Cl **114.6.6** *SC* **114.6.6** *P* **105** *L* **9** # 88

Kolesar, Paul — CommScope

Comment Type **TR** *Comment Status* **A** *Channel*

The channel attenuation is sensitive to the test wavelength and to the test launch condition. Yet there is no specification as to how to make this measurement in the field.

SuggestedRemedy

Define or provide a reference for the measurement of channel loss in the field.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

The channel attenuation is sensitive to the test wavelength and to the test launch condition. That is true.

Improve text of Pg 101, line 34, as: "Fiber optic channel type I includes up to at least 50 m length. The fiber optic channel type I meets a maximum insertion loss of 9.5 dB without inline connections and the transfer function specification of 114.6.5.1 under spectral distribution and launching mode power distribution at TP2 specified per EAF lower bound limits in 114.6.3.1."

Modify items b and c of the same list accordingly for consistency.

The insertion loss, the transfer function specifications, TP EAF and pointer to IEC 60793-2-40 sub-category A4a.2, all together define the minimum set of specifications to produce SI-POF cabling for GEPOF link operation.

Measurement methodology of SI-POF channel in the field is out of the scope of this standard. Characteristics of cable have to be guaranteed by the specification of the cable.

Cl **FM** *SC* **FM** *P* **10** *L* **1** # 243

Carlson, Steve — HSD/Marvell

Comment Type **ER** *Comment Status* **A** *FM*

The description of the 802.3 standard suite is not up-to-date. Please use the template available at: http://www.ieee802.org/3/tools/framemaker/P802_3xx_D0p1_version_2p5.zip. Update the list of amendments per comment i-55 in http://www.ieee802.org/3/bp/comments/8023bp_D30_approved.pdf

SuggestedRemedy

Per comment

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

See response to comment #3.

Cl **1** *SC* **1.4** *P* **19** *L* **21** # 245

Carlson, Steve — HSD/Marvell

Comment Type **ER** *Comment Status* **A** *Definitions*

Unnumbered definitions - all new definitions under 1.4 are numbered as 1.4.x. Please provide specific locations where the new term is expected to be added, as is done in other amendments.

SuggestedRemedy

Please add the missing numbers to individual new definitions

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

See response to comment #5.

Cl **1** *SC* **1.4** *P* **19** *L* **28** # 241

Thomson, Geoff — GraCaSI S.A.

Comment Type **TR** *Comment Status* **R** *BMP*

Having 3 PMD types is addressing 3 instances of Broad Market Potential. This divides the market and is beyond what the group justified and was chartered to do.

SuggestedRemedy

Reduce to a single PMD type.

Response *Response Status* **U**

REJECT.

The attempt to define one port type with multiple link/channel types was rejected by 802.3 optics experts. They demanded multiple port types. The three major markets described in P802.3 project documents do not have the same requirements, and those project documents make it clear that different reaches were required for the requirements of the different markets.

The three port types (RHA, RHB, and RHC) use 1000BASE-H PCS and PMA sublayers and only differ on an small set of specifications of the PMD sublayer. Significant reuse of components between the three port types is expected and enhances Broad Market Potential.

Cl **30** *SC* **30** *P* **21** *L* **1** # 246

Carlson, Steve HSD/Marvell

Comment Type **ER** *Comment Status* **R** *Ed Inst*

All objects being modified in Clause 30 are also modified by other projects. Please align editorial instructions to the ones used in P802.3bp D3.1, including the list of projects changing these specific objects

SuggestedRemedy

This helps the reader, as well as the staff editors in combining individual amendments in the base standard.
See also comment i-162 in
http://www.ieee802.org/3/bp/comments/8023bp_D30_approved.pdf

Response *Response Status* **U**

REJECT.

See response to comment #10

Cl **30** *SC* **30** *P* **21** *L* **1** # 10

Hajduczenia, Marek Bright House Networks

Comment Type **ER** *Comment Status* **R** *Ed Inst*

All objects being modified in Clause 30 are already modified by other projects. Please align editorial instructions to the ones used in P802.3bp D3.1, including list of projects changing these specific objects

SuggestedRemedy

This helps both the reader, as well satff editor folding in individual amendments into a single document.
See also comment i-162 in
http://www.ieee802.org/3/bp/comments/8023bp_D30_approved.pdf

Response *Response Status* **U**

REJECT.

Recent refinements of 802.3 style for writing editing instructions only cite the amendments necessary to unambiguously define the Insert point. Change instructions only cite amendments that are the basis for the text below the instruction.

The editing instructions are consistent with the new guidelines.

Cl **45** *SC* **45** *P* **32** *L* **1** # 254

Carlson, Steve HSD/Marvell

Comment Type **ER** *Comment Status* **A** *Big Ticket PICS 45*

Clause is missing PICS

SuggestedRemedy

Insert PICS

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

Same response as #36.

Cl **45** *SC* **45.2.1.6** *P* **23** *L* **8** # 14

Hajduczenia, Marek Bright House Networks

Comment Type **TR** *Comment Status* **A** *Ed Inst*

Register 1.7 is being modified by multiple projects, including P802.3bp. Bits "1 1 1 1 0 1" were allocated to BASE-T1. You should at least show which bits you're removing from reserved pool and what the reserved pool will look like after the change.
Editorial instruction is not precise, listing "change “reserved” line(s) as appropriate for values defined by this and other approved amendments" - staff editor has to be able to put these together and not figure out what needs to be changed and how, when folding multiple amendments together

SuggestedRemedy

Update editorial instruction to recognize changed done by 802.3bp and other projects. Show changes to reserved space. Update editorial instruction to recognize changes by .3bw and .3bp, which are running ahead

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

Conditionally add Editor’s note that reserved rows will be addressed when the order of amendment approval is known as an editorial action.

If another amendment makes rows individually defined as Reserved as has been commented on their draft, this will become a simple change instruction.

Cl **45** *SC* **45.2.3** *P* **23** *L* **28** # 248

Carlson, Steve HSD/Marvell

Comment Type **ER** *Comment Status* **A** *Ed Inst*

"Replace 3.420 through 3.1799 row with the following rows" is not clear. Where are the strike-through and underline changes to the reserved space being modified?

SuggestedRemedy

Please show all changes to Table 45-119 reserved bit space in the standard underline / cross-through format. Update the editorial note to use the word "Change" instead of "Replace."

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

See response to comment #15.

Cl **45** *SC* **45.2.3.48** *P* **23** *L* **36** # 258

Carlson, Steve HSD/Marvell

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

45.2.3.48 exists in the base standard (Clause 90 TimeSync PCS capability (Register 3.1800))

SuggestedRemedy

Re-number 45.2.3.48 to 45.2.3.54 to be 45.2.3.47a to 45.2.3.47g

Response *Response Status* **U**

ACCEPT.

Cl **45** *SC* **45.2.3.48** *P* **24** *L* **3** # 249

Carlson, Steve HSD/Marvell

Comment Type **ER** *Comment Status* **R** *EZ*

P802.3bp has added 45.2.3.51 through 45.2.3.57.

SuggestedRemedy

Update the subclause numbers and table numbers accordingly, using 802.3bp numbers as the end of the range. Add P802.3bv registers after this range.

Response *Response Status* **U**

REJECT.

P802.3bv's defined registers 3.500 through 3.522 sequentially belong between 45.2.3.47 and 45.3.48. If current new numbering conventions hold, the register descriptions will be 45.2.3.47a through 45.2.3.47g.

See #114 for acceptance of the new lettering convention for inserts.

This comment conflicts with commenter's #258.

Cl **45** *SC* **45.2.3.48** *P* **24** *L* **3** # 16

Hajduczenia, Marek Bright House Networks

Comment Type **ER** *Comment Status* **R** *EZ*

P802.3bp is already adding 45.2.3.51 through 45.2.3.57, so I assume you intended to start adding at 45.2.3.58?

SuggestedRemedy

Update subclause numbers and table numbers, accordingly, using 802.3bp numbers as the end of the range you should be adding after

Response *Response Status* **U**

REJECT.

P802.3bv's defined registers 3.500 through 3.522 sequentially belong between 45.2.3.47 and 45.3.48. If current new numbering conventions hold, the register descriptions will be 45.2.3.47a through 45.2.3.47g.

See #114 for acceptance of the new lettering convention for inserts.

Cl **45** *SC* **45.2.3.48.1** *P* **24** *L* **47** # 250

Carlson, Steve HSD/Marvell

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

As part of a general style clean-up, please implement comment #70 from http://www.ieee802.org/3/bp/comments/8023bp_D20_approved.pdf.

SuggestedRemedy

Change all instances of "This bit" to "Bit xxxx" with a precise and unambiguous cite of the register number to avoid any possible confusion as to which bit is meant.
Also, where the word "it" is used at the beginning of the sentence in Clause 45, please also mention the bit reference explicitly - again, this avoids concerns with interpretation as to what bit is meant

Response *Response Status* **U**

ACCEPT.

Cl **45** *SC* **45.2.3.48.3** *P* **25** *L* **3** # 18

Hajduczenia, Marek Bright House Networks

Comment Type **TR** *Comment Status* **A** *OAM*

"This bit indicates the value of the TXO_MSGT bit in the last message read by the station management entity" - description in 3.500.14 states "This bit indicates the value of the TXO_MSGT bit in the last OAM message received by the remote 1000BASE-H PHY" - is there any specific difference between "Remote PHY" and "station management entity" in this case? Seems that it does not matter what reads data from the given register / bit

SuggestedRemedy

Based on the description, it is not clear what the difference between 3.500.13 and 3.500.14 really is - both point to TXO_MSGT bit in some last message (I assume - the last OAM message in both cases) but why there are two of them, is not clear.
Please clarify what the difference between these two bits is and why both are needed.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

Answer to technical question:
The difference between the two bits is stated. TXO_MSGT is a toggle bit (a one bit sequence number) of a message. As described in the referenced 114.8.2 the MSGT bit is toggled to a new value, some time later, the related message is transmitted, the message is received and validated at the receiver, and at some later time, the message is read by the management entity.
When message is received and validated at the receiver, it causes the receiving link partner PHY to acknowledge message reception by the PHY via the TXO_PHYT bit to the transmitting station. As indicated in state diagram of Figure 114-53, this acknowledge indicates the OAM message has been received and copied to the OAM RX registers and it is ready to be read by the management entity. As specified in state diagram, the receiving link partner PHY cannot copy the received message and then acknowledge via PHYT flag if there is a previous message that has not been read by the management entity.
When message is read by the management entity, it causes the receiving link partner PHY to acknowledge message reception by the management entity via the TXO_MERT bit to the transmitting station.

Editor's actions:
Move sentence of Pg 25 line 11 to Pg 24 line 50 as second paragrapth of TXO_REQ description.

Cl **45** *SC* **45.2.3.49.2** *P* **25** *L* **21** # 265

Carlson, Steve HSD/Marvell

Comment Type **TR** *Comment Status* **A** *OAM*

"This bit contains the toggle identifier of the received message. It toggles with every new received message." What is a "toggle identifier?"

SuggestedRemedy

A search of Clause 45 in 802.3-2015 has no reference to this term. Please define what it is, or describe in other terms.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

See response to comment #26.

Cl **78** *SC* **78.1.4** *P* **33** *L* **5** # 255

Carlson, Steve HSD/Marvell

Comment Type **ER** *Comment Status* **A** *Ed Inst*

"Insert new rows below into Table 78-1 after 1000BASE-KX:" does not account for other amendments (802.3bw, 802.3bp, etc.) that are changing the same table

SuggestedRemedy

Update the editorial instructions accounting for other amendments in (802.3bw, 802.3bp, etc.)
Also applies to the editorial note in 78.2 and 78-5

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

See response to comment #37.

Cl **114** *SC* **114.1.2** *P* **35** *L* **38** # 41

Hajduczenia, Marek Bright House Networks

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

"Mathematical expressions in this clause include symbols and delimiters as specified in ISO 80000-2." - that is the first. All other clauses manage to get along with standard 802.3 coventions. Which specific expressions or symbols require reference to ISO???

SuggestedRemedy

Consider removing this reference, unless it is explicitly clear which expressions, symbols, and delimiters require this reference. If really needed, this ISO standard will also need to be included in references, where it is currently missing.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

This is an editorial error. All the expressions or symbols, and delimiters per ISO 80000-2 were eliminated from D1p3 to D1p4. However, editors forgot to strike this sentence although the reference to 80000-2 was already eliminated.

Cl **114** *SC* **114.1.2** *P* **35** *L* **38** # 257

Carlson, Steve HSD/Marvell

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

"Mathematical expressions in this clause include symbols and delimiters as specified in ISO 80000-2." Which specific expressions or symbols require reference to ISO? The base standard does not require references to ISO.

SuggestedRemedy

Consider removing this reference, unless it is explicitly clear which expressions, symbols, and delimiters require this reference. If this ISO standard is actually needed, it will need to be included in references.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

See response to comment #41.

Cl **114** *SC* **114.1.4** *P* **36** *L* **14** # 267

Carlson, Steve HSD/Marvell

Comment Type **TR** *Comment Status* **A** *Fig 114-1*

The PCS in Figure 114-1 seems to be missing. There is a box, but it's empty.

SuggestedRemedy

Assuming that this PHY has a PCS, please add it to the figure.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

See response to comment #42

Cl **114** *SC* **114.2** *P* **38** *L* **2** # 222

Ran, Adee INTEL

Comment Type **TR** *Comment Status* **A** *PCS TX Intro*

The text refers to PAM16 symbols, then MLCC codewords, then PAM16 codewords. That seems incorrect or is confusing.

SuggestedRemedy

Correct or clarify as necessary

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

See response to comment #45.

Cl **114** *SC* **114.2.1** *P* **38** *L* **19** # 224

Ran, Adee INTEL

Comment Type **TR** *Comment Status* **A** *PCS TX Intro*

Are all these symbols PAM16?

SuggestedRemedy

Assuming they are, either use "PAM16 symbols" consistently or make it clear earlier that "symbols" always means PAM16.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

See response to comments #45 and #54.

Cl **114** *SC* **114.2.2.1** *P* **39** *L* **45** # 191

Zimmerman, George CME Consulting

Comment Type **TR** *Comment Status* **A** *Big Ticket PCS TX*

Mixed requirement and informative text makes it nearly impossible to tell what is the requirement and what is descriptive informative language. "shall be generated as follows:" really only works when there is a clearly enumerated list of step by step requirements. Generation of a sequence would ordinarily be a small set of equations. The requirement can't be HOW the thing is generated, but WHAT the sequence must be.

SuggestedRemedy

Rewrite the requirement to clearly state the requirement. Sorry, its such a mess I can't do it for you in a comment, but suggest that you start with something like "the S1 sequence shall be a sequence of 128 pseudo-random binary numbers, resulting from a linear feedback shift register with generator polynomial 1+x22+x25." You don't need to write a tutorial on how to make LFSRs, and nomenclature should be consistent with the many existing LFSRs in 802.3. See clauses 40, 55, or many others for examples on how to do this compactly. Further, delete the MATLAB, or show why it is necessary. It leaves the reader searching for something nonobvious.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

PICS item delimits the bounds of the requirement. See also the comment #194.

Change pg 39, lines 45 - 50 to:
"A pilot S1 sub-block is transmitted at the beginning of each Transmit Block as shown in Figure 114–4. The S1 generator shall produce an S1 sub-block using a maximum length sequence (MLS) generator from which the first 128-bit binary sequence bits are then mapped into PAM2 symbols so that bits with value 0 are mapped to {-1} and bits with value 1 mapped to {+1}. The resulting 128-symbol long sequence is prefixed and postfixed by a sequence of 16 zero {0} symbols, thus obtaining the 160 symbol length for S1 sub-block."

Delete pg 40, lines 45, 46.

Detailed description of LFSR and MATLAB code are going to remain in the text. It is important to note that initialization value and how the LFSR start generating the sequence have to be clearly defined. Other clauses uses self-synchronized scramblers, where these topics are not relevant for interoperability.
The same applies to S2 sub-blocks generation and the binary and symbol scramblers. Please, note that these circuits initialize the LFSR register to specific values several times per Transmit Block (S2), or once (S1, scramblers).

See comment #196 for additional changes to 114.2.2.

Pg 40, line 50/51, change:
"The pilot S2 sub-blocks of a Transmit Block shall be generated as follows."
to:
"The S2 generator shall produce S2 sub-blocks using a sequence of 1664 PAM8 symbols."

Cl **114** *SC* **114.2.2.1** *P* **39** *L* **45** # 56

Hajduczenia, Marek — Bright House Networks

Comment Type **ER** *Comment Status* **A** *Big Ticket PCS TX*

"The S1 signal within the sub-block shall be generated as follows." - is the intent to make the whole paragraph normative, or just some part of it?

SuggestedRemedy

Clarify what the scope of "shall" statement is - it is not clear where the requirement ends
The same observation for page 40, line 51 and multiple subclauses afterwards, where the scope of the "shall" statement is really not clear

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

Clarity of the bound is provided in the PICS item. It is the subclause.

See response to comment #191.

Cl **114** *SC* **114.2.2.1** *P* **39** *L* **52** # 58

Hajduczenia, Marek — Bright House Networks

Comment Type **TR** *Comment Status* **A** *Big Ticket PCS TX*

Substantial over-specification and implementation-specific details that are not needed for the standard

SuggestedRemedy

Change "The MLS generator is made from a linear feedback shift register (LFSR) of 25-bits (see Figure 114–7)." to "The MLS generator shall produce the same result as the shift register implementation shown in Figure 114–7. The shift register shall be initialzied with the value of 0x0172 DB9D for each Transmit Block, where the leftmost digit corresponds to the initial value of register element r[0]."
Update Figure 114-7 to show the output from the MLS generator
Remove text on page 40, lines 23 - 43, including unnecessary Matlab code.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

Change "The MLS generator is made from a linear feedback shift register (LFSR) of 25-bits (see Figure 114–7)." to "The MLS generator produces the same result as the shift register implementation shown in Figure 114–7.". (with no addition shall, that it is not necessary).

Figure 114-7 shows the output, rename MLS Generator output.

Rest of text remains as is, because many parts of it, including MATLAB code, were demanded by others during TF review. In addition, it is consistent and fill some gaps that could leave ambiguities with just only the figure. See also response to comment #191.

There is no implementation-specific details, only the needed details to specify the funcionality. Typically, this kind of circuits are implemented with parallel architectures that compute N output bits per N input bits, so the needed clock frequency is reduced (this specially applies to the payload data binary scrambler that has to cope with greater than 1Gbps data-rate). Therefore, the desciption is far to be considered implementation-oriented.

Cl **114** *SC* **114.2.2.1** *P* **40** *L* **28** # 228

Ran, Adee INTEL

Comment Type **TR** *Comment Status* **A** *Big Ticket PCS TX*

"first symbol" - and then "rest of the S1 pilot bits" ... should that be "first bit"?

Also "(128 symbols)" in line 31. And later "16-symbol long sequences of zeros". This is all really confusing on first read.

I realize that there is a 1:1 correspondence but PAM2 and bits are not the same. It would be clearer to define the LFSR output as a bit sequence and then convert it to PAM2 as a whole.

SuggestedRemedy

Change "symbol" to "bit" and "symbols" to "bits". Add a clear conversion equation from bits to PAM2 symbols (or better, to PAM16 symbols)..

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

See response to comments #191 and #196.

Cl **114** *SC* **114.2.2.1** *P* **40** *L* **30** # 171

Remein, Duane Huawei Technologies

Comment Type **ER** *Comment Status* **R** *Matlab*

MATLAB is a registered trademark and should be so noted

SuggestedRemedy

Add trandmark symbol and footnote indicating it is a trademark per Mathworks requirements

Response *Response Status* **U**

REJECT.

This is not the first time MATLAB has been used in IEEE Std 802.3 for specification of normative requirements. There is a normative reference for MATLAB in IEEE Std 802.3 (see P8023_D3p2_SECTION1, pg 68, line 43 and footnote 17). See 40.6.1.2.4, as an example.

Cross reference to 1.3 is provided in pg 40, line 30. Section 1.3 includes all required trademarking and references to MathWorks.

Cl **114** *SC* **114.2.2.2** *P* **40** *L* **53** # 61

Hajduczenia, Marek Bright House Networks

Comment Type **TR** *Comment Status* **A** *Big Ticket 64B/65B*

More unnecessary units of data: chunks: "1 664 symbols are divided into 13 chunks each of 128 symbols" - it is becoming at this point to follow all units of data that are being used in this draft

SuggestedRemedy

There are several instances of "chunk" in the draft - do we really need to introduce another data unit into the already complex mixture of data units? Consider removing them altogether in three locations - they do not seem to add anything into the description anyway.
It also seems that a "chunk" does not have any specific definition in terms of number of bits. It is used as "GMII chunk", "block chunk" etc. ... very confusing

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

Change "chunk" to "piece" in:
- pg 40, line 53
- pg 41, line 1
- pg 41, line 50 (also check here the text font of the para, it seems not to be times-roman)
- pg 41, line 51

The removal of "chunk" in S2 and PHS descriptions is not a particularly difficult problem, but removing GMII chunk would be a larger problem as it recurs frequently and the term GMII chunk is much better than "8 consequtive GMII transfers". The TF would appreciate any suggestion of better term than GMII chunk.

Change "chunk" to "piece" in pg 60, line 11.

Cl **114** *SC* **114.2.3.1** *P* **42** *L* **13** # 65

Hajduczenia, Marek — Bright House Networks

Comment Type **TR** *Comment Status* **A** *Big Ticket PCS TX*

Unnecessary details for CRC16 definition

SuggestedRemedy

Insert new text under 114.2.3.1 as follows: "The Physical Header CRC16 generator shall produce the same result as the shift register implementation shown in Figure 114–10. The shift register shall be initialized with the value of 0x00 for each PHD."
Strike text page 42, lines 15-21

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

During TF review, the consensus was that the distillation here of the more verbose description in Clause 55 was the proper amount of reduction of description. Further reduction as the commenter recommends is believed likely to reduce concensus.

Change the second sentence as suggested.

Change the reset value of 0 to 0x0000 as suggested.

Cl **114** *SC* **114.2.4.1.1** *P* **44** *L* **43** # 71

Hajduczenia, Marek — Bright House Networks

Comment Type **TR** *Comment Status* **R** *Big Ticket 64B/65B*

Unnecessary description of GMII - Clause 35 is very complete as is, and does not require summary here.

SuggestedRemedy

Strike text in lines 43-47 on page 44.
On the first following use of the word "GMII" add the following statement "(see Clause 35)" with proper markup - that is all we really need as far as GMII description is concerned
Remove "TXD <7:0>, TX_EN and TX_ER, compose each GMII transmit path sample." as well ...

Response *Response Status* **U**

REJECT.

There are no normative descriptions in the text requested to be deleted. It is not uncommon to include minimal description of functions spread over many pages of another clause. This paragraph provides appropriate and minimal context to understand the signal names used in this clause that by reference are normatively described in Clause 35.

Cl **114** *SC* **114.2.4.1.1** *P* **45** *L* **12** # 76

Hajduczenia, Marek — Bright House Networks

Comment Type **TR** *Comment Status* **A** *Big Ticket 64B/65B*

At this level, speaking of Ethernet frames is confusing - data comes across GMII and all information on what is Ethernet frame and what is not it kind of lost. It is data, and more precisely - GMII transfers

SuggestedRemedy

Change "It consists of 65 bits, namely, 8 data octets from an Ethernet packet (D0 through D7) encoded in TXD<7:0> preceded by the Type bit that is set to 0." to "The PDB.DATA consists of 65 bits, comprising the Type bit (with the value of 0) followed by 8 consecutive GMII data transfers (TXD<7:0>).
Strike: "first, followed by the 8 data octets in the same order as they were received from the GMII (D0 to D7)" - this is repetetive

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

Text speaks about Ethernet packets, but not Ethernet frames, which is equivalent to normal data transmission in the GMII. By definition of PDB.DATA, that is technically correct. However, it is true that is more precise using the term GMII transfers.

The recommended deletion of line 13 text is not acceptable. PDB.CTRL octets are not always transmitted in the order received from the GMII, for example, a control octet may be moved before received data octets. So, it is appropriate to state the octet order of a PDB.DATA is not changed. Also see comment #74 for addition of Table 114-1a.

Change the paragraph to read:
"The format of a PDB.DATA is shown in Figure 114-14. It consists of 65 bits, the first bit being the Type bit (with a value of 0) followed by 8 consecutive GMII data transfers (normal data transmission as shown in Table 114-1a). The 8 data octets are transmitted in the same order as they were received from the GMII. Bits in an octet are transmitted from least to most significant bit."

Cl **114** *SC* **114.2.4.1.1** *P* **46** *L* **40** # 80

Hajduczenia, Marek — Bright House Networks

Comment Type **TR** *Comment Status* **R** *Big Ticket 64B/65B*

Ambiguous statement with no clear purpose: "Because the minimum length of an Ethernet packet is longer than 7 octets, all the GMII control samples
(GCTRLs) in a chunk of a correct packet must be contiguous. Consequently, all the CBs beyond the first
will also be contiguous within the PDB.CTRL." - not sure what the intention in here really is.

SuggestedRemedy

Text is informative right now. Strike text in lines 39-46 - it does not seem to have any formal requirements right now and it is just confusing in discussing "non-contiguous GMII control samples" without explaining what these are …

Response *Response Status* **U**

REJECT.

The sentence is a simple reminder of pages of Clause 35 specification, and possible sequences of GMII transfers. None of the defined sequences in a GMII data stream allow GCTRL, data, GCTRL except for transmit error propagation (e.g., IPG, some preamble, transmit error propagation, more preamble) can occur within 8 GMII transfers.

The next paragraph describes what is done in the encoding for this case of an incorrect/errored packet. The same applies if an implementer uses transmit error propagation for a transmit abort (IPG, some preamble, transmit error propagation, IPG). Though transmit abort is not defined in Clause 35 it would be the natural GMII sequence for what is counted in management as a runt packet.

Neither is a "correct" frame.

Cl **114** *SC* **114.2.4.1.2** *P* **48** *L* **20** # 268

Carlson, Steve — HSD/Marvell

Comment Type **TR** *Comment Status* **A** *Matlab*

Matlab code is used here to provide normative behavior. I do not believe this is allowed in 802.3. The code itself cannot be normative, as it forces the use of a commercial tool (Matlab) in this case. The code can be informative only. Matlab code is typically used in test procedures to allow for a uniform test setup. The process of encoding data from the GMII should be described in a state diagram instead, following our normal 802.3 methodology.

SuggestedRemedy

If the process is already described in an state diagram, please make the state diagram normative and make code informative only

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

See response to comments #82 and #83.

Cl **114** *SC* **114.2.4.1.2** *P* **48** *L* **20** # 82

Hajduczenia, Marek — Bright House Networks

Comment Type **TR** *Comment Status* **A** *Matlab*

The code itself cannot be really normative, given that it forces the use of a commercial tool (Matlab) in this case. The code can be informative only, but the process of encoding data from GMII should be described in a state diagram instead, following our normal 802.3 methodology.

SuggestedRemedy

If the process is already described in an SD, please make the SD normative and make code informative only

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

This is not the first time MATLAB has been used in IEEE Std 802.3 for specification of normative requirements. There is a normative reference for MATLAB in IEEE Std 802.3 (see P8023_D3p2_SECTION1, pg 68, line 43 and footnote 17).

Modify introductory text to the code to make it clear that MATLAB is not required, only consistent output as produced by the MATLAB code.

Change Pg 48, line 21:
"The 64B/65B encoder implementation shall be consistent with the following formal MATLAB definition."
to
"The 64B/65B encoder implementation shall produce output consistent with the following MATLAB (see 1.3) code (add footnote)."

Footnote to read: "Copyright release for MATLAB code: Users of this standard may freely copy or reproduce the MATLAB code in this subclause so it can be used for its intended purpose."

Cl **114** *SC* **114.2.4.1.2** *P* **48** *L* **21** # 83

Hajduczenia, Marek — Bright House Networks

Comment Type **ER** *Comment Status* **R** *Matlab*

Matlab is a trademarked name: http://www.mathworks.com/company/aboutus/policies_statements/trademarks.html and should be listed as follows. Furthermore, it is not clear what the actual policy is on forcing implementers of the standard to comply with Matlab code implementation - at best, we should be using a pseudocode with the same result, that can be then implemented in any formal language of choice

SuggestedRemedy

My personal preference would be to remove all Matlab code, or convert it into a pseudocode instead.
If Matlab is to stay, it needs to be trademarked, and staff editor needs to be consulted on the use of trademarked names and scripts

Response *Response Status* **U**

REJECT.

See also response to comment #82.

Matlab code is to stay. Pseudocode should be based on a well-defined language (syntax, data types, etc). To be the use of pseudocode (no trademarked) feasible, the syntax and then the complete language definition needs to be public and at least an implementation of the golden interpreter be accessible under FRAND terms to all the implementers, to ensure all of them can produce interoperable implementations.

Matlab language / syntax can be used by any implementer. Use of Matlab language does not force to use MathWorks software.

Cl **114** *SC* **114.2.4.3.1** *P* **51** *L* **7** # 194

Zimmerman, George — CME Consulting

Comment Type **TR** *Comment Status* **A** *Big Ticket PCS TX*

There are several problems with this subclause. First and foremost, the only requirement is that the bits are split into 2 levels. Actually it should say two groups. The rest is descriptive, but not a requirement. Other 802.3 clauses do similar mappings, but none are written some confusing and obscure. The resulting MLCC encoding and constellation is similar to that used in Clause 55 (with a different FEC). It should be possible to describe the encoding requirements, one by one in direct equation form.

SuggestedRemedy

Identify and clarify the requirements for the bit ordering and encoding.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

The PICS item clarifies the bounds of the requirement.

In general, it was decided by the TF to use a single "shall" per block, so that PICS generation and verification are simplified, because testing more detailed shalls is impractical.

Editor will attempt to accommodate removing descriptions of method rather than specification of output. The shall statement will cover a list of items clearly specifying the operations needed to generate the demultiplexion ouput from the input bits.

In this context "group" and "level" can be considered synonymous. "level" is commonly used in multi-level coding literature, so it can be considered valid.

Cl **114** *SC* **114.3.5.2** *P* **68** *L* **1** # 269

Carlson, Steve — HSD/Marvell

Comment Type **TR** *Comment Status* **A** *SD*

The state machine has an entry on the side (pma_reset = ON +link_control ≠ ENABLE). It should be on the top per editorial convention. This problem is also present in a number of other state machines.

SuggestedRemedy

Please follow the editorial guidelines for state machines and scrub the draft for these problems.

Response *Response Status* **U**

ACCEPT.

Cl **114** *SC* **114.6** *P* *L* # 157

Stassar, Peter — Huawei Technologies

Comment Type **TR** *Comment Status* **A** *Big Ticket PMD*

Responding to rejection of comment #37 to draft D1.4, repeating "I haven't seen any presentation from the Task Force meetings, with some form of evidence, that a set of devices, when meeting these requirements, a will operate satisfactorily in the field on a standard version of POF, and that, when they fail these requirements, they do not operate in the field."
I remain therefore unconvinced that this Optical specification is sufficiently complete and therefore have the opinion that the Task Force has not completed its work. It should be emphasized that home applications, really will need plug-and-play devices.

SuggestedRemedy

Provide evidence that the specification is adequate for usage in home applications

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

It is important to note that in the CSD documents we reference existing implementation of the VDE specifications. Though we have made a number of different choices from that VDE draft, both, VDE and 3bv, are based on PAM16 plus THP and the same type of photonics. During SG, the technical feasibility was demonstrated by theoretical analysis that supported the baseline specification, and by real experiments using VDE based existing implementations. Following presentations show VDE based devices operating satisfactorily in the field on a standard version of POF (A4a.2).
http://www.ieee802.org/3/GEPOFSG/public/July_2014/Luecke_GEPOF_02_0714.pdf
http://www.ieee802.org/3/GEPOFSG/public/July_2014/Faller_GEPOF_02a_0714.pdf
http://www.ieee802.org/3/GEPOFSG/public/Sep_2014/Lichtenegger_GEPOF_0914.pdf
http://www.ieee802.org/3/GEPOFSG/public/Sep_2014/perezaranda_GEPOF_01_0914.pdf
http://www.ieee802.org/3/GEPOFSG/public/Sep_2014/perezaranda_GEPOF_03_0914.m4v
http://www.ieee802.org/3/GEPOFSG/public/Sep_2014/perezaranda_GEPOF_02_0914.m4v

It is also important to note that many of the bounds specified for the parameters of the transmitter and the receiver are based on very worst-case simulations (1000BASE-RHx implementations are not available yet):
- worst case channel response compliant with transfer function lower bound limits
- worst TP2 launching condition compliant with EAF lower bound limits
- min. ER, min rise/fall time, largest harmonic distortion HD2 and HD3, max RIN, max jitter, etc.
- the receiver is modeled based on circuit level simulations with worst case technology process corner (slow) and highest temperature.

The simulation models correlate very well with VDE implementation.

Being said that, the main objective of the TF has been to generate an specification able to guarantee the satisfactory operation of any two compliant devices in the field. However, there can be scenarios in the field where a device that is non-compliant in some set of parameters is able to operate with a compliant device satisfactory with very good

performance. This situation can be possible because the compliant device integrates typical components that have not moved to worst-case, for example, or because temperature is below the maximum.

Cl **114** *SC* **114.6.3.3** *P* **93** *L* **51** # 102

McDermott, Thomas Fujitsu

Comment Type **TR** *Comment Status* **R** *Big Ticket PMD*

The text specifies that the receiver shall meet the error rate using the methodology specified in 114.6.4. That paragraph specifies terminology and characterization of transmit parameters. 114.6.4 does not specify a test methodology.

The link parameters provide 0.0 dB of link margin in some cases. There is no description that assures that a worst case link is used to test the receiver.

SuggestedRemedy

New text is needed describing the test steps that are to be used to verify that the receiver meets the BER requirements over the worst case set of link parameters. This should include description of the test setup to create a worst case link (attenuation, transfer response, etc.). If such a link setup cannot be validated as worst case, the test procedure should indicate the receive margin available at nominal test limits.

Response *Response Status* **U**

REJECT.

Pg. 93, line 47, exactly state:
"A 1000BASE-RHx receiver shall meet the specifications at TP3 defined in Table 114–8 per measurement techniques defined in 114.6.4."

Table 114-8 specifies: AOP (max and min) and wavelength range.
Measurement methods for AOP and center wavelength measurement are defined for TP2 and TP3.

Pg 95, line 7, states:
"114.6.4 Optical measurement requirements
All the optical measurements of the transmitter shall be made at TP2 (at the end of a 1m length of POF cable consistent with the link type). The optical measurements for the receiver shall be done at TP3."

Pg 95, line 28, states AOP measurement for both:
"114.6.4.3 Average Optical Power (AOP) measurement
The AOP shall meet the specifications at TP2 and TP3 measured with a large area photo-detector able to couple all the output optical power from the optical fiber."

New text asked by the suggested remedy, is already in the draft.

Pg 93, line 51, really says:
"A 1000BASE-RHx PHY shall be able to establish a reliable link per specification of 114.3.7.1 throughout the average optical power (AOP) range between the minimum and maximum limit defined in Table 114–8, for signals received at the MDI that were transmitted from a remote transmitter within the specifications of 114.6.3.1 and have passed through a fiber optic channel specified in 114.6.5. Under these conditions, a 1000BASE-RHx PHY shall provide a BER less than 10^-12 operating in test

mode 1 (see 114.5.1) and a frame error ratio less than 1.1·10^-10 for continuous transmission of 64-octet Ethernet frames transmitted
with minimum IPG at GMII interface operating in normal (non-test) mode. These specifications apply to a complete 1000BASE-RHx full duplex link composed by two interconnected partners with their respective PCS, PMA and PMD sublayers."

Said that, transmitter is specified, channel is defined, minimum AOP at receiver is specified for link establishement, and criteria for that defined. So, the implementer can setup the test. Link budget and link margin are mathematical derivations and informative.

As said in Pg 104, line 50:
"The worst-case link power budget and unallocated link margin for a 1000BASE-RHx PHY defined in Table 114–12 are derived from the transmitter and the receiver optical specifications as well as fiber optic channel specifications of 114.6.3.1, 114.6.3.3 and 114.6.5, respectively."

Cl **114** *SC* **114.6.4.8** *P* *L* # 158

Stassar, Peter — Huawei Technologies

Comment Type **TR** *Comment Status* **A** *Big Ticket PMD*

It's totally unclear whether the script contained in this clause is appropriate to distinguish good from bad transmitters in a way that transmitters, when meeting these requirements, will operate satisfactorily in the field, and that, when they fail these requirements, they do not meet performance requirements in the field.

SuggestedRemedy

Provide evidence that the transmitter specification/script is adequate

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

Please, see response to comment #118.

Cl **114** *SC* **114.6.4.8** *P* **97** *L* **3** # 118

Anslow, Pete — Ciena

Comment Type **TR** *Comment Status* **A** *Big Ticket PMD*

The multi-vendor interoperability of this PHY is critically dependent on the ability of the specification to define a suitable quality for the worst case transmitter. It is very difficult without a physical implementation to assess whether the transmitter distortion measurement defined here does this adequately.
I can't find any presentations on the P802.3bv web pages that show any correlation between the performance of transmitters in actual links and the transmitter distortion measurement defined here.
While there is no rule that requires this to be done, it has been seen as a requirement in other projects before new specification methods have been accepted. See for instance, http://www.ieee802.org/3/bm/public/nov14/petrilla_01b_1114_optx.pdf#page=8 which has plots of receiver sensitivity vs the newly proposed TDEC transmitter quality metric.

SuggestedRemedy

Please provide some measurement results showing the correlation between link performance and the transmitter distortion measurements that show that HD2 of -21 dB, HD3 of -27 dB and RPD of -40 dB are attainable using transmitters that work in conformant links and that transmitters with HD2 of worse than -21 dB or HD3 of worse than -27 dB or RPD of worse than -40 dB do not work in conformant links.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

See perezaranda_3bv_3_0316.

As stated in this presentation (slides 14 - 16), TX non-linear distortion will affect to receiver sensitivity. However, it will be possible to find an implementation in the field that meets TP3 AOP specs connected to a transmitter with worse TP2 HD (I mean, no compliant TX).
There are some margins agreed among the implementers, specially because 1000BASE-RH has to operate in a car during >10 years between -40 and 105ºC.

Editor to modify Table 114-6 and subclause 114.6.4.8 according to the refinement of the transmitter distortion measurement of slides 7 through 9 of perezaranda_3bv_3_0316.

Cl **114** *SC* **114.6.5** *P* *L* # 159

Stassar, Peter — Huawei Technologies

Comment Type **TR** *Comment Status* **A** *Big Ticket PMD*

The justification for the rejection of comment #37 to draft D1.4, where it was stated "there are providers in the market that produce very low cost and very poor quality POF that in spite of being A4a.2 compliant it does not fit the 802.3bv freq response and attenuation specs. In order to filling this gap, 802.3bv specifies bounds on the response and attenuation." implies that additional requirements beyond a certain length of a specific type of POF seem necessary. Clause 114.6.5 contains requirements for transfer characteristics which seem to indicate more specific requirements than compliance to A4a.2. It needs to be made clear roughly how many of the "standard" POF fibers do not comply to these additional requirements in order to investigate in how far "broad market potential" is satisfied.

SuggestedRemedy

Make clear how in applications in the home users can use standard POF

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

It is not appropriate to include in the standard anything about how many fibers meet the specs if that was what the commenter meant in the Suggested Remedy. If only a response about broad market potential is requested, the following is provided.

Please, see:
http://www.ieee802.org/3/bv/public/Jan_2016/takahashi_3bv_03a_0116.pdf

In this presentation, transfer functions measurements are reported for part numbers selected from the most commonly used IEC 60793-2-40 sub-category A4a.2 POF for communications. Members of the TF indicated that actual market percentage is larger than 98%. Therefore, we can say that more than 98% of the A4a.2 POF market is fiber that meets the tightened additional specifications of P802.3bv.

As it was done in 1000BASE-T (40.7.1) for Class D cables, 802.3bv is specifying additional requirements compatible with A4a.2 fibers (transfer functions, insertion loss).

Cl **114** *SC* **114.6.5** *P* **101** *L* **26** # 155

Schicketanz, Dieter — Reutlingen University

Comment Type **TR** *Comment Status* **R** *Channel*

The channels are specifically defined without connector, but in line 50 it says it meets with connections and in line 53 it says number of connections is not normative.

SuggestedRemedy

How will a user built a working system with this statements? This clause needs considerable rework to become useful . Remedy: In the channel definition include the connections (in dB) and delete lines 50 to 54.

Response *Response Status* **U**

REJECT.

See responses to comments #87, #88 and #102.

Cl **114** *SC* **114.6.5** *P* **101** *L* **29** # 240

Thomson, Geoff — GraCaSI S.A.

Comment Type **TR** *Comment Status* **R** *Channel*

The use of the term “channel” is not consistent with cabling standards. The cabling standards “channel” is NOT an equipment to equipment connection as it does not include equipment connectors.

SuggestedRemedy

Use the 802.3 term that was invented for this use, i.e. “link segment”.

Response *Response Status* **U**

REJECT.

IEEE 802.3 optics experts demanded during TF review same terminology used in other optical PMDs.
See response to comment #238.

Cl **114** *SC* **114.6.5** *P* **101** *L* **30** # 209

Zimmerman, George — CME Consulting

Comment Type **ER** *Comment Status* **R** *Channel*

Everywhere else in 802.3 where there are generic cabling standards we don't use the term channel. No need to do it here - it is a link segment.

SuggestedRemedy

Use standard terminology, or explain the difference you mean by channel.

Response *Response Status* **U**

REJECT.

See responses to comments #238, #240.
The same terminology is used in other 802.3 optical PHYs clauses.

Cl **114** *SC* **114.6.5** *P* **101** *L* **43** # 154

Schicketanz, Dieter — Reutlingen University

Comment Type **TR** *Comment Status* **R** *Channel*

Channel Type III is for automotive

SuggestedRemedy

I doubt that the fiber type specified in line 28 can be used in that envinronment. Be specific in the reference.

Response *Response Status* **U**

REJECT.

No additional reference is required.
According to IEC 60793-2-40, Table 1, applications of sub-category A4a are:
"Digital audio interface, automobile, industrial and sensor & data transmission".

A4a.2 fibers are used in automobile from > 10 years in infotainment systems (MOST) up to ambient temperature of 85ºC, with demonstrated reliability and quality. See presentations in 802.3bv project site about developed A4a.2 fibers to operate up to +105 ºC. Ageing is reported.

Cl **114** *SC* **114.6.5** *P* **101** *L* **50** # 87

Kolesar, Paul — CommScope

Comment Type **TR** *Comment Status* **A** *Channel*

The current text states:
"Any fiber optic channel including inline connections meets the transfer function specification of each type."
This cannot be a generally true statement, because not every channel that can be deployed may be compliant to the transfer functions. Even if the channel reach is within the definitions of this clause, and the media is compliant to IEC 60793-2-40 sub-category A4a.2, inline connections will change the mode power distribution and therefore can affect the transfer function.

SuggestedRemedy

Change the sentence in question to state a reqirement as follows:
"Any fiber optic channel including inline connections shall meet the transfer function specification of each type."
Also define or provide a reference as to how to test the transfer fnction in the field.

Response *Response Status* **U**

ACCEPT IN PRINCIPLE.

The experience of TF members (>10 years of MOST deployment in automotive industry) is that inline connections for specified POF cabling produce higher insertion loss for higher modes than for lower modes. Therefore, the transfer function is slightly improved per inline connection although the AOP at TP3 is reduced. Because of that, it was natural to think as a general statement.

However, it may not be necessary true in general terms.

Change text as suggested and update PICS items accordingly.

See comment #88 for measurement methodology of transfer function in the field.

Cl **114** *SC* **114.7** *P* **105** *L* **16** # 239

Thomson, Geoff
GraCaSI S.A.

Comment Type **TR** *Comment Status* **R** *Channel*

There is no MDI connector specified.

SuggestedRemedy

A default MDI connector should be specified for those cases where a connector is used. It should be polarized to enforce the cross-over requirement in the cabling.

Response *Response Status* **U**

REJECT.

Connector is not specified because it is not needed for interoperability. Specifications are independent of connector.
The optical transmit signal is defined at the output end of 1 meter of plastic optical fiber consistent with the link type connected to the MDI (TP2). The optical receive signals are specified and measured at the output of the fiber optic cabling (TP3) which in a link is connected to the receiver.
Connectors are likely to be standardized in other standardization bodies (ISO, IEC) as in many other cases.

The TF is willing to consider specific proposals regarding to the topic raised by the comment.