-feedback shift register is shown in Figure 147–9. The bits stored in the shift register delay line at time n are denoted by Dcrn<16:0>. The '+' symbol denotes the exclusive OR logical operation. When Drn<3:0> is presented at the input of the descrambler, Dcn<3:0> is produced by shifting in each bit of Drn<3:0> as Drn<i>, with i ranging from 0 to 3 (i.e., LSB first). The descrambler is reset upon execution of the PCS Reset function. If PCS Reset is executed, all the bits of the 17-bit vector representing the self-synchronizing descrambler state are arbitrarily set. The initialization of the descrambler state is left to the implementer. At every RSCD, if no data is presented at the descrambler input via Drn<3:0>, the descrambler may be fed with arbitrary inputs."

Please not that the 'n' in the Dcn and Drn variables name is a subscript.

At page 183, in figure 147-9, perform the following changes:
- replace "RXDn[i]" with "DCn[i]"
- replace all square brackets '[]' with angular brackets '<>'

At page 191, line 52, add the followint text after "DME encoded stream received at the MDI.":
"The clock recovery provides a synchronous clock for sampling the signal on the pair. While it may not drive the MII directly, the clock recovery function is the underlying source of RX_CLK."

Cl **147** *SC* **147.3.2.** *P* **179** *L* **26** # i-2

Huszak, Gergely Kone

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

The proper definition of STD is lacking.

SuggestedRemedy

Do the following 2 changes:
- Insert new timer to the end of 147.3.2.7 with the following content and using the regular timer definition layout/formatting::
====
5B_symbol_timer
The 5B_symbol_timer shall be generated synchronously with PCS transmit clock TX_CLK.
Continuous timer: The condition 5B_symbol_timer_done becomes true upon timer expiration.
Restart time: Immediately after expiration, timer restart resets the condition 5B_symbol_timer_done.
Duration: Five DME clock transitions (see Table 147-2).
====
- Change the definition of STD in 147.3.2.5:
from:
====
Alias for 5B symbol timer done, synchronous to PCS TX clock.
====
to:
====
Alias for 5B_symbol_timer_done.
====

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accomodated by comment i-423. Response to comment i-423 is:
ACCEPT IN PRINCIPLE.
Multiple editorial changes are required in both the PCS Receive and PCS Transmit functions subclauses to address the lack of clarity pointed out by the commenter.

Editorial license to align other comments with the variable name changes in this comment response, and to re-alphabetize variable names in lists as necessary.

Throughout the whole subclause 147.3.2 (including figures) apply the following changes:
- replace all occurrences of "pcs_txen" with "TX_EN"
- replace all occurrences of "pcs_txer" with "TX_ER"
- replace all occurrences of "pcs_txd" with "TXD"

Throughout the whole subclause 147.3.3 (including figures) apply the following changes:
- replace all occurrences of "pcs_rxdv" with "RX_DV"
- replace all occurrences of "pcs_rxer" with "RX_ER"
- replace all occurrences of "pcs_rxd" with "RXD"

At page 170, line 42 replace "with every PCS transmit clock cycle" to
"with every symb_timer expiration. The symb_timer is defined in 147.3.2.7."

At page 177, line 33 change the description of the "tx_sym" variable to:
"5B symbol to be conveyed to the PMA Transmit function by the means of the PMA_UNITDATA.request primitive specified in 147.2.2."

At page 178, line 24 change the description of the "ENCODE" function to:
"This function takes a 4 bit input parameter Scn<3:0> and returns a 5B symbol according to the following procedure:
1. Convert Scn<3:0> into Sdn<3:0> as specified in 147.3.2.6.
2. Convert Sdn<3:0> (4B symbol) into the corresponding 5B symbol defined in Table 147-1."

At page 179, line 24 change the description of the "STD" abbreviation to:
"Alias for symbol timer done."

At page 179, line 32, change the second paragraph (starting with "An implementation of ..." to read:
"An implementation of a self-synchronizing scrambler by a linear-feedback shift register is shown in Figure 147–6. The bits stored in the shift register delay line at time n are denoted by Scrn<16:0>. The '+' symbol denotes the exclusive OR logical operation. When Scn<3:0> is presented at the input of the scrambler, Sdn<3:0> is produced by shifting in each bit of Scn<3:0> as Scn<i>, with i ranging from 0 to 3 (i.e., LSB first). The scrambler is reset upon execution of the PCS Reset function. If the PCS Reset is executed, all bits of the 17-bit vector representing the self-synchronizing scrambler state are arbitrarily set. The initialization of the scrambler state is left to the implementer. In no case shall the scrambler state be initialized to all zeroes. At every STD, if no data is presented at the scrambler input via Scn<3:0>, the scrambler may be fed with arbitrary inputs."

At page 180, line 8, append the following text to subclause 147.3.2.7:
"symb_timer
A continuous free-running timer. PMA_UNITDATA.request messages are issued by the PCS concurrently with symb_timer_done (see 147.2.2). TX_CLK (see 22.2.2.1) shall be generated from 5B_symb_timer with the rising edge of TX_TCLK generated synchronously with 5B_symb_timer_done.
Continuous timer: The condition symb_timer_done becomes true upon timer expiration.
Restart time: Immediately after expiration.
Duration: 400 ns ± 100 ppm (see 22.2.2.1)"

At page 179 in Figure 147-6 perform the following changes:
- replace "TXDn[i]" with "Scn<i>". Please note the 'n' is a subscript
- replace all square brackets '[]' with angular brackets '<>'

At page 180, line 9, change the description of the "RXn" variable to read:
"The rx_sym parameter of the PMA_UNITADATA.indication primitive defined in 147.2.1.
The 'n' subscript denotes the rx_sym conveyed in the most recent recv_symb_conv_timer cycle.
The 'n-x' subscript indicates the rx_sym conveyed 'x' cycles behind the most recent one."

At page 181, line 18, change the description of the "DECODE" function to read:
"This function takes a 5B symbol input parameter and returns a 4 bit value Dcn<3:0> value according to the following procedure:
1. Convert the 5B input symbol into Drn<3:0> by performing a reverse lookup of Table 147-1. If no 4B value is associated to the given 5B symbol, the PCS Receive function shall assert RX_ER for at least one symbol period and Drn<3:0> may be set arbitrarily.
2. Convert Drn<3:0> to Dcn<3:0> as specified in 147.3.3.7."

Please not that the 'n' in the Dcn and Drn variables name is a subscript.

At page 181, line 26, change the description of the "RSCD" abbreviation to read:
"Alias for recv_symb_conv_timer_done."

At page 183, line 48, insert a new subclause 147.3.3.x with name "Timers" between existing subclauses 147.3.3.7 and 147.3.3.8.
Add the following text to the newly created subclause:
"recv_symb_conv_timer
A continuous timer which expires when the PMA_UNITDATA.indication message is generated (see 147.2.1).
Continuous timer: The condition recv_symb_conv_timer_done becomes true upon timer expiration.
Restart time: Immediately after expiration.
Duration: timed by the PMA_UNITDATA.indication message generation."

Perform renumbering of the subclauses accordingly.

At page 183, line 28 change the whole paragraph starting with "The PCS receive function shall ..." to read:
"The PCS Receive function descrambles the 5B/4B decoded data stream and returns the value of RXD<3:0> to the MII. The descrambler shall employ the polynomial defined in 147.3.2.6. The implementation of the self-synchronizing descrambler by linear-feedback shift register is shown in Figure 147–9. The bits stored in the shift register delay line at time n are denoted by Dcrn<16:0>. The '+' symbol denotes the exclusive OR logical operation. When Drn<3:0> is presented at the input of the descrambler, Dcn<3:0> is produced by shifting in each bit of Drn<3:0> as Drn<i>, with i ranging from 0 to 3 (i.e., LSB first). The descrambler is reset upon execution of the PCS Reset function. If PCS Reset is executed, all the bits of the 17-bit vector representing the self-synchronizing descrambler state are arbitrarily set. The initialization of the descrambler state is left to the implementer. At every RSCD, if no data is presented at the descrambler input via Drn<3:0>, the descrambler may be fed with arbitrary inputs."

Please not that the 'n' in the Dcn and Drn variables name is a subscript.

At page 183, in figure 147-9, perform the following changes:
- replace "RXDn[i]" with "DCn[i]"
- replace all square brackets '[]' with angular brackets '<>'

At page 191, line 52, add the followint text after "DME encoded stream received at the MDI.":

"The clock recovery provides a synchronous clock for sampling the signal on the pair. While it may not drive the MII directly, the clock recovery function is the underlying source of RX_CLK."

Cl **147** *SC* **147.3.2.6** *P* **179** *L* **27** # i-157

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

Comment Type **E** *Comment Status* **A** *Editorial*

The subclause for the self-synchronizing scrambler does not belong in the middle of the subclauses defining abbreviations and timers for the state diagram

SuggestedRemedy

Move 147.3.2.6 immediately prior to 147.3.2.8 Jabber functional requirements so that it is after all the PCS Transmit state diagram material (adjusting the numbers for any rearrangements as necessary)

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.2.6** *P* **179** *L* **35** # i-131

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

... of Scrn[13], Scrn[16] and TXD[i] ... (add serial comma)

SuggestedRemedy

... of Scrn[13], Scrn[16], and TXD[i] ...

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.2.8** *P* **180** *L* **16** # i-173

Zimmerman, George ADI, APL Group, Aquantia, BMW, Cisco, Commscop

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

"or it can keep silent until reset." - this is unusual language for allowed behavior - "may" is more appropriate

SuggestedRemedy

Change "can" to "may"

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.3.1** *P* **180** *L* **29** # i-195

Beruto, Piergiorgio Canova Tech S.r.l.

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

Non-required "shall".

SuggestedRemedy

Replace "which shall instead be used" with "which can be used".
At page 208, line 9, delete the PCSR2 entry from the PICS.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace, "the next nine symbols which shall instead be used to achieve lock of the self-synchronizing descrambler."

with, "the next nine symbols. These symbols can be used to achieve lock of the self-synchronizing descrambler."

At page 208, line 9, delete the PCSR2 entry from the PICS.

Cl **147** *SC* **147.3.3.2** *P* **180** *L* **53** # i-423

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Editorial*

Not sure why the variable to represent the RX_DV signal of the MII is named pcs_rxdv, RX_ER is named pcs_rxer and RXD named pcs_rxd in the PCS Receive state diagram, particularly when the Figure 147-10 'Heartbeat transmit state diagram' uses COL for the MII signal COL, CRS for CRS and RX_DV for RX_DV.

SuggestedRemedy

Suggest that in Figure 147-7 and 147-8:

[1] pcs_rxdv is renamed RX_DV.
[2] pcs_rxer is renamed RX_ER.
[2] pcs_rxd is renamed RXD.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Multiple editorial changes are required in both the PCS Receive and PCS Transmit functions subclauses to address the lack of clarity pointed out by the commenter.

Editorial license to align other comments with the variable name changes in this comment response, and to re-alphabetize variable names in lists as necessary.

Throughout the whole subclause 147.3.2 (including figures) apply the following changes:
- replace all occurrences of "pcs_txen" with "TX_EN"
- replace all occurrences of "pcs_txer" with "TX_ER"
- replace all occurrences of "pcs_txd" with "TXD"

Throughout the whole subclause 147.3.3 (including figures) apply the following changes:
- replace all occurrences of "pcs_rxdv" with "RX_DV"
- replace all occurrences of "pcs_rxer" with "RX_ER"
- replace all occurrences of "pcs_rxd" with "RXD"

At page 170, line 42 replace "with every PCS transmit clock cycle" to
"with every symb_timer expiration. The symb_timer is defined in 147.3.2.7."

At page 177, line 33 change the description of the "tx_sym" variable to:
"5B symbol to be conveyed to the PMA Transmit function by the means of the PMA_UNITDATA.request primitive specified in 147.2.2."

At page 178, line 24 change the description of the "ENCODE" function to:
"This function takes a 4 bit input parameter Scn<3:0> and returns a 5B symbol according to the following procedure:
1. Convert Scn<3:0> into Sdn<3:0> as specified in 147.3.2.6.
2. Convert Sdn<3:0> (4B symbol) into the corresponding 5B symbol defined in Table 147-1."

At page 179, line 24 change the description of the "STD" abbreviation to:
"Alias for symbol timer done."

At page 179, line 32, change the second paragraph (starting with "An implementation of ..." to read:
"An implementation of a self-synchronizing scrambler by a linear-feedback shift register is shown in Figure 147–6. The bits stored in the shift register delay line at time n are denoted by Scrn<16:0>. The '+' symbol denotes the exclusive OR logical operation. When Scn<3:0> is presented at the input of the scrambler, Sdn<3:0> is produced by shifting in each bit of Scn<3:0> as Scn<i>, with i ranging from 0 to 3 (i.e., LSB first). The scrambler is reset upon execution of the PCS Reset function. If the PCS Reset is executed, all bits of the 17-bit vector representing the self-synchronizing scrambler state are arbitrarily set. The initialization of the scrambler state is left to the implementer. In no case shall the scrambler state be initialized to all zeroes. At every STD, if no data is presented at the scrambler input via Scn<3:0>, the scrambler may be fed with arbitrary inputs."

At page 180, line 8, append the following text to subclause 147.3.2.7:
"symb_timer
A continuous free-running timer. PMA_UNITDATA.request messages are issued by the PCS concurrently with symb_timer_done (see 147.2.2). TX_CLK (see 22.2.2.1) shall be generated from 5B_symb_timer with the rising edge of TX_TCLK generated synchronously with 5B_symb_timer_done.
Continuous timer: The condition symb_timer_done becomes true upon timer expiration.
Restart time: Immediately after expiration.
Duration: 400 ns ± 100 ppm (see 22.2.2.1)"

At page 179 in Figure 147-6 perform the following changes:
- replace "TXDn[i]" with "Scn<i>". Please note the 'n' is a subscript
- replace all square brackets '[]' with angular brackets '<>'

At page 180, line 9, change the description of the "RXn" variable to read:
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The 'n' subscript denotes the rx_sym conveyed in the most recent recv_symb_conv_timer cycle.
The 'n-x' subscript indicates the rx_sym conveyed 'x' cycles behind the most recent one."

At page 181, line 18, change the description of the "DECODE" function to read:
"This function takes a 5B symbol input parameter and returns a 4 bit value Dcn<3:0> value according to the following procedure:
1. Convert the 5B input symbol into Drn<3:0> by performing a reverse lookup of Table 147-1. If no 4B value is associated to the given 5B symbol, the PCS Receive function shall assert RX_ER for at least one symbol period and Drn<3:0> may be set arbitrarily.
2. Convert Drn<3:0> to Dcn<3:0> as specified in 147.3.3.7."

Please not that the 'n' in the Dcn and Drn variables name is a subscript.

At page 181, line 26, change the description of the "RSCD" abbreviation to read:
"Alias for recv_symb_conv_timer_done."

At page 183, line 48, insert a new subclause 147.3.3.x with name "Timers" between

existing subclauses 147.3.3.7 and 147.3.3.8.
Add the following text to the newly created subclause:
"recv_symb_conv_timer
A continuous timer which expires when the PMA_UNITDATA.indication message is generated (see 147.2.1).
Continuous timer: The condition recv_symb_conv_timer_done becomes true upon timer expiration.
Restart time: Immediately after expiration.
Duration: timed by the PMA_UNITDATA.indication message generation."

Perform renumbering of the subclauses accordingly.

At page 183, line 28 change the whole paragraph starting with "The PCS receive function shall ..." to read:
"The PCS Receive function descrambles the 5B/4B decoded data stream and returns the value of RXD<3:0> to the MII. The descrambler shall employ the polynomial defined in 147.3.2.6. The implementation of the self-synchronizing descrambler by linear-feedback shift register is shown in Figure 147–9. The bits stored in the shift register delay line at time n are denoted by Dcrn<16:0>. The '+' symbol denotes the exclusive OR logical operation. When Drn<3:0> is presented at the input of the descrambler, Dcn<3:0> is produced by shifting in each bit of Drn<3:0> as Drn<i>, with i ranging from 0 to 3 (i.e., LSB first). The descrambler is reset upon execution of the PCS Reset function. If PCS Reset is executed, all the bits of the 17-bit vector representing the self-synchronizing descrambler state are arbitrarily set. The initialization of the descrambler state is left to the implementer. At every RSCD, if no data is presented at the descrambler input via Drn<3:0>, the descrambler may be fed with arbitrary inputs."

Please not that the 'n' in the Dcn and Drn variables name is a subscript.

At page 183, in figure 147-9, perform the following changes:
- replace "RXDn[i]" with "DCn[i]"
- replace all square brackets '[]' with angular brackets '<>'

At page 191, line 52, add the followint text after "DME encoded stream received at the MDI.":
"The clock recovery provides a synchronous clock for sampling the signal on the pair. While it may not drive the MII directly, the clock recovery function is the underlying source of RX_CLK."

Cl **147** *SC* **147.3.3.4** *P* **181** *L* **23** # i-281

Huszak, Gergely Kone

Comment Type **T** *Comment Status* **A** *State Diagram*

Descrambler needs 17 bits to lock and that is achieved by receiving 5 symbols.
Descrambler is fed by 4B symbols, so DECODE must be called to be able to do the feeding.
According to the current specification of the PCS_RX FSM, DECODE is called only in DATA state.
If it is done this way, the first 5 actual data symbols would be garbage, as descrambler is not yet locked.
A fix is to spec PCS_RX so, that this DECODE-and-feed task is already run in PRE state, so that by the time DATA state is reached, meaningful descrambling could be done, using the descrambler locked previously.
Moreover it is not specified what descrambler is to be fed, when DECODE fails.

SuggestedRemedy

1. Add the following sentence to the end of the paragraph that ends 181/23 (replacing its closing dot): ", and the return value of this function is implementation-dependent."
2. Add the following new condition to the end of the current content of PCS_RX/PRE:
====
IF precnt > 3 THEN
<tab>DECODE(RXn-3)
END
====
Note: the index "-3" in RXn-3 already incorporates the comment that is submitted by Piergiogio Beruto tagged INDEX

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.3.5** *P* **181** *L* **26** # i-3

Huszak, Gergely Kone

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

The proper definition of RSCD is lacking.

SuggestedRemedy

Do the following 2 changes:
- Create a new subclause "147.3.3.8 Timers" (let 147.3.3.8-10 renumber automatically) and insert the following text underneath using the regular timer definition layout/formatting:
====
receive_symbol_conversion_timer
The receive_symbol_conversion_timer shall be generated synchronously with the PCS receive clock.
Continuous timer: The condition receive_symbol_conversion_timer_done becomes true upon timer expiration.
Restart time: Immediately after expiration, timer restart resets the condition receive_symbol_conversion_timer_done.
Duration: Five receive DME clock transitions (see Table 147-2).
====
- Change the definition of RSCD in 147.3.3.5:
from:
====
Alias for Receive Symbol Conversion Done, synchronous to PCS RX clock.
====
to:
====
Alias for receive_symbol_conversion_timer_done.
====

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accomodated by comment i-423. Response to comment i-423 is:
ACCEPT IN PRINCIPLE.
Multiple editorial changes are required in both the PCS Receive and PCS Transmit functions subclauses to address the lack of clarity pointed out by the commenter.

Editorial license to align other comments with the variable name changes in this comment response, and to re-alphabetize variable names in lists as necessary.

Throughout the whole subclause 147.3.2 (including figures) apply the following changes:
- replace all occurrences of "pcs_txen" with "TX_EN"
- replace all occurrences of "pcs_txer" with "TX_ER"
- replace all occurrences of "pcs_txd" with "TXD"

Throughout the whole subclause 147.3.3 (including figures) apply the following changes:
- replace all occurrences of "pcs_rxdv" with "RX_DV"
- replace all occurrences of "pcs_rxer" with "RX_ER"
- replace all occurrences of "pcs_rxd" with "RXD"

At page 170, line 42 replace "with every PCS transmit clock cycle" to
"with every symb_timer expiration. The symb_timer is defined in 147.3.2.7."

At page 177, line 33 change the description of the "tx_sym" variable to:
"5B symbol to be conveyed to the PMA Transmit function by the means of the PMA_UNITDATA.request primitive specified in 147.2.2."

At page 178, line 24 change the description of the "ENCODE" function to:
"This function takes a 4 bit input parameter Scn<3:0> and returns a 5B symbol according to the following procedure:
1. Convert Scn<3:0> into Sdn<3:0> as specified in 147.3.2.6.
2. Convert Sdn<3:0> (4B symbol) into the corresponding 5B symbol defined in Table 147-1."

At page 179, line 24 change the description of the "STD" abbreviation to:
"Alias for symbol timer done."

At page 179, line 32, change the second paragraph (starting with "An implementation of ..." to read:
"An implementation of a self-synchronizing scrambler by a linear-feedback shift register is shown in Figure 147–6. The bits stored in the shift register delay line at time n are denoted by Scrn<16:0>. The '+' symbol denotes the exclusive OR logical operation. When Scn<3:0> is presented at the input of the scrambler, Sdn<3:0> is produced by shifting in each bit of Scn<3:0> as Scn<i>, with i ranging from 0 to 3 (i.e., LSB first). The scrambler is reset upon execution of the PCS Reset function. If the PCS Reset is executed, all bits of the 17-bit vector representing the self-synchronizing scrambler state are arbitrarily set. The initialization of the scrambler state is left to the implementer. In no case shall the scrambler state be initialized to all zeroes. At every STD, if no data is presented at the scrambler input via Scn<3:0>, the scrambler may be fed with arbitrary inputs."

At page 180, line 8, append the following text to subclause 147.3.2.7:
"symb_timer
A continuous free-running timer. PMA_UNITDATA.request messages are issued by the PCS concurrently with symb_timer_done (see 147.2.2). TX_CLK (see 22.2.2.1) shall be generated from 5B_symb_timer with the rising edge of TX_TCLK generated synchronously with 5B_symb_timer_done.
Continuous timer: The condition symb_timer_done becomes true upon timer expiration.
Restart time: Immediately after expiration.
Duration: 400 ns ± 100 ppm (see 22.2.2.1)"

At page 179 in Figure 147-6 perform the following changes:
- replace "TXDn[i]" with "Scn<i>". Please note the 'n' is a subscript
- replace all square brackets '[]' with angular brackets '<>'

At page 180, line 9, change the description of the "RXn" variable to read:
"The rx_sym parameter of the PMA_UNITADATA.indication primitive defined in 147.2.1.
The 'n' subscript denotes the rx_sym conveyed in the most recent recv_symb_conv_timer cycle.

The ‘n-x’ subscript indicates the rx_sym conveyed ‘x’ cycles behind the most recent one."

At page 181, line 18, change the description of the "DECODE" function to read:
"This function takes a 5B symbol input parameter and returns a 4 bit value Dcn<3:0> value according to the following procedure:
1. Convert the 5B input symbol into Drn<3:0> by performing a reverse lookup of Table 147-1. If no 4B value is associated to the given 5B symbol, the PCS Receive function shall assert RX_ER for at least one symbol period and Drn<3:0> may be set arbitrarily.
2. Convert Drn<3:0> to Dcn<3:0> as specified in 147.3.3.7."

Please not that the 'n' in the Dcn and Drn variables name is a subscript.

At page 181, line 26, change the description of the "RSCD" abbreviation to read:
"Alias for recv_symb_conv_timer_done."

At page 183, line 48, insert a new subclause 147.3.3.x with name "Timers" between existing subclauses 147.3.3.7 and 147.3.3.8.
Add the following text to the newly created subclause:
"recv_symb_conv_timer
A continuous timer which expires when the PMA_UNITDATA.indication message is generated (see 147.2.1).
Continuous timer: The condition recv_symb_conv_timer_done becomes true upon timer expiration.
Restart time: Immediately after expiration.
Duration: timed by the PMA_UNITDATA.indication message generation."

Perform renumbering of the subclauses accordingly.

At page 183, line 28 change the whole paragraph starting with "The PCS receive function shall ..." to read:
"The PCS Receive function descrambles the 5B/4B decoded data stream and returns the value of RXD<3:0> to the MII. The descrambler shall employ the polynomial defined in 147.3.2.6. The implementation of the self-synchronizing descrambler by linear-feedback shift register is shown in Figure 147–9. The bits stored in the shift register delay line at time n are denoted by Dcrn<16:0>. The ‘+’ symbol denotes the exclusive OR logical operation. When Drn<3:0> is presented at the input of the descrambler, Dcn<3:0> is produced by shifting in each bit of Drn<3:0> as Drn<i>, with i ranging from 0 to 3 (i.e., LSB first). The descrambler is reset upon execution of the PCS Reset function. If PCS Reset is executed, all the bits of the 17-bit vector representing the self-synchronizing descrambler state are arbitrarily set. The initialization of the descrambler state is left to the implementer. At every RSCD, if no data is presented at the descrambler input via Drn<3:0>, the descrambler may be fed with arbitrary inputs."

Please not that the 'n' in the Dcn and Drn variables name is a subscript.

At page 183, in figure 147-9, perform the following changes:
- replace "RXDn[i]" with "DCn[i]"
- replace all square brackets '[]' with angular brackets '<>'

At page 191, line 52, add the followint text after "DME encoded stream received at the MDI.":
"The clock recovery provides a synchronous clock for sampling the signal on the pair. While it may not drive the MII directly, the clock recovery function is the underlying source of RX_CLK."

Cl **147** *SC* **147.3.3.5** *P* **181** *L* **27** # i-32

Marris, Arthur Cadence Design Systems, Inc.

Comment Type **TR** *Comment Status* **A** *PCS*

Definition of RSCD is not adequate

SuggestedRemedy

"RSCD indicates a new symbol has been decoded and is available for processing in the state diagram."

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.
Accomodated by comment i-423. Response to comment i-423 is:
ACCEPT IN PRINCIPLE.
Multiple editorial changes are required in both the PCS Receive and PCS Transmit functions subclauses to address the lack of clarity pointed out by the commenter.

Editorial license to align other comments with the variable name changes in this comment response, and to re-alphabetize variable names in lists as necessary.

Throughout the whole subclause 147.3.2 (including figures) apply the following changes:
- replace all occurrences of "pcs_txen" with "TX_EN"
- replace all occurrences of "pcs_txer" with "TX_ER"
- replace all occurrences of "pcs_txd" with "TXD"

Throughout the whole subclause 147.3.3 (including figures) apply the following changes:
- replace all occurrences of "pcs_rxdv" with "RX_DV"
- replace all occurrences of "pcs_rxer" with "RX_ER"
- replace all occurrences of "pcs_rxd" with "RXD"

At page 170, line 42 replace "with every PCS transmit clock cycle" to
"with every symb_timer expiration. The symb_timer is defined in 147.3.2.7."

At page 177, line 33 change the description of the "tx_sym" variable to:
"5B symbol to be conveyed to the PMA Transmit function by the means of the PMA_UNITDATA.request primitive specified in 147.2.2."

At page 178, line 24 change the description of the "ENCODE" function to:
"This function takes a 4 bit input parameter Scn<3:0> and returns a 5B symbol according to the following procedure:
1. Convert Scn<3:0> into Sdn<3:0> as specified in 147.3.2.6.
2. Convert Sdn<3:0> (4B symbol) into the corresponding 5B symbol defined in Table 147-1."

At page 179, line 24 change the description of the "STD" abbreviation to:
"Alias for symbol timer done."

At page 179, line 32, change the second paragraph (starting with "An implementation of ..." to read:
"An implementation of a self-synchronizing scrambler by a linear-feedback shift register is shown in Figure 147–6. The bits stored in the shift register delay line at time n are denoted by Scrn<16:0>. The '+' symbol denotes the exclusive OR logical operation. When Scn<3:0> is presented at the input of the scrambler, Sdn<3:0> is produced by shifting in each bit of Scn<3:0> as Scn<i>, with i ranging from 0 to 3 (i.e., LSB first). The scrambler is reset upon execution of the PCS Reset function. If the PCS Reset is executed, all bits of the 17-bit vector representing the self-synchronizing scrambler state are arbitrarily set. The initialization of the scrambler state is left to the implementer. In no case shall the scrambler state be initialized to all zeroes. At every STD, if no data is presented at the scrambler input via Scn<3:0>, the scrambler may be fed with arbitrary inputs."

At page 180, line 8, append the following text to subclause 147.3.2.7:
"symb_timer
A continuous free-running timer. PMA_UNITDATA.request messages are issued by the PCS concurrently with symb_timer_done (see 147.2.2). TX_CLK (see 22.2.2.1) shall be generated from 5B_symb_timer with the rising edge of TX_TCLK generated synchronously with 5B_symb_timer_done.
Continuous timer: The condition symb_timer_done becomes true upon timer expiration.
Restart time: Immediately after expiration.
Duration: 400 ns ± 100 ppm (see 22.2.2.1)"

At page 179 in Figure 147-6 perform the following changes:
- replace "TXDn[i]" with "Scn<i>". Please note the 'n' is a subscript
- replace all square brackets '[]' with angular brackets '<>'

At page 180, line 9, change the description of the "RXn" variable to read:
"The rx_sym parameter of the PMA_UNITADATA.indication primitive defined in 147.2.1.
The 'n' subscript denotes the rx_sym conveyed in the most recent recv_symb_conv_timer cycle.
The 'n-x' subscript indicates the rx_sym conveyed 'x' cycles behind the most recent one."

At page 181, line 18, change the description of the "DECODE" function to read:
"This function takes a 5B symbol input parameter and returns a 4 bit value Dcn<3:0> value according to the following procedure:
1. Convert the 5B input symbol into Drn<3:0> by performing a reverse lookup of Table 147-1. If no 4B value is associated to the given 5B symbol, the PCS Receive function shall assert RX_ER for at least one symbol period and Drn<3:0> may be set arbitrarily.
2. Convert Drn<3:0> to Dcn<3:0> as specified in 147.3.3.7."

Please not that the 'n' in the Dcn and Drn variables name is a subscript.

At page 181, line 26, change the description of the "RSCD" abbreviation to read:
"Alias for recv_symb_conv_timer_done."

At page 183, line 48, insert a new subclause 147.3.3.x with name "Timers" between existing subclauses 147.3.3.7 and 147.3.3.8.
Add the following text to the newly created subclause:
"recv_symb_conv_timer
A continuous timer which expires when the PMA_UNITDATA.indication message is

generated (see 147.2.1).
Continuous timer: The condition recv_symb_conv_timer_done becomes true upon timer expiration.
Restart time: Immediately after expiration.
Duration: timed by the PMA_UNITDATA.indication message generation."

Perform renumbering of the subclauses accordingly.

At page 183, line 28 change the whole paragraph starting with "The PCS receive function shall ..." to read:
"The PCS Receive function descrambles the 5B/4B decoded data stream and returns the value of RXD<3:0> to the MII. The descrambler shall employ the polynomial defined in 147.3.2.6. The implementation of the self-synchronizing descrambler by linear-feedback shift register is shown in Figure 147–9. The bits stored in the shift register delay line at time n are denoted by Dcrn<16:0>. The '+' symbol denotes the exclusive OR logical operation. When Drn<3:0> is presented at the input of the descrambler, Dcn<3:0> is produced by shifting in each bit of Drn<3:0> as Drn<i>, with i ranging from 0 to 3 (i.e., LSB first). The descrambler is reset upon execution of the PCS Reset function. If PCS Reset is executed, all the bits of the 17-bit vector representing the self-synchronizing descrambler state are arbitrarily set. The initialization of the descrambler state is left to the implementer. At every RSCD, if no data is presented at the descrambler input via Drn<3:0>, the descrambler may be fed with arbitrary inputs."

Please not that the 'n' in the Dcn and Drn variables name is a subscript.

At page 183, in figure 147-9, perform the following changes:
- replace "RXDn[i]" with "DCn[i]"
- replace all square brackets '[]' with angular brackets '<>'

At page 191, line 52, add the followint text after "DME encoded stream received at the MDI.":
"The clock recovery provides a synchronous clock for sampling the signal on the pair. While it may not drive the MII directly, the clock recovery function is the underlying source of RX_CLK."

Cl **147** *SC* **147.3.3.6** *P* **182** *L* **4** # i-421

Law, David — Hewlett Packard Enterprise

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

The variables link_control and transmitting are used in Figure 147-7 'PCS Receive state diagram' but are not listed in subclause 147.3.3.2 'Variables'.

SuggestedRemedy

Suggest that the following are added to subclause 147.3.3.2 'Variables'.

link_control
See 147.3.2.2.

transmitting
See 147.3.2.2.

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.3.6** *P* **183** *L* **5** # i-319

Beruto, Piergiorgio — Canova Tech S.r.l.

Comment Type **T** *Comment Status* **A** *State Diagram*

tag [INDEX]
The function DECODE(RXn-4) should be checking RXn-3, not RXn-4.
If it checks RXn-4, it would decode one less nibble than it ought to when evaluating the arc to GOOD_ESD state.

SuggestedRemedy

In Figure 147-8 In the DATA state change RXn-4 to RXn-3.

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.3.6** *P* **183** *L* **12** # i-278

Huszak, Gergely Kone

Comment Type **T** *Comment Status* **A** *State Diagram*

Conditions on DATA->BAD_ESD and DATA->GOOD_ESD should be mutually exclusive, but those are not.
Implementations would work, due to the usual if - else construct, however this leaves space for implementation-dependent divergence in PHY behavior.

SuggestedRemedy

1. Change the condition on DATA->BAD_ESD from:
====
RSCD *
(((RXn-2 = ESD + RXn-2 = ESDBRS) * RXn-1 != ESDOK) + RXn-3 = SILENCE)
====
to:
====
RSCD *
(((RXn-2 = ESD + RXn-2 = ESDBRS) * RXn-1 != ESDOK * RXn-3 != ESD * RXn-3 != ESDBRS) + RXn-3 = SILENCE)
====
2. Change the condition on DATA->DATA from:
====
RSCD *
!(((RXn-2 = ESD + RXn-2 = ESDBRS) * RXn-1 != ESDOK) + RXn-3 = SILENCE) *
!((RXn-3 = ESD + RXn-3 = ESDBRS) * RXn-2 = ESDOK)
====
to:
====
RSCD *
!(((RXn-2 = ESD + RXn-2 = ESDBRS) * RXn-1 != ESDOK * RXn-3 != ESD * RXn-3 != ESDBRS) + RXn-3 = SILENCE) *
!((RXn-3 = ESD + RXn-3 = ESDBRS) * RXn-2 = ESDOK)
====
Note: Separate comment on changing all the indexes in the RXn-# notation on all 3 exist conditions from DATA was submitted. Consider these comments together.

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.5** *P* **184** *L* **27** # i-248

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **A** *PCS*

The text of this sub-clause does not meet the fundamental functional requirements of a bussed CSMA/CD system (Ref.: cl. 8.2 c)). It is just flat out incorrect. The last sentence of the 1st paragraph is technically incorrect. Statement a) is technically incorrect. Statement b) is true but technically insignificant to the operation of a MAC.

SuggestedRemedy

Add a full specification for Collison Detect that meets the full Ethernet requirements for function, reliability and timing.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change:
====
a) The PHY shall assert COL within 256 bit times from the beginning of a transmission when one or more stations are transmitting at the same time.
b) The PHY shall assert CRS in the presence of a signal resulting from a collision between two or more stations.
====
to this:
====
a) The PHY shall assert COL when it is transmitting, and one or more other stations are also transmitting at the same time.
b) The PHY shall assert CRS in the presence of a signal resulting from a collision between two or more other stations.
====

Cl **147** *SC* **147.3.5** *P* **184** *L* **30** # i-417

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **A** *PCS*

[CSD/Compatibility] [Collision Detect, no assurance thereof]
In IEEE 802.3 project where CSMA/CD ("half-duplex") is supported, the collision detection method always has been specified, AND the assurance of 100% collision detection has been obvious, i.e. DC bias voltage rise from two or more transmitters using current source into a known resistance, or simple logical AND function of PMA TXD enable and RXD enable. This project, however, does not specify any collision detection method except to say 1) data corruption == collision, and 2) require, without specification, find two or more stations transmitting somewhere in the network and assert CRS during that time.

We all know what collision condition is, 'two or more simulanous transmittion into a shared collision domain" or there about. It is the responsibility of the project to specify how this is done, and also assure us that collision detection confidence is at least ar PAR with prior projects. This project does not specify the collsion detection method; therefore, it is incomplete.

That said, there are tactical issues with the current draft, and I do not wish to indicate that fixing any of these tactical issues would be satisfactory to requiring 100% assurance of collision detect. But here goes.
1) "corrupted signal while transmitting" == collision. This has an obvious flaw that one station may see random bit-error (e.g. from a local noise hit) and detect collision and backs-off, the other station does not see a collision 'corrupted signal while tranmitting" and completes transmission. Some receivers may see errored frames, some may not see errored frame. Result = non-determinstic behavior and lost packet.
2) Local strong TX and remote weak TX may not assure corruption.
- Max Attenuation: Attenuation of the TX signal on the nominal-length worst-case channel is 65% (3.7 db)
- Max TX power of local, so +20% P-P from 147.5.4.1 transmit output voltage is 1V +/- 20% P-P. + minimum droop and power spectral density (highest power allowed).
- Min TX power of remote, so -20% P-P, with max droop.
so power diff give another ~66%. Or ~43% max interference from remote, and it could be as little as ~35% considering droop.

In addition, COL assertion within 256 bit times from the begining of a transmission seems insufficient -- a minimum collision duration is 96 bit times. A min collision + IPG would allow a new transmission to occur at 192 bit times from the initial collision. So allowing collisoin to assert up to 256 bit time later, would potentially affect the subsequent packet transmission.

Without receiver specification we have NO CLUE how receiver would behave -- whether or not data corruption would be detected from the worst case remote TX interference.. And we've opted for TX and channel spec and leave RX to implementors to *recover* tx data over channel.

From 147.3.5 Collision Detection:
"When operating in half-duplex mode, the 10BASE-T1S PHY shall detect when a transmission initiated locally results in a corrupted signal at the MDI as a collision. When collisions are detected, the PHY shall assert the signal COL on the MII for the duration of the collision or until TX_EN signal is FALSE. The method for detecting a collision is implementation dependent but the following requirements have to be fulfilled. ..... a) The PHY shall assert COL within 256 bit times from the beginning of a transmission when one or more stations are transmitting at the same time.
b) The PHY shall assert CRS in the presence of a signal resulting from a collision between two or more stations."

SuggestedRemedy

The draft is incomplete without 100% collision detection specification. 100% defined to be as obvious as prior 802.3 CSMA/CD PHY projects. Please complete the draft by including collision detection specification.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.
Comment appears to comment on multiple issues, at least one of which is accomodated by comment i-248.

1. With regards to the 256 bit times delay in asserting COL, comment is accomodated by comment i-248.

Response to comment i-248 is:

ACCEPT IN PRINCIPLE.
Change:
====
a) The PHY shall assert COL within 256 bit times from the beginning of a transmission when one or more stations are transmitting at the same time.
b) The PHY shall assert CRS in the presence of a signal resulting from a collision between two or more stations.
====
to this:
====
a) The PHY shall assert COL when it is transmitting, and one or more other stations are also transmitting at the same time.
b) The PHY shall assert CRS in the presence of a signal resulting from a collision between two or more other stations.
====

The above response to comment i-248 effectively removes "within 256 bit times from the beginning of a transmission".

2. CRG disagrees with the remainder of the commenter's statements.
Various results have been presented to the Task Force, showing reliable collision detection on link segments using a variety of methods.
http://www.ieee802.org/3/cg/public/May2019/griffiths_3cg_01b_0519.pdf showed voltage-domain collision detection.
Additionally, analysis has been presented in
http://www.ieee802.org/3/cg/public/adhoc/beruto_3cg_collision_detection.pdf to address

issues of existence, feasibility and reliability of collision detect (CD).

The highlights of this analysis relevant to this comment are:
- Target level of reliability (less-than-or-equal-to one miss-categorization per lifetime of universe) can be achieved based on the current specs.
- In the voltage domain, in presence of the specified Gaussian noise, reliable CD can be achieved. The commenter's calculation seems to confirm most of these (see commenter's figure compared to pages 4 and 5 of the study), but CRG has difficulty following commenter's calculations in full.
- Using the properties of the DME, the self-synchronizing scrambler and network geometry (reach, exclusion of the repeaters) and other properties of the Ethernet frame, the same can be achieved.
- At least one implementation exists that meet these requirements in specified noise environment.

Cl **147** *SC* **147.3.3.10** *P* **185** *L* **10** # i-414

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *PCS*

Generation of Commit indication states PHY shall notify RS of received Commit by the means of MII interface in 22.2.2.8. This statement makes support of PLCA RS in 10BASE-T1S PHY not optional. PLCA RS is advertised as optional RS. The use of COMMIT (in proposed changes to CL22) requires support of the optional RS, but this clause does not specify the optional RS bevior. This and two other shalls in this subclause makes it mandatoy implementation in all 10BASE-T1S PHYs.

SuggestedRemedy

Delete CL147.3.3.10 requirements.

Response *Response Status* **W**

REJECT.
The CRG disagrees with the commenter.
The decoding and signaling of the COMMIT and BEACON indications, and presentation of the signaling onto the MII does not make support of PLCA mandatory.
When the PLCA is not enabled or not supported, RS operation shall conform to C22, which would cause the signals to be ignored because the state diagrams they effect are not implemented, and the codes are defined as reserved with no action in existing clause 22, per IEEE Std 802.3-2018, 22.2.2.8:
"While RX_DV is deasserted, RXD<3:0> shall have no effect on the Reconciliation sublayer."

See also 215/51 ("148.4.2 Reconciliation Sublayer operation").

Cl **147** *SC* **147.3.7.1** *P* **185** *L* **13** # i-132

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **R** *EZ*

..., while the slave PHY replies back to received HB signals. (redundant wording)

SuggestedRemedy

..., while the slave PHY replies to received HB signals.

Response *Response Status* **C**

REJECT.
While "reply back" indeed is somewhat redundant, it is a valid expression and appropriate for this sentence.

Cl **147** *SC* **147.3.7.1** *P* **185** *L* **15** # i-416

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **A** *PCS*

WRT ".. and Auto-Negotiation has achieved a good link." Auto-negotiation never achieves a good link. Auto-negotiation only negotiates capabilities.

SuggestedRemedy

Either delete the quoted text, or revise the text to describe appropriate condition while correcting for the error.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

Page 185, line 15:

Replace, "Auto-Negotiation has achieved a good link"

with, "Auto-Negotiation has completed"

Cl **147** *SC* **147.3.7.1** *P* **185** *L* **19** # i-413

Kim, Yongbum NIO

Comment Type **ER** *Comment Status* **A** *PCS*

"... a BEACON is received..." the word "BEACON" is used without any x-reference, and the nature of 'BEACON' (signal?, state?, interface?, etc) is found in other clauses.

SuggestedRemedy

Please insert x-ref to 'BEACON'.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.
Change this:
====
When the PHY is not in multidrop mode and a BEACON is received either over the MII or from the line
====
to this:
====
When the PHY is not in multidrop mode and a BEACON request is received from the MII (See Table 22-2) or a BEACON signal is received from the line (See Table 147-1)
====

Cl **147** *SC* **147.3.7.1** *P* **185** *L* **19** # i-412

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *PCS*

WRT to "When the PHY is not in multidrop mode and a BEACON is received either over the MII or from the line, the state diagram in Figure 147-10 enters the DISABLE_HB state and stays there until PCS Reset is asserted,...". This statement makes support of PLCA RS in 10BASE-T1S PHY (current all three of 10BASE-T1S PHYs) not optional. PLCA RS is advertised as optional RS. The recognition of BEACON (in proposed changes to CL22) requires support of the optional RS, but this clause does not specify the optional RS bevior. This and two other shalls in this subclause makes it mandatoy implementation in all 10BASE-T1S PHYs.

SuggestedRemedy

Delete CL147.3.7.1 requirements.

Response *Response Status* **W**

REJECT.
The CRG disagrees with the commenter.
The decoding and signaling of the COMMIT and BEACON indications, and presentation of the signaling onto the MII does not make support of PLCA mandatory.
When the PLCA is not enabled or not supported, RS operation shall conform to C22, which would cause the signals to be ignored because the state diagrams they effect are not implemented, and the codes are defined as reserved with no action in existing clause 22, per IEEE Std 802.3-2018, 22.2.2.8:
"While RX_DV is deasserted, RXD<3:0> shall have no effect on the Reconciliation sublayer."

See also 215/51 ("148.4.2 Reconciliation Sublayer operation").

Cl **147** *SC* **147.3.7.1.1** *P* **185** *L* **35** # i-422

Law, David Hewlett Packard Enterprise

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

Values are not defined for the multidrop variable.

SuggestedRemedy

Add 'Values: TRUE or FALSE' to the end of the multidrop variables in subclause 147.3.7.1.1 'Variables'.

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.7.1.1** *P* **185** *L* **37** # i-371

Law, David Hewlett Packard Enterprise

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

There isn't a subclause 98.2.1.5 in IEEE Std 802.3-2018, suggest this should be to subclause 98.2.1.2.5.

SuggestedRemedy

Change the text '... method in 98.2.1.5 and ...' to read '... method in 98.2.1.2.5 and ...'.

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.7.1.1** *P* **185** *L* **43** # i-133

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

... is being sent or an higher priority request is ... ("a/an" distinction)

SuggestedRemedy

... is being sent or a higher priority request is ...

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.7.1.1** *P* **185** *L* **51** # i-415

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *PCS*

WRT to "..rx_cmd <= 'COMMIT' when a COMMIT indication is generated as specified". This statement makes support of PLCA RS in 10BASE-T1S PHY not optional. PLCA RS is advertised as optional RS. The use of COMMIT (in proposed changes to CL22) requires support of the optional RS, but this clause does not specify the optional RS bevior. This and two other shalls in this subclause makes it mandatoy implementation in all 10BASE-T1S PHYs.

SuggestedRemedy

Delete CL147.3.7.1.1 requirements.

Response *Response Status* **W**

REJECT.
The CRG disagrees with the commenter.
The decoding and signaling of the COMMIT and BEACON indications, and presentation of the signaling onto the MII does not make support of PLCA mandatory.
When the PLCA is not enabled or not supported, RS operation shall conform to C22, which would cause the signals to be ignored because the state diagrams they effect are not implemented, and the codes are defined as reserved with no action in existing clause 22, per IEEE Std 802.3-2018, 22.2.2.8:
"While RX_DV is deasserted, RXD<3:0> shall have no effect on the Reconciliation sublayer."

See also 215/51 ("148.4.2 Reconciliation Sublayer operation").

Cl **147** *SC* **147.3.7.1.1** *P* **185** *L* **52** # i-134

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

... when a HB is detected on the line. ("a/an" distinction)

SuggestedRemedy

... when an HB is detected on the line. (if we alternatively decide to read this as a HEARTBEAT then on the same side in line 41 "an HB message" needs to be changed to "a HB message").

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.7.1.1** *P* **185** *L* **54** # i-135

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

BEACON, COMMIT, HEARTBEAT or NONE (add serial comma)

SuggestedRemedy

BEACON, COMMIT, HEARTBEAT, or NONE

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.3.7.1.3** *P* **186** *L* **5** # i-249

Thompson, Geoffrey Independent Consultant

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

The state diagram can be significantly compacted vertically with no loss in clarity.

SuggestedRemedy

Move the WAIT_TX state from the left column to the right column above REPLY_HB and move both boxes up.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Editorial license to compact this figure.

Cl **147** *SC* **147.3.7.1.3** *P* **187** *L* **3** # i-424

Law, David Hewlett Packard Enterprise

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

The values for pcs_reset defined in subclause 147.3.2.2 'Variables' are 'ON or OFF'. As a result, pcs_reset needs to be tested against these values when used as part of a transition condition.

SuggestedRemedy

[1] On the open arrow entry to the INIT state change 'pcs_reset +' to read '(pcs_reset = ON) +'
[2] On the open arrow entry to the DISABLE_HB state change 'pcs_reset +' to read '(pcs_reset = OFF) +'

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
1. At 172/39 change "while pcs_reset = OFF" to "while pcs_reset = FALSE"
2. At 172/44 change "pcs_reset = ON" to "pcs_reset = TRUE"
3. At 172/45 change "pcs_reset = OFF" to "pcs_reset = FALSE"
4. At 175/2 (in "Figure 147-4-PCS Transmit state diagram (part a)") change "pcs_reset = ON +" to "pcs_reset +"
5. At 177/5 change "Values: ON or OFF" to "Values: TRUE or FALSE"

Cl **147** *SC* **147.3.7.2** *P* **188** *L* **3** # i-429

Law, David Hewlett Packard Enterprise

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

The values for pcs_reset defined in subclause 147.3.2.2 'Variables' are 'ON or OFF'. As a result, pcs_reset needs to be tested against these values when used as part of a transition condition.

SuggestedRemedy

On the open arrow entry to the INACTIVE state change 'pcs_reset +' to read '(pcs_reset = ON) +'

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
RESOLVED BY COMMENT i-424, THE PROPOSED RESPONSE OF WHICH IS AS FOLLOWS:
>>>>
PROPOSED ACCEPT IN PRINCIPLE.
1. At 172/39 change "while pcs_reset = OFF" to "while pcs_reset = FALSE"
2. At 172/44 change "pcs_reset = ON" to "pcs_reset = TRUE"
3. At 172/45 change "pcs_reset = OFF" to "pcs_reset = FALSE"
4. At 175/2 (in "Figure 147-4-PCS Transmit state diagram (part a)") change "pcs_reset = ON +" to "pcs_reset +"
5. At 177/5 change "Values: ON or OFF" to "Values: TRUE or FALSE"
<<<<

Cl **147** *SC* **147.3.7.2** *P* **188** *L* **3** # i-250

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **A** *EZ*

The leftmost transition into INACTIVE is confusing. It looks like it is an entrance from the text.

SuggestedRemedy

Put in a CR or, preferably, don't use a purely vertical transition line.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.
Editorial license to eliminate the visual artifact (top of hanging vertical line that goes into INACTIVE almost touches the 2nd underline in "link_hold_timer") as appropriate (without inserting CR to text).

Cl **147** *SC* **147.4** *P* **190** *L* **1** # i-204

Griffiths, Scott — Rockwell Automation

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

PMA_CARRIER.indication is not shown in Figure 147-12. There is also no mention of this primitive or how it is generated in 147.4, which discusses the PMA.

SuggestedRemedy

Describe how PMA_CARRIER.indication is generated somewhere in 147.4, and add this primitive in the appropriate location in Figure 147-12.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add an arrow from "PMA RECEIVE" with "PMA_CARRIER.indication (pma_crs)" in "Figure 147-12-PMA functional block diagram" (PMA_CARRIER.indication itself is already described in "147.2.3 Mapping of PMA_CARRIER.indication" and its sub-clauses)

Cl **147** *SC* **147.4** *P* **190** *L* **31** # i-251

Thompson, Geoffrey — Independent Consultant

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

In the sentence "The PMA provides either half duplex communications, or, optionally full duplex..." the word "either" is superficial given the presence of the word "optionally".

SuggestedRemedy

Remove the word "either" so that it reads: "The PMA provides half duplex communications, or, optionally full duplex..."

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace, "The PMA provides either half duplex communications, or, optionally full duplex communications to and from medium employing DME."

with, "The PMA provides half duplex communications to and from the medium. Optionally, the PMA may also provide full duplex communications to and from the medium."

Cl **147** *SC* **147.4** *P* **190** *L* **32** # i-252

Thompson, Geoffrey — Independent Consultant

Comment Type **ER** *Comment Status* **A** *EZ*

The statement: "The PMA provides ... communications to and from medium employing DME." would lead one to believe that the medium provides the DME. Such is not the case.

SuggestedRemedy

Change to: "The PMA utilizes DME to provide either half duplex communications, or, optionally full duplex communications to and from the medium.

Response *Response Status* **W**

ACCEPT.

Cl **147** *SC* **147.4.2** *P* **191** *L* **11** # i-253

Thompson, Geoffrey — Independent Consultant

Comment Type **ER** *Comment Status* **A** *PMA*

In Fig. 147-13 the two figures are confusing because they are vastly different time scales. One figure shows the actual (idealized) signal transitions and the other shows the LF envelope of the signal.

SuggestedRemedy

Resolve the isue within the figure. I suggest grey-scaling within the transmission. (Unless what is being depicted on the second fig. Is 2 time scales, then their should be a two wiggly vertical discontinuity break in the middle of T1)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Insert a two wiggly vertical discontinuity break in the middle of T1 in the lower part of Fig. 147-13.

Cl **147** *SC* **147.5.1** *P* **193** *L* **1** # i-254

Thompson, Geoffrey — Independent Consultant

Comment Type **ER** *Comment Status* **A** *PMA Electrical*

This clause and its sub-clauses don't say anything useful to specify the conformance requirements for 10BASE-T1S Physical Layer implementation. Saying something "may" be relevant also means it "may not" be relevant. It also means it is not an element of a conformance requirement.

SuggestedRemedy

Replace with: Applications for the specified device commonly have additional requirements that limit its conducted radio frequency emission and its susceptibility to electromagnetic interference coupling to the cabling system. Such requirements are beyond the scope of this standard.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.
Delete "Additional tests may be needed to verify EMC performance in various configurations, applications, and conditions."

Insert new second paragraph to 147.5.1 (after "manufacturer.")
"Applications for the specified device commonly have additional requirements that limit its conducted radio frequency emission and its susceptibility to electromagnetic interference. Such requirements are beyond the scope of this standard."

Cl **147** *SC* **147.5.2** *P* **193** *L* **33** # i-136

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **T** *Comment Status* **A** *Test Mode*

Test mode 3 - Transmitter distortion test and PSD mask (there is no transmitter distortion test, only a transmit PSD mask specification within Clause 147)

SuggestedRemedy

Test mode 3 - Transmitter PSD mask

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.5.5.1** *P* **196** *L* **40** # i-255

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **D** *PMA Electrical*

"...and sent to the MII during normal..." Because of the inclusion PLCA as being within the scope of this project the term MII is ambiguous in the context of this draft as there are two reconciliation sublayers. This a result of the further confusion between the "PHY" and the "Physical Layer". Originally the RS was supposed to a functionally transparent block which only (a) did not interfere with access at all and (b) allowed the old physical interface (AUI) to move to a more logical division point (MII) in line with the evolution of technology over the twenty years from 1973 to 1993.

SuggestedRemedy

Either define two terms, one for each RS (e.g. DMII, AMII) or clearly state which RS is intended in each use of MII in this project's draft.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **147** *SC* **147.5.6** *P* **197** *L* **18** # i-256

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *PMA Electrical*

I don't understand how the following text can be true: "The PMA local loopback function is optional" ...on a PMA where transmit is connected to receive.

SuggestedRemedy

Please clarify. I think you mean "The PMA local loopback test function is optional."

Response *Response Status* **W**

REJECT.
The CRG disagrees with the comment.
The PMA local loopback function is optional.
What this test mode does in
- half-duplex mode, is overriding part of the condition on the single-ended arrow that point into WAIT_SYNC in "Figure 147-7-PCS Receive state diagram", allowing receiving back transmitting station's own data.
- full-duplex mode, is suspending functionality that would prevent the transmitting station from receiving its own data.

Cl **147** *SC* **147.5.6** *P* **197** *L* **24** # i-257

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **A** *PMA Electrical*

The word "unterminated" here implies that loopback only works if there is no compliant link segment and other MAU connected but there is a requirement of some sort for some circuit characteristics at the MDI to guarantee the echo.

SuggestedRemedy

Clarify and specify

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
At P197 L24: Change "unterminated MDI" to "open MDI"

Cl **147** *SC* **147.5.6** *P* **197** *L* **27** # i-258

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **D** *PMA Electrical*

The paragraph seems to assume that what is on the receive PMA is sufficiently well-formed to be to be decoded and converted to data. Since it is the sum of two or more signals that is not a valid assumption.

SuggestedRemedy

Add the following text: "During a collision (i.e. either a transmit collision or a receive collision) no assumptions whatsoever can be made about the validity or decodabilty of the waveform present at the input of the receiver."

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **147** *SC* **147.5.6** *P* **197** *L* **31** # i-259

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **D** *PMA Electrical*

Paragraph 4 is not true. Add conditional text to make it true.

SuggestedRemedy

Precede the current text with: "In the absence of collision..."

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **147** *SC* **147.6** *P* **197** *L* **38** # i-260

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *Management*

I don't understand how the last sentence of this paragraph works in an actual implementation. I think a compliant (as opposed to interoperable in some fixed configuration) implementation is required to have control bits. Ifso, there has to be a way to test their existence and function. I don't see how you get there from the present text.

SuggestedRemedy

Put in a testable requirement to access the configurable aspects.

Response *Response Status* **C**

REJECT.
The identical language is used in several 802.3 clauses with respect to control, in particular in clause 45 which governs the registers.
While the implementation of the MDIO interface is optional, and an equivalent mechanism is recommended, the implementation is NOT required to have the control bits. An equivalent means of control and configuration (e.g., with a different encoding of bits, or with strap pins) would be permitted. The existing text allows this.

Cl **147** *SC* **147.6.1** *P* **197** *L* **47** # i-22

Anslow, Peter Ciena

Comment Type **E** *Comment Status* **A** *Editorial*

"10BASE-T1S" should not be split across two lines.

SuggestedRemedy

Change the hyphen to a non-breaking hyphen (Esc - h)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change all manifestations of "10BASE-T1S" (so excluding figures and titles) in the text to use NBH in c147, to prevent this problem from resurfacing in the future (when text is changed).

Cl **147** *SC* **147.7** *P* **198** *L* **4** # i-137

Graber, Steffen Pepperl+Fuchs GmbH

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

..., such as industrial, automotive and building automation ... (add serial comma)

SuggestedRemedy

..., such as industrial, automotive, and building automation ...

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.7.2** *P* **198** *L* **24** # i-138

Graber, Steffen Pepperl+Fuchs GmbH

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

In order to limit the noise at the receiver due to impedance mismatches each 10BASE-T1S ... (add comma after "mismatches")

SuggestedRemedy

In order to limit the noise at the receiver due to impedance mismatches, each 10BASE-T1S ...

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.7.4** *P* **198** *L* **51** # i-139

Graber, Steffen Pepperl+Fuchs GmbH

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

When multiple cable pairs are bundled, the alien XTALK (ANEXT and AFEXT) become interference sources. (needs to be singular)

SuggestedRemedy

When multiple cable pairs are bundled, the alien XTALK (ANEXT and AFEXT) becomes the interference source.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace sentence: When multiple cable pairs are bundled, the alien XTALK (ANEXT and AFEXT) become interference sources.

With: Noise coupled between the disturbed 10BASE-T1S link segment and other disturbing 10BASE-T1S link segments is referred to as alien crosstalk noise.

Cl **147** *SC* **147.8** *P* **199** *L* **26** # i-23

Anslow, Peter Ciena

Comment Type **E** *Comment Status* **A** *Editorial*

In "The 10BASE-T1S mixing segment (1.4.332) is..." the definition for "mixing segment" has been re-numbered from 1.4.332 to 1.4.331 due to the deletion of 1.4.294 by IEEE Std 802.3bt-2018.
Also, this is an external cross-reference.

SuggestedRemedy

Change "1.4.332" to "1.4.331" and apply character tag "External".

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.8.1** *P* **199** *L* **52** # i-402

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *Mixing Segment*

The mixing segment shall meet the insertion loss characteristics specified for link segments in 147.7.1
between any two MDI attachment points. And from 147.8 "A mixing segment is specified based on cabling that supports up to at least 8 nodes and 25 m in reach". From both of this statement, this specification is requiring 28 (combination of any two) measurement taken. And any added nodes requires all combinations to be measured again, and with no assurances that the prior conformant MDI may fall out of range.

SuggestedRemedy

Provide better medium specifcation and cable design considerations that can be followed assured scaleable MDI and medium construction.

Response *Response Status* **W**

REJECT.
The proposed change in the comment does not contain sufficient detail so that the CRG can understand the specific changes that satisfy the commenter.

Further, the CRG disagrees with the commenter, as the commenter mistakes 147.8 explanatory text with the specification ("is specified" vs. "shall meet.").

There are alternative ways to taking a large number of measurements to validate a mixing segment compliant with the specifications in 147.8. For example, simulation with sample validation is a common approach. It is also common practice for cabling systems to be specified to be compliant by design rather than necessarily measured for each instance. Further, the characteristics required have been specified based on measurements indicating that they support the described topologies, an existence proof that design is feasible.

Cl **147** *SC* **147.8.2** *P* **200** *L* **4** # i-303

Schicketanz, Dieter University of Applied Science Reutlingen

Comment Type **E** *Comment Status* **R** *Mixing Segment*

There is a typo in the reference impedance for return loss

SuggestedRemedy

change 50 to 100

Response *Response Status* **C**

REJECT.

CRG disagress with the commenter. The correct figure for mixing segment is indeed 50 (not 100), so current text is correct.

Cl **147** *SC* **147.9** *P* **200** *L* **12** # i-261

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *MDI*

Since the MDI connector that is called out is not required there is no standardized way or specifically characterized test point where specification or conformance testing can be done on a multi-vendor repeatable basis.

SuggestedRemedy

Add text that permits alternate connections/connectors can be used in the application environment, that the compliance requirements (like other Ethernet PHYs) are specified and tested at the mating surface of the specified MDI connector.

Response *Response Status* **C**

REJECT.

The CRG disagrees with the commenter. Like other IEEE Std 802.3 single-pair PHYS, a single MDI connector is not specified in clauses 146 and 147. This is because requirements for the connector may be application specific. This has not proven to be a significant handicap for other single-pair 802.3 PHYs.

Cl **147** *SC* **147.9.1** *P* **200** *L* **24** # i-197

Maguire, Valerie The Siemon Company

Comment Type **TR** *Comment Status* **A** *MDI*

The P802.3cg example text is no longer aligned with the TIA and ISO/IEC single-pair interface recommendations. Specifically, TIA and ISO/IEC recommended different connectors for different MICE environments. The results of the TIA and ISO/IEC evaluation would likely have been different (perhaps, even limited to one connector style) if it was agreed that operation across MICE1 to MICE3 was desired. As a result, there is no longer a basis for selecting these two connectors as the examples.

P802.3cg is close to publication and some of the example products are not commercially available.

SuggestedRemedy

On page 200, line 24: Replace, "Specific systems or applications can use connectors or terminals, in addition to those listed below, that support the link segment specification defined in 147.7 or the mixing segment specification defined in 147.8." with, "Specific systems or applications can use connectors or terminals that support the link segment specification defined in 147.7 or the mixing segment specification defined in 147.8.

Delete lines 26-34 on page 200.

Delete Figure 147-21, Figure 147-22, and Figure 147-23 on page 201.

Delete Figure 147-24, Figure 147-25, Figure 147-26, and Table 147-3 on page 202.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

P 200, Line 26; Replace, “Connectors meeting the requirements of IEC 63171-1 or IEC 61076-3-125 may be used as the mechanical interface to the balanced cabling.”

With, “Connectors meeting the requirements of IEC 63171-1 may be used as the mechanical interface to the balanced cabling in environments meeting the E1 and E2 electromagnetic classifications specified in Table 146-7. Connectors meeting the requirements of IEC 63171-6 may be used as the mechanical interface to the balanced cabling in environments meeting the E3 electromagnetic classifications specified in Table 146-7.”

Cl **147** *SC* **147.8.2** *P* **200** *L* **52** # i-403

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *Mixing Segment*

The mixing segment shall meet the return loss characteristics specified for link segments in 147.7.2
between any two MDI attachment points. And from 147.8 "A mixing segment is specified based on cabling that supports up to at least 8 nodes and 25 m in reach". From both of this statement, this specification is requiring 28 (combination of any two) measurement taken. And any added nodes requires all combinations to be measured again, and with no assurances that the prior conformant MDI may fall out of range.

SuggestedRemedy

Provide better medium specifcation and cable design considerations that can be followed assured scaleable MDI and medium construction.

Response *Response Status* **W**

REJECT.
The proposed change in the comment does not contain sufficient detail so that the CRG can understand the specific changes that satisfy the commenter.

Further, the CRG disagrees with the commenter, as the commenter mistakes 147.8 explanatory text with the specification ("is specified" vs. "shall meet.").

There are alternative ways to taking a large number of measurements to validate a mixing segment compliant with the specifications in 147.8. For example, simulation with sample validation is a common approach. It is also common practice for cabling systems to be specified to be compliant by design rather than necessarily measured for each instance. Further, the characteristics required have been specified based on measurements indicating that they support the described topologies, an existence proof that design is feasible.

Cl **147** *SC* **147.9.2** *P* **203** *L* **17** # i-140

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

"." at the end of the line is too much (all other similar expressions in the draft D3.0 do not have a ".")

SuggestedRemedy

Remove "." at the end of the line.

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.9.2** *P* **203** *L* **32** # i-1

Huszak, Gergely Kone

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

Format of the "NOTE-" paragraph is incorrect

SuggestedRemedy

Use the appropriate paragraph style for "NOTE-" paragraphs.
Consider scrubbing through the whole draft, to make sure all clauses are aligned with this: e.g. 147.3.2.7 and c146, including the annexes are good candidates for such checks

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.9.3** *P* **203** *L* **36** # i-262

Thompson, Geoffrey Independent Consultant

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

The phrasing of this clause and the next one make it appear that this is a requirement for testing the wiring rather than as a test access point for testing the DTE. Further, the test limit for a withstand voltage has absolutely zero margin with respect to PoDL which is contrary to usual practice for withstand voltage requirements. Additionally, consideration should be given to the possibility of there being other voltages in a sheath shared with this instance of 10BASE-T1L such as PoE.

SuggestedRemedy

Change the text to make it clearer that this test is a test of the DTE as tested from the MDI. Raise the test limit to be more appropriate with traditional withstand limits (ref e.g. cl. 14, 10BASE-T) and real world requirements such as static discharge.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **147** *SC* **147.9.3** *P* **203** *L* **38** # i-44

Yseboodt, Lennart Signify

Comment Type **TR** *Comment Status* **A** *MDI*

* Similar comment filed against Clause 146. Make sure to make changes consistently.

147.9.3:
"The wire pair of the MDI shall withstand without damage the application of positive voltages of up to 60 V dc with the source current limited to 2000 mA, under all operating conditions, for an indefinite period of time."

147.9.4:
"The wire pair of the MDI shall withstand without damage the application of short circuits of any wire to the other wire of the same pair or ground potential, as per Table 147-5, under all operating conditions, for an indefinite period of time."

- Why does 147.9.3 only cover positive voltages ?
- ... and 147.9.4 covers both polarities ?
- why is the subject of the sentence 'the wire pair of the MDI' when it should be the device itself ?

SuggestedRemedy

Change the quoted text in 146.9.3 to read:
"The device shall withstand without damage the application of any voltages between 0 V dc and 60 V dc with the source current limited to 2000 mA, applied across BI_DA+ and BI_DA-, in either polarity, under all operating conditions, for an indefinite period of time."

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.
On page, 203, lines 38-39:

Replace,
"The wire pair of the MDI shall withstand without damage the application of positive voltages of up to 60 V DC with the source current limited to 2000 mA, under all operating conditions indefinitely."

with,
"The DTE shall withstand without damage the application of any voltages between 0 V DC and 60 V DC with the source current limited to 2000 mA, applied across BI_DA+ and BI_DA<en-dash>, in either polarity, under all operating conditions, for an indefinite period of time."

Cl **147** *SC* **147.10.2** *P* **204** *L* **32** # i-141

Graber, Steffen Pepperl+Fuchs GmbH

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

... according to any applicable local, state or national standards ... (add serial comma)

SuggestedRemedy

... according to any applicable local, state, or national standards ...

Response *Response Status* **C**

ACCEPT.

Cl **147** *SC* **147.11** *P* **205** *L* **18** # i-45

Baggett, Tim Microchip Technology, Inc.

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

*** Comment submitted with the file 100559000003-Comment_8023cg_D3p0_Table_147-6_Typo_Errors.pdf attached ***

There are typographical (copy/paste?) errors in Table 147-6 10BASE-T1S Delay Constraints.

SuggestedRemedy

Change the "event" in Row 6 (Lines 43-45) from:
"COL input to CRS asserted"
to:
"MDI input to COL asserted"

==
Change the "Output timing reference" in Row 6 (Lines 43-45) from:
"Rising edge of CRS"
To:
"Rising edge of COL"

==
Change the "event" in Row 7 (Lines 46-47) from:
"COL input to CRS deasserted"
to:
"MDI input to COL deasserted"

==
Change the "Output timing reference" in Row 7 (Lines 46-47) from:
"Rising edge of CRS"
To:
"Rising edge of COL"

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148** *P* **214** *L* **1** # i-48

Grow, Robert RMG Con

Comment Type **GR** *Comment Status* **R** *PLCA_SCOPE*

This clause specifies functionality that is outside the scope of the PAR. The result of out of scope content is that all interested parties may not have been aware of actual content and as a result enticed to join the ballot group.

SuggestedRemedy

Either delete the clause and related content, or revise the PAR, reform the ballot group, and restart Standards Association ballot.

Response *Response Status* **U**

REJECT.
The CRG disagrees with the commenter, and believes the draft is within the PAR scope. A key responsibility of the ballot pool is to evaluate whether the scope of the draft is within the scope of the PAR, and an affirmative vote indicates your agreement that the work does not exceed the scope of the PAR. The ballot pool has voted in the affirmative.

Cl **148** *SC* **148** *P* **214** *L* **1** # i-47

Grow, Robert RMG Con

Comment Type **TR** *Comment Status* **R** *PLCA_SCOPE*

The PLCA protocol is a MAC protocol. It is virtually identical to a token bus protocol (shared medium) I specified years ago. This clause violates 802.3 layering, and though considerable effort has been made to place this in the Reconciliation Sublayer, it doesn't change the fact that the functions are medium access control.

SuggestedRemedy

Delete Clause 148 and related text.

Response *Response Status* **U**

REJECT.
The CRG disagrees with the commenter's description of layering and the proper placement of PLCA in the layering model. PLCA performs the functions delegated by the 802.3 layer model to the physical layer - carrier sense and collision detection. Commenter seems to posit an implementation which is not described in the amendment, where the PLCA sublayer interfaces to the MAC via an MII. (a "top MII" per the commenter), whereas PLCA maintains the layering and communicates to the MAC via the primitives PLS_CARRIER and PLS_SIGNAL defined in IEEE Std 802.3, and communicates with the remainder of the physical layer through the MII interface. For more detail on how PLCA relates to OSI layering please see
http://www.ieee802.org/3/cg/public/adhoc/brandt_020619_3cg_01a_adhoc.pdf.

Additionally, the fact that PLCA-enabled half-duplex CSMA/CD stations may operate with and coexist with non-PLCA enabled half-duplex CSMA/CD stations on the same mixing segment is evidence that the PLCA RS is located beneath the CSMA/CD MAC and not a new MAC function in itself. See
http://www.ieee802.org/3/cg/public/Jan2019/Tutorial_cg_0119_final.pdf and
http://www.ieee802.org/3/cg/public/Sept2018/beruto_3cg_mixing_PLCA_with_non_PLCA_enabled_nodes_r1.2.pdf
The PLCA working principle is to detect collisions (concurrent transmission of multiple stations on a shared network segment) in a logical sense. As an example, 10BASE-2 and 10BASE-5 detect concurrent transmissions by checking the DC voltage level on the shared media, that is detecting the superposition of multiple (not decodable) signals on the line. PLCA detects the very same concurrent transmissions by aligning the data conveyed by the local MAC to the unique transmit opportunity of the node and checking for concurrent reception of a packet. In such a way the collision does not result in "corrupting" the signal on the media. That is, the packet currently being transmitted is not interrupted, thus yielding the advertised network performance enhancement.

This is also in line with the ISO/OSI principle by which a layer may enhance the service it provides to the upper layer.
See http://www.ieee802.org/3/cg/public/adhoc/brandt_020619_3cg_01a_adhoc.pdf

Moreover the commenter is unclear as PLCA + CSMA/CD is obviously not identical to 802.4 Token Bus, and it is unclear what specification the commenter is referring to. For example, PLCA does not define any handshake protocol between nodes, it does not

generate packets and there is no concept of arbitration of the media. Additionally, CSMA/CD nodes with PLCA enabled interoperate properly with non-PLCA enabled nodes on the same network segment (without yielding the advertised gain in performance in this case). That would not be possible if nodes with PLCA enabled were not, in fact, using the CSMA/CD MAC protocol. See http://www.ieee802.org/3/cg/public/Sept2018/beruto_3cg_mixing_PLCA_with_non_PLCA_enabled_nodes_r1.2.pdf.

Cl **148** *SC* **148** *P* **214** *L* **1** # i-393

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *PLCA_SCOPE*

[CSD] CSD/Economic Feasibility statements in CSD document is not valid for CL148 PLCA operation.
The project CSD states that "
The cost factors for Ethernet components and systems are well known. The proposed project may introduce new cost factors which can be quantified.
-The reduction in the number of legacy networks requiring specialized components, expertise, and gateways in the targeted markets is anticipated to result in a significant drop in both installation and operational costs."
While the cost factors for Ethernet is well known, this project introduces the new requirements that has not been a part of Ethernet. This project requires each node to be assigned a unique and sequential (as in little to no gaps in number sequence) node identifier to be assigned to each PHY, and allocate and assigna a special node identifier value of zero to a 'master node' that is responsible for sending special 'beacon' frame. This project requires that the configuration is assured (outside of this draft standard) that node identifier of zero is present, and only one of such node identifier is present. This operation described in this project cannot reasonably assume that this new behavior requirement could inherit "well known Ethernet cost factors". Also this project cannot reasonably assert assert "drop in both installation and operational costs" when addtional configuration of node assignment and behaviors are required and without any specification on how they are done.
CSD/Economic Feasibility with regard to other clauses, other than CL148, are not in question.

SuggestedRemedy

CSD/Economic Feasibility with regard to CL148 PLCA operation is no longer valid and grossly incorrect. Appropriate changes to the CSD/Economic Feasibility to be made and to be approved.

Response *Response Status* **W**

REJECT.
CRG disagrees with the commenter.

Both the 802.3 working group and the 802 Executive Committee have confirmed the CSD responses.
Any changes to the CSD documents, as the commenter requests, would be handled through internal 802 processes which are outside the SA ballot process.

With respect to the issues raised by the commenter regarding node ID assignment, the CRG specifically disagrees on these points:

[1] PLCA is an optional feature that still operates under misconfiguration. See http://www.ieee802.org/3/cg/public/Sept2018/beruto_3cg_mixing_PLCA_with_non_PLCA_enabled_nodes_r1.2.pdf
[2] The draft does not constrain how the value for PLCA node ID is obtained. There are many different ways to implement this.

[3] Default operation is with PLCA turned off, allowing interoperable plug-and-play, and opportunity for the management entity to configure for improved performance.

The CRG additionally disagrees on these points the commenter asserts:
[1] PLCA node IDs do not need to be sequential
[2] There is no such description of master node in the draft
[3] The BEACON is not a frame, it is a 20 bit long signal on the line which carries no information apart from its own presence. It is conceptually not different from IDLE signals which most physical layers use to retrieve clocking information.

Cl **148** *SC* **148** *P* **214** *L* **1** # i-390

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *PLCA_SCOPE*

[PAR] PLCA Reconsciliation Sublayer (RS) contain specifications that handles contention avoidance and collision handling as well as access control. Media Access Control (MAC) specification is not a part of this Physical Layer project, as stated in this PAR scope: "5.2.b. Changes in scope of the project: Specify additions to and appropriate modifications of IEEE Std 802.3 to add 10 Mb/s Physical Layer (PHY) specifications and management parameters for operation, and associated optional provision of power, using a single balanced pair of conductors.", whereas the MAC definition is in CL 4.1.1 of IEEE 802.3-2018 states:
"...The MAC sublayer defines a medium-independent facility...b) Media Access Management
1) Medium allocation (collision avoidance)
2) Contention resolution (collision handling).."

Furthermore, Reconsilliation Sublayer, as defined in the same parent document IEEE 802.3-2018, in 1.4.425 states "1.4.425 Reconciliation Sublayer (RS): A mapping function that reconciles the signals at the Media Independent Interface (MII) to the Media Access Control (MAC)-Physical Signaling Sublayer (PLS) service definitions. (See IEEE Std802.3, Clause 22.)". PLCA RS claims to be an RS, but does NOT simply map PLS to MII, but performs 1) Medium allocation (collision avoidance) -- as the title says ("physical layer Collision Avoidance), 2) Contention resolution (collision handling). PLCA performs Medium Access control function (MAC).

SuggestedRemedy

Align this draft to the approved PAR (14-May-2018)by deleting CL148 in its entirety (pages 214 through 234, inclusive) and any changes associated with such deletion. Alternatively, submit a new PAR that substantialy reflect this project content, including a MAC specification in the scope, and provide approved PAR with such revised scope. If a new PAR is submitted with MAC specification in scope, then re-open and seek technical contributions with regards to the new scope.

Response *Response Status* **W**

REJECT.
The CRG disagrees with the commenter.
Specifically the CRG disagrees that the Clause 148 PLCA RS is a new MAC. It does not meet the requirements for a MAC, and leaves the MAC functionality with Clause 4. In fact, the network could not work without the MAC functionality.

Additionally, the Task Force has previously considered the issues raised by the commenter and has also reviewed and evaluated contributions that rebut the commenter's assertions.

The CRG believes the PLCA RS only performs functions delegated to the physical layer, which the MAC uses to perform its functions. For example, see www.ieee802.org/3/cg/public/Jan2019/Tutorial_cg_0119_final.pdf for further information.

See also http://www.ieee802.org/3/cg/public/adhoc/brandt_020619_3cg_01a_adhoc.pdf for a discussion of layering as it relates to this draft.

Cl **148** *SC* **148.1** *P* **214** *L* **11** # i-263

Thompson, Geoffrey Independent Consultant

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

It appears that the new text from the last round of changes is just laid on top as a note and did not actually get integrated into the text.

SuggestedRemedy

Change para. 3 to read: "PLCA is designed to work in conjunction with CSMA/CD and can be dynamically enabled or disabled via management interface. The use of this clause in any other context is beyond the scope of this standard." and remove the floating text.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

Cl **148** *SC* **148.1** *P* **214** *L* **12** # i-265

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **A** *PLCA_SCOPE*

The first sentence refers to PLCA as though it is already a familiar, well understood and well specified protocol that is familiar to the reader by the time he gets to clause 148 of IEEE Std. 802.3. Such is hardly the case.

SuggestedRemedy

Add the following text to the last paragraph: "PLCA modifies the CSMA/CD shared media access method so that assured access is provided via the collision free round robin protocol specified in this clause." This is a necessary but not sufficient addition. We'll leave further detail requirements to later in the clause..

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.
Change "This clause specifies the optional Physical Layer Collision Avoidance (PLCA) capabilities. PLCA is defined for half-duplex mode of operation only. The PLCA RS is specified for operation with the PHY defined in Clause 147 (10BASE-T1S). PLCA is designed to work in conjunction with CSMA/CD and can be dynamically enabled or disabled via management interface."

to

"This clause specifies a reconciliation sublayer to provide optional Physical Layer Collision Avoidance (PLCA) capabilities among participating stations. The PLCA RS is specified for operation with Clause 147 (10BASE-T1S) PHYs operating in half-duplex multidrop mode. PLCA can be dynamically enabled or disabled via management interface.

When enabled, the PLCA RS aligns data from the MAC with transmission opportunities of the physical layer and maps the physical layer signals to PLS primitives towards the MAC. The use of PLCA-enabled physical layers in CSMA/CD half-duplex shared-medium networks provides enhanced performance relative to CSMA/CD without PLCA. PLCA-enabled nodes can coexist with nodes without PLCA enabled on the same mixing segment, all using 802.3 CSMA/CD."

Change "This clause specifies the optional Physical Layer Collision Avoidance (PLCA) capabilities. PLCA is defined for half-duplex mode of operation only. The PLCA RS is specified for operation with the PHY defined in Clause 147 (10BASE-T1S). PLCA is designed to work in conjunction with CSMA/CD and can be dynamically enabled or disabled via management interface."

to

"This clause specifies a reconciliation sublayer to provide optional Physical Layer Collision Avoidance (PLCA) capabilities among participating stations. The PLCA RS is specified for operation with Clause 147 (10BASE-T1S) PHYs operating in half-duplex multidrop mode.

PLCA can be dynamically enabled or disabled via management interface.

When enabled, the PLCA RS aligns data from the MAC with <scheduled> transmission opportunities of the physical layer <in a round robin fashion for PLCA participants> and maps the physical layer signals to PLS primitives towards the MAC. The use of PLCA-enabled physical layers in CSMA/CD half-duplex shared-medium networks provides enhanced performance relative to CSMA/CD without PLCA< by avoiding corruption of signals on the media itself>. PLCA-enabled nodes can coexist with nodes without PLCA enabled on the same mixing segment, all using 802.3 CSMA/CD."

Straw Poll #3: (pick one)
A: I am happy with an ACCEPT IN PRINCIPLE with the text above in angle brackets
B: I am happy with an ACCEPT IN PRINICPLE with the text above without the text in angle brackets
C: I am unhappy with either A or B.

A: 1 B: 9 C: 2

Motion #9: Accept the text above as the response to comment i-265 without the text in angle brackets, as described by straw poll #3 choice B.
M: Peter Jones S: Phil Brownlee
Y: 21 N: 2 A:5 Motion Passes (technical >= 75%)

Cl **148** *SC* **148.4.6** *P* **214** *L* **22** # i-418

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *PLCA_SCOPE*

[CSD/Compatibility] [Installed base compatibility] [PAR -- scope did not include MAC function in the project scope]
In PLCA data state diagram, COLLIDE state and related functional behaviors create a condition where in half-duplex, CSMA/CD, MAC transmits a packet, into a substantially busy network, but the collision condition does not result in a collision on the shared media. The collision signal is asserted only for the local node for the TX to collide-&-retry, while the simultaneous received signal that caused the collision is expected to be received as if there is no collision. The remote transmiter is not notified of contention on the network. This is a new behavior for an half-duplex MAC.

Legacy and installed base of Ethernet MACs expect to operate in 'architecturally' separate TX and RX, i.e. full-duplex datapath, while in half-duplex mode. Explicit allowance for implementations to optimize the datapath resources to only support simplex datapath operation is found in 4.1.2 where only obvious externally testable condition was inserted into the CL4 spec:

"4.1.2 CSMA/CD operation. ..... Transmit frame operations are independent from the receive frame operations. A transmitted frame addressed to the originating station will be received and passed to the MAC client at that station. This characteristic of the MAC sublayer may be implemented by functionality within the MAC sublayer or full duplex characteristics of portions of the lower layers."

And the clear architectural model vs implementations here in 1.1.3.1: "...The architectural model is based on a set of interfaces that may be different from those emphasized in implementations. One critical aspect of the design, however, shall be addressed largely in terms of the implementation interfaces: compatibility."

This new behavior specified in CL148 PLCA data state diagram is not compatible with many installed bases of 802.3 nodes with appropriate explosed MII interoperability test point that is also a phyical interface with specified connectors. Also as forementioned, the contention management and collision handling are MAC functions, not a part of Physical Layer that Reconsiiation Sub-layer belongs to.

Additional info could be found here : (slides 14~18 of):
http://www.ieee802.org/3/cg/public/Nov2018/Kim_3cg_01a_1118.pdf

SuggestedRemedy

This clause CL148 PLCA RS should be deleted. Alternatively re-architected to avoid introducing new normative behaviors to the installed base with exposed interoperability interfaces.

Response *Response Status* **W**

REJECT.
CRG disagrees with the commenter.
Commenter fails to show compatibility issues with conformant implementations and

incorrectly posits PLCA is a new MAC.

Additionally, the Task Force has previously considered the issues raised by the commenter and has also reviewed and evaluated contributions that rebut the commenter's assertions. See for example:
http://www.ieee802.org/3/cg/public/Jan2019/Tutorial_cg_0119_final.pdf,
http://www.ieee802.org/3/cg/public/Jan2019/baggett_3cg_01_0119.pdf
http://www.ieee802.org/3/cg/public/adhoc/beruto_3cg_plca_mac_compatibility.pdf
http://www.ieee802.org/3/cg/public/adhoc/beruto_3cg_plca_multiple_collisions.pdf

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Cl **148** *SC* **148.2** *P* **214** *L* **38** # i-419

Seaman, Michael MICK SEAMAN

Comment Type **G** *Comment Status* **R** *PLCA_PRIORITIES*

The utility of PLCA would be considerably improved, and emerging application areas (e.g. industrial, automotive) if the BEACON mechanisms provided simple support for priority. Two priority levels would be sufficient to support a deterministic (known bounded latency) service in addition to best effort. Four priority levels may be desirable, though I would not advocate more without detail uses case analysis.

SuggestedRemedy

Specify the BEACON to allow inclusion of a priority indication as a follow on project if not part of the present effort.

Response *Response Status* **C**

REJECT.
CRG disagrees with the commenter.

Communication of 802.1 priorities to the physical layer in an 802.3 PHY would require modification of the 802.3 MAC Service Access Point definition, and the MAC layer, and thus may be considered outside the current scope of 802.3. While potentially desirable, this would be outside the scope of a physical layer project and the approved PAR.

The Task Force previously considered adding a similar feature into the amendment, and decided not to do so.

In addition, commenter did not supply sufficient detail to implement his request.

Cl **148** *SC* **148.2** *P* **214** *L* **41** # i-7

Hajduczenia, Marek Charter Communications

Comment Type **E** *Comment Status* **A** *PLCA_ID*

We typically avoid the use of "must" except for the use cases specidified in Style Manual - this is not the case.

SuggestedRemedy

Change "node ID must be" to "node ID shall be" and add PICS entry for it

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Replace "Other than the condition that the assigned node ID must be unique to the local collision domain, the method of determination of the node ID and to_timer by the management entity is beyond the scope of this standard."

with "The method of determination of the node ID and to_timer by the management entity is beyond the scope of this standard. Proper operation of the Clause 148 functionality assumes that the assigned node ID is unique in the local collision domain."

Cl **148** *SC* **148.2** *P* **214** *L* **42** # i-269

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **A** *PLCA_ID*

There needs to be a little more discussion of local_ID assignment, how it doesn't appear externally and that it is fully contained within the segment.

SuggestedRemedy

Add the following text at the end of the first paragraph: The local_ID assignment value doesn't appear externally or in the payload packet format. The local_ID assignment value is fully contained within the local bussed segment.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add the following text at the end of the first paragraph at line 43: The node ID assignment value does not appear externally or in the payload packet format. The node ID assignment value is fully contained within the local collision domain.

Cl **148** *SC* **148.2** *P* **214** *L* **42** # i-268

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **R** *PLCA_ID*

This lack of a complete specification for full functionality is completely unprecedented for 10 Mb/s Ethernet and a major shortcoming. Plug and work, historically, has been a major factor in the success of Ethernet in face of the competition (which usually required a bunch of configuration before it would go on-line). Two examples of this in the history of Ethernet come to mind: (1) In the early days of 10 Mb/s full duplex and 100BASE-T early implementations of AutoNegotiation did not work very well. The failure of the promised plug 'n' play was a major marketing issue. (2) In the very first (3 Mb/s) version of Ethernet, DTEs only had 8 bit addresses. They had to have their addresses manually configured with push-on test leads as part of their installation process. This made the customer (most of whom were EEs or Computer Scientists) installation not possible and a technician had to be involved. Major network management problem.

SuggestedRemedy

Come up with and require availability of an automatic configuration app. No reason one shouldn't be able to use the CSMA/CD capability to (1) identify the stations on the local segment and (2) hand out the unique assigned node ID to each DTE.

Response *Response Status* **U**

REJECT.
CRG disagrees with the commenter:

The CRG specifically disagrees on these points:
[1] PLCA is an optional feature that still operates under misconfiguration. See http://www.ieee802.org/3/cg/public/Sept2018/beruto_3cg_mixing_PLCA_with_non_PLCA_enabled_nodes_r1.2.pdf
[2] The draft does not constrain how the value for PLCA node ID is obtained. There are many different ways to implement this.
[3] Defining an "automatic configuration app" may be a desirable feature, but is only one of a large set of possible solutions.
[4] Default operation is with PLCA turned off, allowing interoperable plug-and-play, and opportunity for the management entity to configure for improved performance.

Cl **148** *SC* **148.2** *P* **214** *L* **44** # i-396

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *PLCA_ID*

[CSD] PLCA RS requires 1) each node/PHY to be configured with a nodeID, 2) entire network node/PHY configuration to be coordinated, i.e. unique and nearly sequential nodeID values, unique node with nodeID=0, etc 3) provides no protocol with which #2 could be accomplished, i.e. no interoperable protocol to achieve these requyirements, 4) provides no remedy for boundry conditions such as multiple nodeID=0, no node with nodeID=0, non-unique nodeID in a network, unconfigured node in a configured network, etc, 5) provides no protocol that may discover any of these issues.

CSD/Compatibility means that two or more complaint implementations would interoperate with a high degree of probablity. This is one of the main reasons most standards to exist -- assured and certain interoperability.

PLCA RS in CL148 does not meet this CSD requirements, nor its asserted claim in its CSD response.

SuggestedRemedy

CSD/Compatibilty assertions with regard to CL148 PLCA operation is grossly incorrect. Appropriate changes to the CSD/Compatibility with regards to PLCA's inability to assure two compliant implementations interoperate without further engineering, design, and configuration be addressed, OR add appropriate specifcations to remedy the concerns WRT interoperability and completeness of specification that assure interoperability, OR delete CL148 PLCA from this draft (and re-start the project development with completeness as a required scope, if desired.)

Response *Response Status* **W**

REJECT.
CRG disagrees with the commenter:

The CRG specifically disagrees on these points:
[1] PLCA node IDs do not need to be sequential
[2] PLCA is an optional feature that still operates under misconfiguration. See http://www.ieee802.org/3/cg/public/Sept2018/beruto_3cg_mixing_PLCA_with_non_PLCA_enabled_nodes_r1.2.pdf
[3] The draft does not constrain how the value for PLCA node ID is obtained. There are many different ways to implement this.
[4] Default operation is with PLCA turned off, allowing interoperable plug-and-play, and opportunity for the management entity to configure for improved performance.

Cl **148** *SC* **148.2** *P* **214** *L* **44** # i-397

Kim, Yongbum NIO

Comment Type **TR** *Comment Status* **R** *PLCA_ID*

[CSD/Compatibility + PAR] CL148 PLCA RS does not specify how a node is selected for NodeID=0, how other NodeIDs are assigned, how an end-station is aware of other end-stations configuration enough to configure itself to operate, etc, such that two implementations connected via a referenced network segment is not assured to work. This indicates grossly incomplete specification.

SuggestedRemedy

Complete CL148 specification by including additional currently-missing specifications on how all parameters necessary to assure interoperability is achieved via non-vendor-denpendant protocols. Since this is a concern WRT to missing specification, the suggested remedy is not included (i.e. filling in the missing specification is the scope of the IEEE 802.3cg project).

Response *Response Status* **W**

REJECT.
The CRG disagrees with the commenter.
Description or requirements of assignment of parameters in the management entity is beyond the scope of this standard.

This is clearly stated in 148.2 (draft 3.0 is quoted): "Other than the condition that the assigned node ID must be unique to the local collision domain, the method of determination of the node ID and to_timer by the management entity is beyond the scope of this standard."

Additionally, end stations on mis-configured networks or networks where not all the nodes are configured for PLCA operation will, in fact, operate, allowing configuration to be set by management for improved performance. See http://www.ieee802.org/3/cg/public/Sept2018/beruto_3cg_mixing_PLCA_with_non_PLCA_enabled_nodes_r1.2.pdf

Cl **148** *SC* **148.3** *P* **215** *L* **5** # i-270

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **R** *PLCA_SCOPE*

The "Relationship with other IEEE standards" is incorrect with respect to the ISO Layer Model, 802 tradition and precedent and previous 802.3 projects that fiddled with shared media access methods[1]. When 802 did its adaptation of the ISO 7 Layer Model it subdivided the Data Link Layer into the LLC Sublayer and the MAC Sublayer specifically so that there was a separate place in the overall 802 model that "performs access control functions for the shared medium in support of the (common) LLC Sublayer[2]". Properly placed, PLCA would conform to this model, or (more properly) PLCA and CSMA/CD together would supply a complete MAC Sublayer for PLCA operation that would have a "Distinct Identity" that is different from CSMA/CD - Ethernet. To make things fit into the desired product implementation for fitting to existing IP the new PLCA block could have both a top MII to interface to existing designs and a bottom MII to attach to the PHY in the conventional manner. [1] Clause 64, Clause 99 [2] IEEE Std 802-1990 Overview & Architecture

SuggestedRemedy

Remove the entire PLCA clause (148) and associated textual material plus references from the draft. This will eliminate any scope issues and bring the draft into fully into line with the letter and expectations of the project paperwork at all levels (i.e. PAR, CSD, 802.3 project Objectives) [Further, thoughts not needed to resolve my required comment. I would fully support the creation of a new project to take place either within 802.3 or in a new 802 Working Group to standardize what we now call PLCA as a MAC sublayer element where the other required elements for a full DTE standard are provided by reference to the relevant portions of the 802.3 standard, as appropriate.]

Response *Response Status* **U**

REJECT.
The CRG disagrees with the commenter's description of layering and the proper placement of PLCA in the layering model. PLCA performs the functions delegated by the 802.3 layer model to the physical layer - carrier sense and collision detection. Commenter seems to posit an implementation which is not described in the amendment, where the PLCA sublayer interfaces to the MAC via an MII. (a "top MII" per the commenter), whereas PLCA maintains the layering and communicates to the MAC via the primitives PLS_CARRIER and PLS_SIGNAL defined in IEEE Std 802.3, and communicates with the remainder of the physical layer through the MII interface. For more detail on how PLCA relates to OSI layering please see http://www.ieee802.org/3/cg/public/adhoc/brandt_020619_3cg_01a_adhoc.pdf.

Additionally, the fact that PLCA-enabled half-duplex CSMA/CD stations may operate with and coexist with non-PLCA enabled half-duplex CSMA/CD stations on the same mixing segment is evidence that the PLCA RS is located beneath the CSMA/CD MAC and not a new MAC function in itself. See http://www.ieee802.org/3/cg/public/Jan2019/Tutorial_cg_0119_final.pdf and http://www.ieee802.org/3/cg/public/Sept2018/beruto_3cg_mixing_PLCA_with_non_PLCA_enabled_nodes_r1.2.pdf

Motion #10:
Resolve comment i-270 with the proposed reject response above:
M: Peter Jones
S: Tim Baggett
Y: 20 N: 0 A: 10 (motion passes)

Cl **148** *SC* **148.4.2** *P* **215** *L* **49** # i-198

Koczwara, Wojciech Rockwell Automation

Comment Type **T** *Comment Status* **A** *PLCA_LIMITS*

*** Comment submitted with the file 100622500003-Koczwara_3cg_PLCA_improvement_for_high_node_count_v1p6.pdf attached ***

Variable delay line in PLCA RS can overrun slotTime, resulting in late collisions. See Koczwara_3cg_PLCA_improvement_for_high_node_count_v1p6.pdf slides 4-8 for more detail.

SuggestedRemedy

Specify the delay in the PLCA RS to less than 496 bit times (to avoid late collisions) and use carrier-sense to avoid buffer overflow. See Koczwara_3cg_PLCA_improvement_for_high_node_count_v1p6.pdf slides 10-23 for detailed text and state diagram changes.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accommodated by i-425.

Resolution of comment i-425 is:
ACCEPT IN PRINCIPLE.
Change 148.4.6.1 page 225 ln 33-34 from:
The variable delay line is a small buffer that aligns a transmission with the transmit opportunity. The variable delay line length is no greater than to_timer * plca_node_count + beacon_timer.
To:
The variable delay line is a small buffer that aligns a transmission with the transmit opportunity.

In Figure 148-4, page 226, ln 49-50, in the transition from the HOLD state to the A connector, change the condition to:
“recv_timer_done + receiving + (a ≥ delay_line_length)“

In Figure 148-4, page 227, ln 7-16 do the following:
1. remove the transition from the COLLIDE to the PENDING STATE and its associated condition
2. In Figure 148-4, add a new state DELAY_PENDING between COLLIDE and PENDING states.
3. Add a transition between COLLIDE and DELAY_PENDING states with the following condition: “!plca_txen”
4. Add a transition between DELAY_PENDING and PENDING states with the following condition: “pending_timer_done”
5. Add the following text inside the DELAY_PENDING state box:
“start pending_timer
SIGNAL_STATUS <= NO_SIGNAL_ERROR”
6. From the PENDING state delete “CARRIER_STATUS <= CARRIER_ON” and “SIGNAL_STATUS <= NO_SIGNAL_ERROR”

Grant editorial license to draw the diagram according to IEEE 802.3 style

Change in 148.4.6.1, page 225 ln 43-46:
During the COLLIDE state, the PLCA Data state diagram asserts packetPending = FALSE and CARRIER_STATUS = CARRIER_ON via the PLS_CARRIER.indication primitive. When the MAC is done sending the jam bits as described in Clause 4, it waits for the next transmit opportunity by switching to PENDING state.
To:
During the COLLIDE state, packetPending = FALSE and CARRIER_STATUS = CARRIER_ON are asserted via the PLS_CARRIER.indication primitive. When the MAC is done sending the jam bits as described in Clause 4, it waits for the next transmit opportunity by switching to DELAY_PENDING state. The PLCA Data State Diagram transitions to the PENDING state after waiting for the pending_timer. The pending_timer is used to prevent committing to a transmit opportunity before transmit data is available. This prevents conveying unwanted long COMMIT requests to the PHY.

Append text to 148.4.6.4 Timers, page 228 ln 54:
pending_timer
Defined the time the PLCA Data State Diagram waits in the DELAY_PENDING state before switching to PENDING state.
Duration: 512 bit times.

add subclause 148.4.6.5 Constants, page 228 ln 54:
delay_line_length
This constant is implementation dependent and specifies the maximum length of the PLCA RS variable delay line depicted in figure 148-2.
Value: up to 396 bit times

Change in 147.11 Delay constraints, page 205 line 44
Table 147–6—10BASE-T1S delay constraints
“MDI input to COL asserted Maximum value: 25.6us”
To
“MDI input to COL asserted Maximum value: 5.0us”

Cl **148** *SC* **148.4.4** *P* **218** *L* **17** # i-372

Law, David — Hewlett Packard Enterprise

Comment Type **TR** *Comment Status* **A** *Editorial*

Clause 148, which specifies the PLCA Reconciliation Sublayer (RS), cannot place requirement (shall statements) on the connected PHY. Subclause 1.1.3.2 'Compatibility interfaces' of IEEE Std 802.3-2018 defines the MII as a compatibility interface. As such an implementer is permitted to implement only the Clause 148 RS, however having shall statements related to the PHY results in requirements that this RS implementer will be unable to satisfy. This can be seen in the PICS where a Clause 148 RS implementer is required to respond to questions about the PHY such as PLCA2 and PLCA3 where the status is M and the support is Yes[]. In addition a PLCA RS supports PHYs other than 10BASE-TS1.

SuggestedRemedy

[1] Change 148.4.4 'Requirements for the PHY' to read 'In order to support Physical Layer Collision Avoidance the RS has to be connected to a 10BASE-TS1 PHY.
{2] Remove requirements on the PHY from Clause 148.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.
Implement proposed remedy [1].

At page 218, line 29, change "the PHY shall encode and transmit a signal" to "the PHY encodes and transmits a signal"

At page 218, line 44, change "Upon the reception of this request, the RX_DV signal shall not be asserted" to "Upon the reception of this request, the RX_DV signal is not asserted"

At page 219, line 3, change "When the PHY receives a BEACON, it shall indicate this information" to "When the PHY receives a BEACON, it indicates this information"

At page 219, line 11, change "When the PHY receives a COMMIT from the line, it shall indicate" to "When the PHY receives a COMMIT from the line, it indicates"

Delete the following PICS entries in 148.5.3.3: PLCA2, PLCA3, PLCA4, PLCA5, PLCA8.

Cl **148** *SC* **148.4.4.2** *P* **218** *L* **51** # i-142

Graber, Steffen — Pepperl+Fuchs GmbH

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

PLCA specific (add "-")

SuggestedRemedy

PLCA-specific

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.5.1** *P* **219** *L* **25** # i-143

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **R** *Editorial*

To achieve error free operation the PLCA node should be configured appropriately before transmit functions are enabled. (add comma after "appropriately")

SuggestedRemedy

To achieve error free operation the PLCA node should be configured appropriately, before transmit functions are enabled.

Response *Response Status* **C**

REJECT.
Wording looks correct

Cl **148** *SC* **148.4.5.1** *P* **219** *L* **28** # i-144

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **R** *Editorial*

b) there is one and only one node with local_nodeID = 0 on the local collision domain, (redundant wording)

SuggestedRemedy

b) there is only one node with local_nodeID = 0 on the local collision domain,

Response *Response Status* **C**

REJECT.
"one and only one" is logically different from "only one". It means that you need to have one, and no more than one. If you just say "only one", you are not saying that you need exactly one, which is the intended meaning here.

Cl **148** *SC* **148.4.5.1** *P* **219** *L* **35** # i-428

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **A** *Editorial*

The text calls for things to be reset to the defaults shown in the figure. There are no defaults shown in the figure.

SuggestedRemedy

Point instead to subclause 148.4.5.2 where the items are defined and add the default values there,

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.
Delete "When PLCA functions are disabled (plca_en = FALSE), the PLCA control variables are reset to their default
values as shown in Figure 148-3 and no special signaling is conveyed to the MII through the tx_cmd variable."

The intention was to describe what happens in Figure 148-3 / DISABLE state. Since the figure is self-explenatory the text is not needed.

Cl **148** *SC* **148.4.5.1** *P* **220** *L* **13** # i-145

Graber, Steffen Pepperl+Fuchs GmbH

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

CRS is asserted by the PHY through MII, indicating there's activity on the line. (avoid short forms)

SuggestedRemedy

CRS is asserted by the PHY through MII, indicating there is activity on the line.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.5.1** *P* **220** *L* **22** # i-146

Graber, Steffen Pepperl+Fuchs GmbH

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

If condition (1) occurs, the node is about to receive either a valid packet, a COMMIT request, a BEACON request or it might just be receiving a false carrier event. (remove "just")

SuggestedRemedy

If condition (1) occurs, the node is about to receive either a valid packet, a COMMIT request, a BEACON request or it might be receiving a false carrier event.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace, "If condition (1) occurs, the node is about to receive either a valid packet, a COMMIT request, a BEACON request or it might just be receiving a false carrier event."

with, If condition (1) occurs, the node is about to receive either a valid packet, a COMMIT request, a BEACON request, or it might be receiving a false carrier event."

(Editor's note: remote "just" and add oxford comma).

Cl **148** *SC* **148.4.5.1** *P* **220** *L* **28** # i-186

Xu, Dayin Rockwell Automation

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

Change "RECEIVE state is then enterer until ..." to "RECEIVE state is then kept until ..."

SuggestedRemedy

Change "RECEIVE state is then enterer until ..." to "RECEIVE state is then kept until ..."

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.5.1** *P* **220** *L* **45** # i-147

Graber, Steffen Pepperl+Fuchs GmbH

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

In this case the YIELD state is entered to just skip the TO, allowing other nodes a chance to transmit. (add comma after "case" and remove (redundant) "just")

SuggestedRemedy

In this case, the YIELD state is entered to skip the TO, allowing other nodes a chance to transmit.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.5.1** *P* **221** *L* **9** # i-373

Law, David Hewlett Packard Enterprise

Comment Type **TR** *Comment Status* **A** *State Diagram*

There appears to be a conflict, or at least a lack of clarity, between the Figure 148-3 'PLCA Control state diagram' and the Figure 148-4 'PLCA DATA state diagram' in respect to which controls the encoding being placed on the MII transmit signals TXD, TX_EN and TX_ER by the PLCA RS.

As an example, when the PLCA Control state diagram is in the SEND_BEACON state, one of the actions is tx_cmd <= BEACON, which based on subclause 148.4.5.2 should result on the BEACON encoding defined in Table 22-1 being placed on TXD, TX_EN and TX_ER. At the same time that the PLCA Control state diagram is in the SEND_BEACON state, it would appear that the PLCA DATA state diagram is in the IDLE state, and the actions within the IDLE state include TXD <= 0000 and TX_EN <= FALSE. Hence we have the two different state diagrams requiring different values to be placed on TXD and TX_EN at the same time resulting in a conflict.

Perhaps the intent is to have both state diagrams assign values to TXD and TX_EN, but that isn't clear to me as one state diagram uses tx_cmd and the other TXD and TX_EN.

In addition, the states within the PLCA Control state diagram that have actions assigning values to tx_cmd, and therefore potentially changing the values of TXD and TX_EN, are not synchronised to TX_CLK through the MCD variable in that way that actions that assign values to TXD and TX_EN are in the 'PLCA DATA state diagram'. Not synchronising state changes in the PLCA Control state diagram change the value of tx_cmd could result in transitions in TXD and TX_EN that do not meet the timing requirements of IEEE Std 802.3-2018 subclause 22.3.1 'Signals that are synchronous to TX_CLK'.

Finally, it isn't clear to me why TX_ER would be an input to Figure 148-4 'PLCA DATA state diagram'. I was wondering if it was meant to be a plca_txer variable derived from the MAC service interface, similar to the plca_txen, but the MAC service interface doesn't provide the ability for the MAC to pass transmit errors to the RS.

One, I assume unintended, consequence of the use of TX_ER is that when the PLCA RS with local_nodeID=0 is transmitting a BEACON, and therefore TX_ER = 1 (see Table 22-1), and then a transmission from the local MAC is started, it would appear that this transmission is discarded. This is due to the PLCA DATA state diagram transitioning from the IDLE state to the HOLD state due to plca_txen, then to the ABORT state, which sets packetPending to FALSE discarding the packet, as a result of the transition condition (recv_timer_not_done * MCD * !committed * TX_ER * !receiving) being true.

SuggestedRemedy

[1] Clarify the source of TXD and TX_EN as either the Figure 148-3 'PLCA Control state diagram' or the Figure 148-4 'PLCA DATA state diagram'. If the intent is that both should source TXD and TX_EN, suggest that tx_cmd should be replaced with TXD, TX_EN and TX_ER in the respective PLCA Control state diagram states.

[2] Ensure that MCD is used in any condition that results in a change of value in TXD,

TX_EN or TX_ER in the PLCA Control state and PLCA DATA state diagrams.

[3] Clarify the use of TX_ER in the transition condition from the HOLD to the ABORT state in the PLCA DATA state diagram.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
At page 223, line 23 replace
"tx_cmd Command to be conveyed to the PHY via MII. When set to NONE, no special signaling shall be conveyed. When set to BEACON or COMMIT, respective commands shall be conveyed to MII as specified in 148.4.4.1.1 and 148.4.4.1.2.
Values: NONE, BEACON or COMMIT"

with:

"tx_cmd Command for the PLCA DATA State Diagram to convey to the PHY via the MII.
Values: NONE, BEACON or COMMIT"

At page 225, line 36, replace "TX_ER" with "plca_txer".

Apply the following changes, in this order exactly:
1. In figure 148-4 replace all occurrences of "TX_ER" with "plca_txer".
2. In figure 148-4, in the NORMAL state, add "TX_ER <= plca_txer"
3. In figure 148-4, in the IDLE state, add "TX_ER <= ENCODE_TXER(tx_cmd)". Replace "TXD <= 0000" with "TXD <= ENCODE_TXD(tx_cmd)"
4. In figure 148-4, in the RECEIVE, PENDING and WAIT_MAC states, add "TX_ER <= ENCODE_TXER(tx_cmd). Add "TXD <= ENCODE_TXD(tx_cmd)"
5. In figure 148-4, in the HOLD, ABORT, TRANSMIT and FLUSH states, add "TX_ER <= plca_txer".
6. In figure 148-4, in the HOLD and ABORT states, add "TXD <= 0000".

At page 228, line 10, add:
"plca_txer the conditions for generating plca_txer are the same as defined in 22.2.1.6 and 22.2.2.5 for the TX_ER MII signal. Values: TRUE or FALSE"

Replace content of subclause 148.4.6.3 with the following text:
"ENCODE_TXER
This function takes as its argument the tx_cmd variable defined in 148.4.5.2.
It returns TRUE if tx_cmd is BEACON or COMMIT. Otherwise it returns the value of the plca_txer variable, defined in 148.4.6.2

ENCODE_TXD
This function takes as its argument the tx_cmd variable defined in 148.4.5.2.
If tx_cmd is BEACON, the return value is the TXD encoding defined in Table 22-1 for the BEACON request.
If tx_cmd is COMMIT, the return value is the TXD encoding defined in Table 22-1 for the COMMIT request.
Otherwise, the return value is 0000.
"

Replace content of subclause 148.4.3.6 with the following text:
"Generation of TX_ER shall comply with the PLCA Data State Diagram specified in 148.4.6.1"

Apply the following modifications to the PICS:
At page 232, line 39, replace "Specified in 22.2.1.6" with "Specified in "148.4.6.1"
At page 233, line 44, delete the CON3 line.

Cl **148** *SC* **148.4.5.2** *P* **223** *L* **25** # i-374

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Editorial*

Suggest that '... to the PHY via MII.' should be changed to read '... to the PHY via the MII.'.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Superseded by resolution of i-373.

Proposed Resolution of comment i-373 is:
PROPOSED ACCEPT IN PRINCIPLE.
At page 223, line 23 replace
"tx_cmd Command to be conveyed to the PHY via MII. When set to NONE, no special signaling shall be conveyed. When set to BEACON or COMMIT, respective commands shall be conveyed to MII as specified in 148.4.4.1.1 and 148.4.4.1.2.
Values: NONE, BEACON or COMMIT"

with:

"tx_cmd Command for the PLCA DATA State Diagram to convey to the PHY via the MII.
Values: NONE, BEACON or COMMIT"

At page 225, line 36, replace "TX_ER" with "plca_txer".

Apply the following changes, in this order exactly:
1. In figure 148-4 replace all occurrences of "TX_ER" with "plca_txer".
2. In figure 148-4, in the NORMAL state, add "TX_ER <= plca_txer"
3. In figure 148-4, in the IDLE state, add "TX_ER <= ENCODE_TXER(tx_cmd). Replace "TXD <= 0000" with "TXD <= ENCODE_TXD(tx_cmd)"
4. In figure 148-4, in the RECEIVE, PENDING and WAIT_MAC states, add "TX_ER <= ENCODE_TXER(tx_cmd). Add "TXD <= ENCODE_TXD(tx_cmd)"
5. In figure 148-4, in the HOLD, ABORT, TRANSMIT and FLUSH states, add "TX_ER <= plca_txer".
6. In figure 148-4, in the HOLD and ABORT states, add "TXD <= 0000".

At page 228, line 10, add:
"plca_txer the conditions for generating plca_txer are the same as defined in 22.2.1.6 and 22.2.2.5 for the TX_ER MII signal. Values: TRUE or FALSE"

Replace content of subclause 148.4.6.3 with the following text:
"ENCODE_TXER
This function takes as its argument the tx_cmd variable defined in 148.4.5.2.
It returns TRUE if tx_cmd is BEACON or COMMIT. Otherwise it returns the value of the plca_txer variable, defined in 148.4.6.2

ENCODE_TXD
This function takes as its argument the tx_cmd variable defined in 148.4.5.2.
If tx_cmd is BEACON, the return value is the TXD encoding defined in Table 22-1 for the BEACON request.
If tx_cmd is COMMIT, the return value is the TXD encoding defined in Table 22-1 for the COMMIT request.
Otherwise, the return value is 0000.
"

Replace content of subclause 148.4.3.6 with the following text:
"Generation of TX_ER shall comply with the PLCA Data State Diagram specified in 148.4.6.1"

Apply the following modifications to the PICS:
At page 232, line 39, replace "Specified in 22.2.1.6" with "Specified in "148.4.6.1"
At page 233, line 44, delete the CON3 line.

Cl **148** *SC* **148.4.5.2** *P* **223** *L* **27** # i-148

Graber, Steffen Pepperl+Fuchs GmbH

Comment Type **E** *Comment Status* **A** *Editorial*

NONE, BEACON or COMMIT (add serial comma after "BEACON")

SuggestedRemedy

NONE, BEACON, or COMMIT (please also add the comma to the identical text in line 32 on the same page)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Superseded by resolution of i-373.

Propopsed resolution of comment i-373 is:
PROPOSED ACCEPT IN PRINCIPLE.
At page 223, line 23 replace
"tx_cmd Command to be conveyed to the PHY via MII. When set to NONE, no special signaling shall be conveyed. When set to BEACON or COMMIT, respective commands shall be conveyed to MII as specified in 148.4.4.1.1 and 148.4.4.1.2.
Values: NONE, BEACON or COMMIT"

with:

"tx_cmd Command for the PLCA DATA State Diagram to convey to the PHY via the MII.
Values: NONE, BEACON or COMMIT"

At page 225, line 36, replace "TX_ER" with "plca_txer".

Apply the following changes, in this order exactly:
1. In figure 148-4 replace all occurrences of "TX_ER" with "plca_txer".
2. In figure 148-4, in the NORMAL state, add "TX_ER <= plca_txer"
3. In figure 148-4, in the IDLE state, add "TX_ER <= ENCODE_TXER(tx_cmd). Replace "TXD <= 0000" with "TXD <= ENCODE_TXD(tx_cmd)"
4. In figure 148-4, in the RECEIVE, PENDING and WAIT_MAC states, add "TX_ER <= ENCODE_TXER(tx_cmd). Add "TXD <= ENCODE_TXD(tx_cmd)"
5. In figure 148-4, in the HOLD, ABORT, TRANSMIT and FLUSH states, add "TX_ER <= plca_txer".
6. In figure 148-4, in the HOLD and ABORT states, add "TXD <= 0000".

At page 228, line 10, add:
"plca_txer the conditions for generating plca_txer are the same as defined in 22.2.1.6 and 22.2.2.5 for the TX_ER MII signal. Values: TRUE or FALSE"

Replace content of subclause 148.4.6.3 with the following text:
"ENCODE_TXER
This function takes as its argument the tx_cmd variable defined in 148.4.5.2.
It returns TRUE if tx_cmd is BEACON or COMMIT. Otherwise it returns the value of the plca_txer variable, defined in 148.4.6.2

ENCODE_TXD
This function takes as its argument the tx_cmd variable defined in 148.4.5.2.
If tx_cmd is BEACON, the return value is the TXD encoding defined in Table 22-1 for the BEACON request.
If tx_cmd is COMMIT, the return value is the TXD encoding defined in Table 22-1 for the COMMIT request.
Otherwise, the return value is 0000.
"

Replace content of subclause 148.4.3.6 with the following text:
"Generation of TX_ER shall comply with the PLCA Data State Diagram specified in 148.4.6.1"

Apply the following modifications to the PICS:
At page 232, line 39, replace "Specified in 22.2.1.6" with "Specified in "148.4.6.1"
At page 233, line 44, delete the CON3 line.

Cl **148** *SC* **148.4.5.2** *P* **223** *L* **28** # i-375

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Editorial*

Suggest that rx_cmd should be defined in terms of the PLCA RS, which this Clause is specifying, rather than the PHY. In addition, suggest that there should be a reference to Table 22-2 encodings that rx_cmd is derived from.

SuggestedRemedy

rx_cmd
Encoding present on RXD<3:0>, RX_ER, and RX_DV as defined in Table 22-2.
Values:
NONE: PLCA BEACON or COMMIT indication encoding not present on RXD<3:0>, RX_ER, and RX_DV.
BEACON: PLCA BEACON indication encoding present on RXD<3:0>, RX_ER, and RX_DV.
COMMIT: PLCA COMMIT indication encoding present on RXD<3:0>, RX_ER, and RX_DV.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.5.4** *P* **224** *L* **32** # i-376

Law, David Hewlett Packard Enterprise

Comment Type **TR** *Comment Status* **A** *Timers*

This subclause specifies the duration of the beacon_timer as 20 bit times. IEEE Std 802.3-2018 subclause 1.4.160 'bit time' states that 'The bit time is the reciprocal of the bit rate. For example, for 100BASE-T the bit time is 10-8 s or 10 ns.'. As a results in a duration of beacon_timer is exactly 20 x reciprocal(10 Mb/s) = 2000 ns. This would seem to result in a requirement for infinite precision and make a beacon_timer of 2000 + 10-15 ns non-conformant.

SuggestedRemedy

Provide a tolerance for the beacon_timer, burst_timer, commit_timer (subclause 148.4.6.4), hb_send_timer (subclause 147.3.7.1.2), hb_timer (subclause 147.3.7.1.2) and link_hold_timer (subclause 147.3.7.2.3)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
At page 224, line 32, append: "Tolerance: +/- 1/2 bit time"

At page 224, line 38, append: "Tolerance: +/- 1/2 bit time"

At page 224, line 52, append: "Tolerance: +/- 1/4 bit time"

At page 228, line 55, append: "Tolerance: +/- 1/2 bit time"

At page 186, line 16, append: "Tolerance: +/- 1/2 bit time"

At page 186, line 20, append: "Tolerance: +/- 100 us"

At page 189, line 35, append: "Tolerance: +/- 100 us"

Cl **148** *SC* **148.4.5.4** *P* **224** *L* **34** # i-377

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Editorial*

As there are other instances of an actual counter within Figure 148-3 'PLCA Control state diagram' such as bc (see page 222, line 34) suggest that burst_timer shouldn't be defined as 'Counts the time to wait ... in bit-times.'.

SuggestedRemedy

Suggest that the text 'Counts the time to wait for the MAC to send a new packet before yielding the transmit opportunity, in bit-times.' should be changed to read 'This timer determines how long to wait for the MAC to send a new packet before yielding the transmit opportunity.'.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.5.4** *P* **224** *L* **38** # i-271

Thompson, Geoffrey Independent Consultant

Comment Type **E** *Comment Status* **A** *Editorial*

It would be helpful to include the default value here

SuggestedRemedy

Add text: The default value specified in Clause 30 is 128.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add text: "The default value is specified in 30.3.9.2.7"

In the editor's opinion duplicating the text could make the maintenance more complicated in the future. A reference is usually better.

Cl **148** *SC* **148.4.5.4** *P* **224** *L* **40** # i-378

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Editorial*

Suggest that 'This timer determines how much time to wait in ...' should be changed to read 'This timer determines how long to wait in ...'.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.5.4** *P* **224** *L* **42** # i-272

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **A** *Editorial*

This is not a "should" in the usual standards sense of the word

SuggestedRemedy

Change "should" to "needs to be"

Response *Response Status* **W**

ACCEPT.

Cl **148** *SC* **148.4.5.4** *P* **224** *L* **45** # i-320

Baggett, Tim Microchip Technology, Inc.

Comment Type **E** *Comment Status* **A** *Timers*

*** Comment submitted with the file 100633500003-baggett_3cg_plca_timing_01_0519.pdf attached ***

More specific guidance may be provided to the system integrator in selecting a proper value for the PLCA to_timer when implementing a mixing segment that exceeds the "up to at least 25m" length or medium with different velocity of propagation. The following text change describes in additional detail the effects the medium propagation and PHY delays have in determining the transmit opportunity time.

See baggett_3cg_plca_timing_01_0519.pdf

SuggestedRemedy

Change the description of to_timer in lines 45-52 to read as follows:

The transmit opportunity timer maps to aPLCATransmitOpportunityTimer. The timer value should meet Equation (148-2). to_timer shall be set equal across the mixing segment for PLCA to work properly.
Duration: integer number between 1 and 255, expressed in bit times.

to_timer > max(2 * t_propdelay) + max(TX_EN sampled to MDI output) + max(MDI input to CRS asserted) + max(MDI input to CRS deasserted) - min(MDI input to CRS deasserted) (148-2)

where:
t_propdelay is the propagation delay between any two nodes on the mixing segment, and the delay specifications are the maxima and minima for the PHY type on the mixing segment (for 10BASE-T1S, see 147.11).

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change the description of to_timer in P224, lines 45-52 to read as follows:

The transmit opportunity timer maps to aPLCATransmitOpportunityTimer. The timer value needs to meet Equation (148-2). to_timer should be set equal across the mixing segment for PLCA to work properly.
Duration: integer number between 1 and 255, expressed in bit times.

to_timer > 2 * max(t_propdelay) + max(TX_EN sampled to MDI output) + max(MDI input to CRS asserted) + max(MDI input to CRS deasserted) - min(MDI input to CRS deasserted) (148-2)

where:
t_propdelay is the propagation delay between any two nodes on the mixing segment, and the delay specifications are the maxima and minima for the PHY type on the mixing segment (for 10BASE-T1S, see 147.11).

(note "*" is to be a mulitiplication sign)

With respect to thesuggested remedy the "should" statement at the beginning of the sentence has been replaced with a "needs to be", and the relation of to_timer across the network has been replaced with "should" to avoid placing a requirement on the user.

Cl **148** *SC* **148.4.5.4** *P* **224** *L* **51** # i-427

Brandt, David Rockwell Automation

Comment Type **T** *Comment Status* **A** *PLCA_LIMITS*

Even when the variable delay line length is less than slotTime, it is possible to configure a node to overrun the delay line before a transmit opportunity arrives. For example, if to_timer is set to 255 and there are more than 2 nodes, the delay line can fill before the transmit opportunity arrives. Other combinations of settings can lead to the same error.

SuggestedRemedy

Add to the B exist condition of the HOLD state of Figure 148-4, a check to exit if the variable delay line is full. The delay line will be emptied by the action of the state diagram, and the node will transmit into a subsequent transmit opportunity. Flag the error condition in Clause 30.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accommodated by i-425.

Resolution of comment i-425 is:
ACCEPT IN PRINCIPLE.
Change 148.4.6.1 page 225 ln 33-34 from:
The variable delay line is a small buffer that aligns a transmission with the transmit opportunity. The variable delay line length is no greater than to_timer * plca_node_count + beacon_timer.
To:
The variable delay line is a small buffer that aligns a transmission with the transmit opportunity.

In Figure 148-4, page 226, ln 49-50, in the transition from the HOLD state to the A connector, change the condition to:
“recv_timer_done + receiving + (a ≥ delay_line_length)“

In Figure 148-4, page 227, ln 7-16 do the following:
1. remove the transition from the COLLIDE to the PENDING STATE and its associated condition
2. In Figure 148-4, add a new state DELAY_PENDING between COLLIDE and PENDING states.
3. Add a transition between COLLIDE and DELAY_PENDING states with the following condition: “!plca_txen”
4. Add a transition between DELAY_PENDING and PENDING states with the following condition: “pending_timer_done”
5. Add the following text inside the DELAY_PENDING state box:
“start pending_timer
SIGNAL_STATUS <= NO_SIGNAL_ERROR”
6. From the PENDING state delete “CARRIER_STATUS <= CARRIER_ON” and “SIGNAL_STATUS <= NO_SIGNAL_ERROR”
Grant editorial license to draw the diagram according to IEEE 802.3 style

Change in 148.4.6.1, page 225 ln 43-46:
During the COLLIDE state, the PLCA Data state diagram asserts packetPending = FALSE and CARRIER_STATUS = CARRIER_ON via the PLS_CARRIER.indication primitive. When the MAC is done sending the jam bits as described in Clause 4, it waits for the next transmit opportunity by switching to PENDING state.
To:
During the COLLIDE state, packetPending = FALSE and CARRIER_STATUS = CARRIER_ON are asserted via the PLS_CARRIER.indication primitive. When the MAC is done sending the jam bits as described in Clause 4, it waits for the next transmit opportunity by switching to DELAY_PENDING state. The PLCA Data State Diagram transitions to the PENDING state after waiting for the pending_timer. The pending_timer is used to prevent committing to a transmit opportunity before transmit data is available. This prevents conveying unwanted long COMMIT requests to the PHY.

Append text to 148.4.6.4 Timers, page 228 ln 54:
pending_timer
Defined the time the PLCA Data State Diagram waits in the DELAY_PENDING state before switching to PENDING state.
Duration: 512 bit times.

add subclause 148.4.6.5 Constants, page 228 ln 54:
delay_line_length
This constant is implementation dependent and specifies the maximum length of the PLCA RS variable delay line depicted in figure 148-2.
Value: up to 396 bit times

Change in 147.11 Delay constraints, page 205 line 44
Table 147–6—10BASE-T1S delay constraints
“MDI input to COL asserted Maximum value: 25.6us”
To
“MDI input to COL asserted Maximum value: 5.0us”

Cl **148** *SC* **148.4.5.4** *P* **224** *L* **52** # i-273

Thompson, Geoffrey Independent Consultant

Comment Type **E** *Comment Status* **A** *Editorial*

It would be helpful to include the default value here

SuggestedRemedy

Add text: The default value specified in Clause 30 is 20.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Add text: The default value is specified in 30.3.9.2.5

In the editor's opinion duplicating the text could make the maintenance more complicated in the future. A reference is usually better.

Cl **148** *SC* **148.4.6.1** *P* **225** *L* **9** # i-274

Thompson, Geoffrey Independent Consultant

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

Clarify

SuggestedRemedy

Change to:...transmit opportunity on the media is detected.

Proposed Response *Response Status* **Z**

REJECT.

This comment was WITHDRAWN by the commenter.

The requested clarity is provided by the state diagram.

Cl **148** *SC* **148.4.6.1** *P* **225** *L* **22** # i-149

Graber, Steffen Pepperl+Fuchs GmbH

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

In this case the Data state diagram switches to the COLLIDE state asserting ... (add comma after "case")

SuggestedRemedy

In this case, the Data state diagram switches to the COLLIDE state asserting ...

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.6.1** *P* **225** *L* **33** # i-425

Brandt, David Rockwell Automation

Comment Type **T** *Comment Status* **A** *PLCA_LIMITS*

The existing draft allows configuration of compliant implementations in a way that violates a rule of CSMA/CD physical layer design - that the delay in the physical layer should not be allowed to be so long that late collisions can occur. The variable delay line length is allowed to be up to to_timer * plca_node_count + beacon_timer. The delay line should be limited to less than the slotTime in order to avoid late collisions.

SuggestedRemedy

Change from:
The variable delay line is a small buffer that aligns a transmission with the transmit opportunity. The variable
delay line length is no greater than to_timer * plca_node_count + beacon_timer.

To:
The variable delay line is a small buffer that aligns a transmission with the transmit opportunity. The variable
delay line length shall be less than slotTime.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Change 148.4.6.1 page 225 ln 33-34 from:
The variable delay line is a small buffer that aligns a transmission with the transmit opportunity. The variable delay line length is no greater than to_timer * plca_node_count + beacon_timer.
To:
The variable delay line is a small buffer that aligns a transmission with the transmit opportunity.

In Figure 148-4, page 226, ln 49-50, in the transition from the HOLD state to the A connector, change the condition to:
“recv_timer_done + receiving + (a ≥ delay_line_length)“

In Figure 148-4, page 227, ln 7-16 do the following:
1. remove the transition from the COLLIDE to the PENDING STATE and its associated condition
2. In Figure 148-4, add a new state DELAY_PENDING between COLLIDE and PENDING states.
3. Add a transition between COLLIDE and DELAY_PENDING states with the following condition: “!plca_txen”
4. Add a transition between DELAY_PENDING and PENDING states with the following condition: “pending_timer_done”
5. Add the following text inside the DELAY_PENDING state box:
“start pending_timer
SIGNAL_STATUS <= NO_SIGNAL_ERROR”
6. From the PENDING state delete “CARRIER_STATUS <= CARRIER_ON” and “SIGNAL_STATUS <= NO_SIGNAL_ERROR”

Grant editorial license to draw the diagram according to IEEE 802.3 style

Change in 148.4.6.1, page 225 ln 43-46:
During the COLLIDE state, the PLCA Data state diagram asserts packetPending = FALSE and CARRIER_STATUS = CARRIER_ON via the PLS_CARRIER.indication primitive. When the MAC is done sending the jam bits as described in Clause 4, it waits for the next transmit opportunity by switching to PENDING state.
To:
During the COLLIDE state, packetPending = FALSE and CARRIER_STATUS = CARRIER_ON are asserted via the PLS_CARRIER.indication primitive. When the MAC is done sending the jam bits as described in Clause 4, it waits for the next transmit opportunity by switching to DELAY_PENDING state. The PLCA Data State Diagram transitions to the PENDING state after waiting for the pending_timer. The pending_timer is used to prevent committing to a transmit opportunity before transmit data is available. This prevents conveying unwanted long COMMIT requests to the PHY.

Append text to 148.4.6.4 Timers, page 228 ln 54:
pending_timer
Defined the time the PLCA Data State Diagram waits in the DELAY_PENDING state before switching to PENDING state.
Duration: 512 bit times.

add subclause 148.4.6.5 Constants, page 228 ln 54:
delay_line_length
This constant is implementation dependent and specifies the maximum length of the PLCA RS variable delay line depicted in figure 148-2.
Value: up to 396 bit times

Change in 147.11 Delay constraints, page 205 line 44
Table 147–6—10BASE-T1S delay constraints
“MDI input to COL asserted Maximum value: 25.6us”
To
“MDI input to COL asserted Maximum value: 5.0us”

Cl **148** *SC* **148.4.6.1** *P* **225** *L* **40** # i-187

Xu, Dayin — Rockwell Automation

Comment Type **E** *Comment Status* **A** *Editorial*

Reword the text "If another node starts a transmission after meeting its own transmit opportunity, delayed data cannot be held anymore and a collision is triggered by switching to COLLIDE state."

SuggestedRemedy

Change " If another node starts a transmission after meeting its own transmit opportunity, delayed data cannot be held
anymore and a collision is triggered by switching to COLLIDE state. " to " If another node starts a transmission during the HOLD state, the delayed data is dropped and a collision is triggered by switching to COLLIDE state."

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.6.1** *P* **225** *L* **46** # i-379

Law, David — Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Editorial*

It isn't entirely clear what the 'it' in the text 'When the MAC is done sending the jam bits as described in Clause 4, it waits for the ...' is. It appears it might be the MAC, but I think it is actually the PLCA Data state diagram.

SuggestedRemedy

Suggest that the text 'When the MAC is done sending the jam bits as described in Clause 4, it waits for the ...' be changed to read 'When the MAC has completed sending the jam bits as described in Clause 4, the PLCA Data state diagram waits for the ...'.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.6.1** *P* **226** *L* **3** # i-177

Lewis, Jon — Dell EMC

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

Arrows and Lines in Figure 148-4 are not connsistent.

SuggestedRemedy

Change the figure to align the thickness of the lines and the size of the arrows.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.6.1** *P* **226** *L* **7** # i-380

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Editorial*

The variable CRS is used in Figure 148-4 'PLCA DATA state diagram' but is missing from subclause 148.4.6.2 'PLCA Data variables'.

SuggestedRemedy

Suggest that the following definition should be added to subclause 148.4.6.2 'PLCA Data variables':

CRS
The MII signal CRS (see 22.2.2.11).

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.6.1** *P* **226** *L* **26** # i-426

Brandt, David Rockwell Automation

Comment Type **T** *Comment Status* **A** *State Diagram*

The exit condition on the left side of the IDLE state is incorrect. If !plca_en occurred, we would return to the NORMAL state.

SuggestedRemedy

From:
receiving * !plca_en * tx_cmd = NONE

To:
receiving * !plca_txen * tx_cmd = NONE

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Accommodated by response to comment i-193

Response to comment i-193 is:
ACCEPT IN PRINCIPLE.
Replace "receiving * !plca_en * tx_cmd = NONE" with "receiving * (!plca_txen)) * (tx_cmd = NONE)"

Cl **148** *SC* **148.4.6.1** *P* **226** *L* **26** # i-193

Beruto, Piergiorgio Canova Tech S.r.l.

Comment Type **E** *Comment Status* **A** *State Diagram*

In figure 148-4, in the transition from "IDLE" to "RECEIVE" state,
the condition reads "receiving * !plca_en * tx_cmd = NONE".
The use of plca_en variable looks wrong here. It appears that text was changed as a result of
the implementation of comment #247 on draft 2.2 but the approved text did not meet the draft (see
http://www.ieee802.org/3/cg/public/Jan2019/beruto_3cg_burst_mode_fixes_revC.PDF slide #7).

SuggestedRemedy

In figure 148-4, in the transition from "IDLE" to "RECEIVE" state,
replace "plca_en" with "plca_txen".

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
Replace "receiving * !plca_en * tx_cmd = NONE" with "receiving * (!plca_txen)) * (tx_cmd = NONE)"

Cl **148** *SC* **148.4.6.1** *P* **226** *L* **27** # i-381

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Editorial*

The variables tx_cmd and rx_cmd are used in Figure 148-4 'PLCA DATA state diagram' but are missing from subclause 148.4.6.2 'PLCA Data variables'. I assume that tx_cmd and rx_cmd are the same variables as tx_cmd and rx_cmd defined in 148.4.5.2 'PLCA Control variables'.

SuggestedRemedy

Suggest that the following definitions should be added to subclause 148.4.6.2 'PLCA Data variables':

tx_cmd
See 148.4.5.2.

rx_cmd
See 148.4.5.2.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.6.1** *P* **226** *L* **30** # i-188

Beruto, Piergiorgio Canova Tech S.r.l.

Comment Type **T** *Comment Status* **A** *State Diagram*

*** Comment submitted with the file 100619700003-fig_148_4.png attached ***

In figure 148-4 in the "RECEIVE" state box, CARRIER_STATUS is set according to CRS and rx_cmd. According to IEEE state diagram representation, such assignment is only evaluated once when first entering the RECEIVE state. This is not the intended behavior, the CARRIER_STATUS parameter needs to be updated anytime the expression changes because of CRS or rx_cmd.

SuggestedRemedy

Add a recirculating arc to the RECEIVE state with 'ELSE' as a condition. See also attached figure.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.6.1** *P* **226** *L* **38** # i-275

Thompson, Geoffrey Independent Consultant

Comment Type **E** *Comment Status* **A** *Editorial*

Vertically compress state diagram.

SuggestedRemedy

Move HOLD state to the intersection of the RECEIVE and ABORT shadows. Move HOLD loop on itself from left to right side.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.6.1** *P* **226** *L* **43** # i-382

Law, David Hewlett Packard Enterprise

Comment Type **T** *Comment Status* **A** *Editorial*

The counter recv_timer is used in Figure 148-4 'PLCA DATA state diagram' but is missing from subclause 148.4.6.4 'Timers'. I assume it is the same timer as recv_timer defined in subclause 148.4.5.4 'Timers'.

SuggestedRemedy

Suggest that the following definition should be added to subclause 148.4.5.4 'Timers':

recv_timer
See 148.4.5.4.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.6.1** *P* **227** *L* **19** # i-383

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Editorial*

Please move the committed condition on the transition from PENDING to WAIT_MAC to be just below the PENDING state.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.6.1** *P* **227** *L* **24** # i-384

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Editorial*

Please move the plca_txen condition on the transition from WAIT_MAC to TRANSMIT to be adjacent to the line it is associated with.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.6.1** *P* **227** *L* **31** # i-385

Law, David Hewlett Packard Enterprise

Comment Type **TR** *Comment Status* **A** *Editorial*

There is no definition for the mean of the subscript n-a in relation to plca_txd.

SuggestedRemedy

Define the meaning of the subscript n-a in subclause 148.4.6.1.

Response *Response Status* **W**

ACCEPT IN PRINCIPLE.

148.4.3.1.2 Change "The values ONE and ZERO are conveyed by the PLCA variables plca_txd<3>, plca_txd<2>, plca_txd<1>, and plca_txd<0>, each of which conveys"

to

"The values ONE and ZERO are conveyed by the individual bits of the four-bit variable plca_txd<3:0>. Each bit of plca_txd<3:0> conveys..."

Additionally, on page 228, line 11, change the description of plca_txd as follows:
Change from "plca_txd See 148.4.3.1.2"

to

"plca_txd<3:0> A four-bit data value conveying a nibble of data to transmit from four successive PLS_DATA.request(OUTPUT_UNIT) primitives where OUTPUT_UNIT has a value of ONE or ZERO. See 148.4.3.1.2."

Cl **148** *SC* **148.4.6.1** *P* **227** *L* **45** # i-386

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Editorial*

Missing 'THEN' in IF-THEN-ELSE-END construct

SuggestedRemedy

Change 'IF COL' to read 'IF COL THEN' in the FLUSH state of Figure 148-4 'PLCA DATA state diagram (continued)'.

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.6.1** *P* **227** *L* **51** # i-276

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **A** *Editorial*

3 different arcs with different terms coming into a join.

SuggestedRemedy

Shorten each arc and terminate separately with a "To C" symbol.

Response *Response Status* **W**

ACCEPT.

Cl **148** *SC* **148.4.6.2** *P* **228** *L* **25** # i-387

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *Editorial*

Suggest that cross-references to related Clause 22 subclauses be added for TXD, TX_EN, TX_ER and COL.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

At page 228, line 26, replace description of TXD with: "The MII signals TXD<3:0> specified in 22.2.2.4".

At page 228, line 29, replace description of TX_EN with: "The MII signal TXEN specified in 22.2.2.3.".

At page 228, line 32, replace description of TX_ER with: "The MII signal TXER specified in 22.2.2.5.".

At page 228, line 34, replace description of COL with: "The MII signal COL specified in 22.2.2.12".

Cl **148** *SC* **148.4.6.2** *P* **228** *L* **40** # i-388

Law, David Hewlett Packard Enterprise

Comment Type **TR** *Comment Status* **A** *Editorial*

As noted in Figure 148-2 'PLCA functions within the Reconciliation Sublayer (RS)' and elsewhere in the IEEE P802.3cg draft, the TX_CLK is sourced from the PHY. In addition the relationship between MCD, that defines the when TXD, TX_EN and TX_ER change value in the TRANSMIT state, and phase of TX_CLK needs to be defined to meet subclause 22.3.1. MCD should therefore be derived from a free-running timer that expires synchronously with the rising edge of TX_TCLK.

SuggestedRemedy

[1] Add a new subclause as follows:

148.4.6.5 Abbreviations
MCD
Alias for mii_clock_timer_done.

[2] Add a new timer to subclause 148.4.6.4 as follows:

mii_clock_timer
A continuous free-running timer that shall expire synchronously with the rising edge of TX_TCLK.
Restart time: Immediately after expiration; restarting the timer resets the condition mii_clock_timer_done.'.
Duration: see 22.2.2.1.

Response *Response Status* **W**

ACCEPT.

Cl **148** *SC* **148.4.7.1** *P* **229** *L* **10** # i-194

Beruto, Piergiorgio Canova Tech S.r.l.

Comment Type **E** *Comment Status* **A** *Editorial*

The plca_status variable should follow the same syntax as the link_status parameter in 146.2.2.1 and 147.2.5.1.

SuggestedRemedy

At page 229, line 10, replace "FALSE" with FAIL.
At page 229, line 12, replace "TRUE" with OK.
At page 229, line 15, replace "TRUE" with OK.
At page 229, line 19, replace "FALSE" with FAIL.
In figure 148-5, in the "INACTIVE" state box, change "plca_status <= FALSE" with "plca_status <= FAIL"
In figure 148-5, in the "ACTIVE" state box, change "plca_status <= TRUE" with "plca_status <= OK"
At page 229, line 52, replace "If plca_status is true" with "If plca_status is OK".
At page 229, line 53, replace "If plca_status is false" with "If plca_status is FAIL".
At page 230, line 2, replace "Values: TRUE or FALSE" with "Values: OK or FAIL".
At page 230, line 13, replace "time plca_status is maintained in TRUE state" with "time plca_status is maintained in OK state".

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.7.2** *P* **229** *L* **51** # i-150

Graber, Steffen Pepperl+Fuchs GmbH

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

If plca_status is true, ... (TRUE is if capital letters in the rest of the page)

SuggestedRemedy

If plca_status is TRUE, ...

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.7.2** *P* **229** *L* **53** # i-151

Graber, Steffen Pepperl+Fuchs GmbH

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

If plca_status is false, ... (FALSE is in capital letters in the rest of the page)

SuggestedRemedy

If plca_status is FALSE, ...

Response *Response Status* **C**

ACCEPT.

Cl **148** *SC* **148.4.7.4** *P* **230** *L* **13** # i-277

Thompson, Geoffrey Independent Consultant

Comment Type **TR** *Comment Status* **A** *Timers*

Also Figure 148-5. The timer is very weakly defined. It only specifies the duration of the timer, not whether it is reset by a plca_reset nor whether it is reset by being "done and entering another state or anything else. Further, when the state is returned to ACTIVE from HYSTERESIS there is no modification to the timer setting so the operation of the timer degrades should there be noise on the !plca_active input no matter how far apart the noise events are.

SuggestedRemedy

Fully specify the operation pf the timer.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.
delete "stop plca_status_timer" from "ACTIVE" state in Figure 148-5.

The behaviour of the timers is specified in 148.1.1.2. They operate in the manner described in 40.4.5.2. This means that "start timer_xxx" implies a reset of the timer, while "stop timer_xxx" has no effect on an already "done" timer.

The timer status is only checked in the HYSTERESIS state, and it is reset on entry of the same state. This means that its status has no effect when the PLCA Status State Diagram is in any state other than HYSTERESIS.

In other words, this diagram represents a filter to hold the plca_active variable on.

Cl **98** *SC* **98B.3** *P* **235** *L* **11** # i-154

Marris, Arthur Cadence Design Systems, Inc.

Comment Type **TR** *Comment Status* **A** *Editorial*

Put the two unchanged rows into Table 98B-1 it will make things clearer.

SuggestedRemedy

Delete "(unchanged rows not shown)" on line 11

Add the following to Table 98B-1:
A0 100BASE-T1 ability
A2 1000BASE-T1 ability

Response *Response Status* **W**

ACCEPT.

Cl **146** *SC* **146A.1** *P* **236** *L* **17** # i-264

Thompson, Geoffrey Independent Consultant

Comment Type **ER** *Comment Status* **A** *Safety*

The text's description of the relationship to safety may twitch the IEEE lawyers. I would prefer to state it in a manner that is a little more removed.

SuggestedRemedy

Replace paragraph with: Defining "intrinsically safe", an intrinsically safe system and the limits of parameters used for intrinsically safe communications circuits is established by International Standards (Ref: Please provide correct reference). The specification of 10BASE-T1L in Clause 146 is intended to be compatible with implementation of such intrinsically safe systems.

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace sentences on page 236, lines 17-20 with,

The additional requirements to achieve equipment protection by intrinsic safety are described by International Standards (e.g., IEC 60079-11). Possible limits of parameters used for intrinsically safe communication circuits can be derived from these standards. The specification of 10BASE-T1L in Clause 146 is intended to be compatible with implementation of such intrinsically safe systems.

Cl **146** *SC* **146.20** *P* **239** *L* **22** # i-389

Law, David Hewlett Packard Enterprise

Comment Type **E** *Comment Status* **A** *PoDL*

Suggest that Annex 146B should be addressing optional power distribution in terms of IEEE Std 802.3 Clause 104 PoDL. As a result 'Single-pair PSE' should be change to read 'PoDL PSE' and 'Single-pair PD' should be change to read 'PoDL PD' throughout Annex 146B.

SuggestedRemedy

See comment.

Response *Response Status* **C**

ACCEPT.

Cl **146** *SC* **146.20.1.1.1** *P* **240** *L* **9** # i-152

Graber, Steffen Pepperl+Fuchs GmbH

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

mm (AWG) (it is not exactly clear, what "mm" means)

SuggestedRemedy

Diameter in mm (AWG)

Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Replace table column heading "mm (AWG)"

with, "Conductor diameter mm (AWG)"

Cl **146** *SC* **146.20.1.1.1** *P* **240** *L* **18** # i-153

Graber, Steffen Pepperl+Fuchs GmbH

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

1.02(18) (Space is missing)

SuggestedRemedy

1.02 (18)

Response *Response Status* **C**

ACCEPT.