Cl **00** *SC* **46.1.2** *P* *L* **0** # **65**

Bradshaw, Peter BitBlitz Communicatio

Comment Type **T** *Comment Status* **A** *T65*

802.3ae says in 46.1.2 about XGMII ""This interface is used to provide media independence so that an identical media access controller may be used with all 10GBASE PHY types using either serial or wavelength division multiplexed optics."" There is no technical reason that XGMII cannot be used with CX4 (in fact I expect most implementations will have XGMII explicitly or implicitly embedded within them).

SuggestedRemedy

Direct the editor to consider adding this to the 'modify' sections, with proposed new wordin such as replacing 'serial or wavelength division multiplexed optics' with 'serial or multiple lane optical or electrical channels', which would aslo cover the 10GBASE-T proposal.

Proposed Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Elivated from "E" to "T"

In 46.1.2 change "This interface is used to provide media independence so that an identical media access controller may be used with all 10GBASE PHY types using either serial or wavelength division multiplexed optics." to "This interface is used to provide media independence so that an identical media access controller may be used with all 10GBASE PHY types."

Cl **01** *SC* **3** *P* **3** *L* **6** # **23**

Frazier, Howard SWI

Comment Type **TR** *Comment Status* **A** *TR23*

Incomplete reference to IEC 61076-3-113. I have been told that all references must be complete prior to the start of the WG ballot

SuggestedRemedy

Provide the complete reference to IEC 61076-3-113 , including the date and title.

Proposed Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Added in "Connectors for electronic equipment - Part 3-113: Screened, serial multi-conductor cable to board connectors suitable for 10 Gbit/sec data rates." This is a similar title to IEC 61076-3-103.

Cl **01** *SC* **3** *P* **5** *L* **6** # **5**

Booth, Brad Intel

Comment Type **T** *Comment Status* **A** *TR23*

Normative reference missing document title.

SuggestedRemedy

Insert corresponding document title.

Proposed Response *Response Status* **C**

ACCEPT.

See comment #23

Cl **01** *SC* **4.276** *P* *L* # **1**

Marris, Arthur Cadence

Comment Type **T** *Comment Status* **A** *T1*

Add definition for 'twinaxial cable'

SuggestedRemedy

twinaxial cable: A pair of insulated conductors surrounded by a conductive sheath

Proposed Response *Response Status* **C**

ACCEPT.

Cl **44** *SC* **3** *P* **13** *L* **35** # **6**

Booth, Brad Intel

Comment Type **T** *Comment Status* **A** *T6*

It appears that the CX4 Task Force has created a new form of electrical cable, one that is capable of carrying light.

SuggestedRemedy

Return paragraph to its original form. Insert new subheading ""44.3.1 Fiber delay constraints"" following 44.3. Add new subheading after equation 44-1, ""44.3.2 Copper delay constraints"". Add new text point to a reference for the CX4 delay parameters, or a reference to contact the electrical cable manufacturer.

Proposed Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Change "... ratio of the speed of light in the fiber or electrical cable to ..." to "... ratio of the speed of electromagnetic propagation in the fiber or electrical cable to ..."

Cl **45** *SC* **2** *P* **194** *L* # **66**

Bradshaw, Peter BitBlitz Communicatio

Comment Type **T** *Comment Status* **X** *T66*

Section 44A7 (including Figure 44A-7) implies a possible loopback ability at all of the PMA, WIS and PCS sublayers (explicitly omitting WIS if not present). Other parts of 802.3ae specify:- PMA loopback (45.2.1.1.4) is mandatory or optional, depending on PMA type, the ability being advertised in bit 1.8.0, loopback is mandatory for a WIS device (if present), and for a 10G-BASE-R PCS, but is forbidden for all other PCS types (45.2.3.1.2)*, and loopback is optional for a PHY XS device (45.2.4.1.2) (advertised in bit 4.24.10), and mandatory for a DTE XS device (45.2.5.1.2), where the 5.24.10 bit must be 0*. These awkward inconsistencies (a PHY XGXS and a DTE XGXS are otherwise identical) are enhanced by the addition of the CX4 PMA/PMD, since the functional differences between a CX4 PMA/PMD/PCS device and a DTE XGXS device are mainly some changes to the output and input levels and the SIGNAL_DETECT function, the required register Device Address value changes, and the loopback function and advertising scrambling. *Comments on the comment: a small side bet says that any plausible compliant devices will actually have this loopback/bit, and will have had to hide it somewhere in a vendor-specific register or in some other way.

SuggestedRemedy

Add a section after page 11 with following:- 1. In 45.2.3.1.2: Remove the prohibition against loopback in a 10GBASE-X PCS device, making it optional. If present, the 3.24.10 bit could be used to advertise its presence, since this register is required in a 10GBASE-X PCS. Current compliant devices are still in compliance, since they do not have the loopback* and the advertising bit would say so. 2. In 45.2.5.1.2: Allow the 5.24.10 bit to optionaly be a 1, so that a device that can implement both PHY XGXS and DTE XGXS need not change this status bit when changing device address*. Present comforming devices would be allowed to keep this bit a 0, but it would be recommended that it be a 1.

Proposed Response *Response Status* **Z**

Withdrawn, commentor will consider submitting a maintenance request.

Cl **45** *SC* **2.1.6.1** *P* **10** *L* **5** # **67**

Bradshaw, Peter BitBlitz Communicatio

Comment Type **TR** *Comment Status* **D** *TR67*

I believe the register 1.7 struture proposed in D4.0 is prefereable to that proposed in D4.1. The original 802.3ae pattern had some reasonable logical consistency (hobgoblins being ignored), where all 10GBASE-X devices had '00' as the last two bits, and the optical devices all came in the order 'E-L-S' in numerical ascending order. The related ability bits 1.8.0--7 would all encode into the control bits. The D4.0 proposal reatined and expanded this, leaving '0000' for a possible EX4 addition, and '1000' for SX4. Furthermore, the extended 'ability' bits, now ordered 1.8.0...7 and 1.11.0...14, would continue to encode from the control bits. Efficiency in the use of register 1.7 values hardly seems necessary (there are still over 65,000 codes available, and no previous 802.3 speed family has used more than 6 variants: even if we give up to 32 variants to each data rate, and go up by a data rate factor of

SuggestedRemedy

3.2 each time, a.c.w the prior factor of 10, and devote a full bit of 1.7 to each step (rather than a decoded value), the wavelength of the data pattern gets below 100 nm, well into the UV, before 1.7 runs out!) Register 1.8 is to be extended to 1.11, and (leaving bit 1.11.15 for further extension bits to 1.12 with 1.12.15 & 1.13), we have a total of 46 more bits, of which one is needed now for CX4, possibly one for SX4, and probably one or two for 10GBASE-T, maybe one for an XFI-type electrical interface. These can fill up 1.11.0-4, leaving 5-14 for expansion. Two nominally independant chages, but preferably done together. 1. Retain the changes proposed for 45.2.1.6.1 in D4.0 2. Modify Table 45-11 on Page 12 of D4.2 to use 1.11.1 for CX4 ability, reserving the other bits.

Proposed Response *Response Status* **Z**

Withdrawn by commentor.

Note: This is a non-binding comment because the commentor was not a voting member at the time of the comment.

Cl **45** *SC* **2.1.6.1** *P* **15** *L* **27** # **9**

Booth, Brad Intel

Comment Type **T** *Comment Status* **A** *T9*

Wrong bit range.

SuggestedRemedy

Change bit range to be 1.7.15:3, then 1.7.2:0.

Proposed Response *Response Status* **C**

ACCEPT.

Cl **54** *SC* **0** *P* *L* # **47**

Baumer, Howard — Broadcom Corp.

Comment Type **T** *Comment Status* **A** *T47*

It is the commentor's opinion that the current link budget as specified in Clauses: 54.7.3.8 Transmitter jitter, 54.8.2 Cable assembly insertion loss, 54.8.3 Cable assembly return loss, 54.8.4.1 Differentialk near end crosstalk, 54.8.4.2 Multiple disturber near end crosstalk, 54.8.5.1 Equal Level Far-End Crosstalk (ELFEXT) loss, 54.8.5.2 Multiple Disturber Equal Level Far-End Crosstalk (MDELFEXT) loss do not produce an error free system with a BER of 10^-12 or better. This is based on simulations run with these limits.

SuggestedRemedy

Further simulations with adjusted limits should need to be run and the appropriate limits that create a error free system (to a BER of better than 10^-12) found. This is in support of comment #388 against draft 4.0.

Proposed Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

See comment #388 against D4.0.

Cl **54** *SC* **1** *P* **18** *L* **9** # **49**

Dawe, Piers — Agilent

Comment Type **T** *Comment Status* **R** *T49*

Management is always optional, as well as the MDIO being optional. See e.g. 28.5.3.

SuggestedRemedy

Change to ""... shall be integrated with the appropriate physical sublayers (see Table 54-1) and may be integrated with the management ...

Proposed Response *Response Status* **C**

REJECT.

Not all management functions are optional (e.g. transmit disable). The access of the management functions through the Clause 45 MDIO interface is optional as stated.

Cl **54** *SC* **10.1** *P* **38** *L* **47** # **62**

Dawe, Piers — Agilent

Comment Type **TR** *Comment Status* **A** *TR62*

This subclause needs wordmithing to avoid another ""shall be performed"". The suggested remedy moves the last sentence to the beginning to improve readability, and modifies it. I've also suggested an editorial change to one other sentence. There is no loss of rigour without the ""shall"": there's one in 54.7.3.8 and a normative reference to this subclause. ""54.10.1 Transmit Jitter test requirements For the purpose of jitter measurement, the effect of a single-pole high pass filter with a 3 dB point at 1.875 MHz is applied to the jitter. The data pattern for jitter measurements is the CJPAT pattern defined in Annex 48A. All four lanes of the 10GBASE-CX4 transceiver are active in both directions, and opposite ends of the link use asynchronous clocks. Jitter is measured with AC-coupling and at 0 volts differential. Jitter measurement for the transmitter shall be performed with a test procedure resulting in a BER bathtub curve such as that described in Annex 48B.""

SuggestedRemedy

""54.10.1 Transmit Jitter test requirements Transmit jitter is defined with respect to a test procedure resulting in a BER bathtub curve such as that described in Annex 48B. For the purpose of jitter measurement, the effect of a single-pole high pass filter with a 3 dB point at 1.875 MHz is applied to the jitter. The data pattern for jitter measurements is the CJPAT pattern defined in Annex 48A. All four lanes of the 10GBASE-CX4 transceiver are active in both directions, and opposite ends of the link use asynchronous clocks. Crossing times are defined with respect to the mid-point (0 V) of the AC-coupled differential signal.""

Proposed Response *Response Status* **C**

ACCEPT.

Cl **54** *SC* **12.4.2** *P* **42** *L* **19** # **33**

Dove, Daniel — HP ProCurve Networki

Comment Type **TR** *Comment Status* **A** *TR33*

MF5 appears to be un-necessary. In section 54.5.7 it states..""If a PMD_fault is detected, then the PMD may turn off the electrical transmitter in all lanes.""

SuggestedRemedy

Either make 54.5.7 a ""shall"" requirement, or remove the PIC entry.

Proposed Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Will make PICS entry MD:O

Cl **54** *SC* **5.1** *P* **20** *L* **20** # **2**

Marris, Arthur Cadence

Comment Type **T** *Comment Status* **A** *T2*

In Figure 54-2, is it the intention that the link and signal shields should be grounded at both ends of the link?

SuggestedRemedy

Modify Figure 54-2 to show the electrical connections of the link and signal shields going through the connectors and being grounded at both the transmit and receive sides. Alternatively add some text saying where the link and signal shields should be grounded.

Proposed Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Signal Shield and Link Shield lines will be extended through the connectors into the CX4 transmit network and the CX4 receive network. The exact implementation is left up to the implementor.

"CX4 transmit network" will be changed to "CX4 transmit connection" and "CX4 receive network" will be change to "CX4 receive connection".

Cl **54** *SC* **5.6** *P* **22** *L* **9** # **25**

Dove, Daniel HP ProCurve Networki

Comment Type **T** *Comment Status* **A** *T25*

Zero volts out is not a logic level, but should be valid in the case of an AC coupled transmitter.

SuggestedRemedy

Remove the word ""logic"" from this sentence. ie: ""...constant logic level..."" becomes ""...constant level..."""

Proposed Response *Response Status* **C**

ACCEPT.

And also line 17.

Cl **54** *SC* **7.3** *P* **24** *L* **39** # **3**

Adam Healey Agere Systems

Comment Type **T** *Comment Status* **A** *T3*

Peak-peak jitter should be expressed as magnitude (positive value).

SuggestedRemedy

Remove "+/-" for all Output Jitter entries in Table 54-4.

Proposed Response *Response Status* **C**

ACCEPT.

Cl **54** *SC* **7.3.1** *P* **24** *L* **7** # **26**

Dove, Daniel HP ProCurve Networki

Comment Type **T** *Comment Status* **A** *T26*

This figure leaves some confusion regarding where the test fixture starts in my opinion.

SuggestedRemedy

I think that a dashed line around the area that involves the test fixture... to clearly indicate that TP2 exists to the left of that fixture... and a vertical line at the TP2 interface will help a lot. Also, the graphic for the lower common-mode measurement resistor has a few mis-aligned connections.

Proposed Response *Response Status* **C**

ACCEPT.

Cl **54** *SC* **7.3.4** *P* **26** *L* **1** # **68**

802.3ak Task Force

Comment Type **T** *Comment Status* **A** *T68*

Output amplitude specification does not specify what pattern should be used while preforming the tests. The amplitude for a continuous "010101..." will be different for a "00000111110000011111..."

SuggestedRemedy

Specify to use the test pattern in 48A.2.

Proposed Response *Response Status* **C**

ACCEPT.

Cl **54** *SC* **7.3.6** *P* **28** *L* **6** # **57**

Dawe, Piers — Agilent

Comment Type **TR** *Comment Status* **A** *TR57*

This continues my comment 418 against D4.0. Rationale is this: we want the ""shall""s and the PICS to certify what the compliant product does, all the time, not that 100% testing is required. We leave implementers room to use margin, ""right by design"" and test reduction strategies to build cost-effective product. We have struggled with similar wordsmithing issues in EFM. I think the remedy below gives you what need.

SuggestedRemedy

Instead of saying: ""These measurements are to be made for each pair while observing the differential signal output at TP2 using the transmitter test fixture shown in Figure 54-3 and with all other transmitters disabled."" please change to: ""The template {is met|shall be met} for each differential signal output at TP2 using the transmitter test fixture shown in Figure 54-3, when the three other transmitters are disabled.""

Proposed Response *Response Status* **C**

ACCEPT IN PRINCIPLE.

Will remove the sentence: "These measurements are to be made for each pair while observing the differential signal output at TP2 using the transmitter test fixture shown in Figure 54–3 and with all other transmitters disabled." Will modify "... test pattern specified in 48A.2." to "... test pattern specified in 48A.2, with all other transmitters disabled."

Cl **54** *SC* **7.3.8** *P* **29** *L* **33** # **4**

Adam Healey — Agere Systems

Comment Type **T** *Comment Status* **A** *T3*

Peak-peak jitter should be expressed as magnitude (positive value).

SuggestedRemedy

Remove "+/-" in all references to peak-peak jitter values. Also apply changes to corresponding PICS items in section 54.12.4.3 (DS15, 16, and 17).

Proposed Response *Response Status* **C**

ACCEPT.

Cl **54** *SC* **8** *P* **31** *L* **18** # **60**

Dawe, Piers — Agilent

Comment Type **T** *Comment Status* **A** *TR31*

Line 10 says TP1 and TP4 while this table says TP2/TP3.

SuggestedRemedy

Reconcile.

Proposed Response *Response Status* **C**

ACCEPT.

Table item is being removed from the response to comment #484 against D4.0.

Cl **54** *SC* **8** *P* **31** *L* **31** # **61**

Dawe, Piers — Agilent

Comment Type **TR** *Comment Status* **R** *TR61*

""The impedance for the cable assembly, shall be recorded at half the length of the cable but not to exceed 1ns away from the MDI."" Problem 1: you can't put a ""shall"" under an informative table. Problem 2: ""shall be recorded"": like, keep records of every cable? For how many years? Problem 3: a cable more than a very few feet long will have its mid-point more than 1ns from either end. Which do you mean, mid-point or 1 ns from an end?

SuggestedRemedy

1. Move the impedance requirement to the normative section 54.8.1. 2. Something like ""cable impedance is defined at <position>"" or better, see below 3. 1 ns from each MDI or at the mid-point if cable is shorter than 2 ns? or better I think, don't take a TDR approach: just define the impedance looking into TP1 with TP4 terminated by the test fixture (and looking into TP4 with TP1 terminated ...).

Proposed Response *Response Status* **C**

REJECT.

Table item is being removed from the response to comment #484 against D4.0.

Cl **54** *SC* **8** *P* **31** *L* **31** # **31**

Dove, Daniel — HP ProCurve Networki

Comment Type **TR** *Comment Status* **R** *TR31*

Erroneous reference (TP2 and TP3)

SuggestedRemedy

Change ""(TP2 and TP3)"" to ""(TP1 and TP4)""

Proposed Response *Response Status* **C**

REJECT.

Table item is being removed from the response to comment #484 against D4.0.

Cl **54** *SC* **8.3** *P* **33** *L* **18** # **32**

Dove, Daniel — HP ProCurve Networki

Comment Type **T** *Comment Status* **A** *T32*

Last sentence appears to have been cut-n-pasted into the wrong locations.

SuggestedRemedy

Remove sentence ""This includes..."" Other locations; P34-L6, P34-L25, P36-L8, P36-L27

Proposed Response *Response Status* **C**

ACCEPT.

Cl **54** *SC* **8.4.2** *P* **34** *L* **37** # **34**

Baumer, Howard Broadcom Corp.

Comment Type **T** *Comment Status* **A** *T34*

Units for NL(f)i are not defined

SuggestedRemedy

modify NL(f)i definition as follows: (.. combination i, in dB)

Proposed Response *Response Status* **C**

ACCEPT.

Cl **54** *SC* **8.5.2** *P* **36** *L* **39** # **36**

Baumer, Howard Broadcom Corp.

Comment Type **T** *Comment Status* **A** *T36*

NL(f)i is stated as the magnitude of the ELFEXT loss, it should be power

SuggestedRemedy

Change ""magnitude"" to ""power""

Proposed Response *Response Status* **C**

ACCEPT.

Cl **54** *SC* **8.5.2** *P* **36** *L* **39** # **35**

Baumer, Howard Broadcom Corp.

Comment Type **T** *Comment Status* **A** *T35*

NL(f)i units are not defined

SuggestedRemedy

modify NL(f)i definition as follows: (.. combination i, in dB)

Proposed Response *Response Status* **C**

ACCEPT.

Cl **54** *SC* **8.6** *P* **37** *L* **31** # **24**

Frazier, Howard SWI

Comment Type **TR** *Comment Status* **R** *TR24*

It appears that the text makes a normative reference to IEC 61196-1. This publication does not appear in the list of references in 1.3

SuggestedRemedy

If this document is not already referenced in the base standard, add IEC 61196-1 to the list of reference in 1.3, including the date and full title.

Proposed Response *Response Status* **C**

REJECT.

IEC 61196-1 is listed in 1.3, Page 8, third paragraph from the bottom of IEEE Std 802.3-2002.