*Cl* **00** *SC* **7.3.2** *P* **7.1** *L* **1** # **112**

Geoff Thompson Bay Networks, Inc.

*Comment Type* **TR** *Comment Status* **D** *RESUBMIT*

Restore the clock specification for 10 Mb/s that was inadvertently deleted by P802.3x (Cls 07)

It is recognized that this is a service to humanity and not within the nominal scope of the extension to the exisitng standard to specify Gigabit operation. It is a very important piece of the standard as a whole. I wish to insure that no future edition of the merged standard is printed without the correction of this error.

I will not let this item be a critical path item in the approval of this standard. If a case can be made that this is a critical path item I will withdraw this comment.

*SuggestedRemedy*

Change 7.3.2 paragraph 1 to read:

The signaling rate specified here is 10 million bits per second ± 0.01%. Other signaling rates are specified elsewhere in this standard.

*Proposed Response* *Response Status* **U**

REJECT.

This change would be outside the scope of 802.3z.

[ Editor's note: Because the commentor believes this to be an important issue, and wishes to have this comment widely ciculated within the 802.3 community, he has chosen to not APPROVE of this response at this time. The remainder of the clause 34 subtask force unanimously rejected the comment. ]

[ Additional note: The 802.3 maintenance committee plans to recommend this change in the recirculation of P802.3aa, Maintenance #5, which is expected to reach publication in the same time frame as 802.3z. ]

*Cl* **04** *SC* **4.2.2.4** *P* **4.4** *L* **1** # **4**

howard frazier cisco systems, inc

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

mea culpa, mea culpa, mea culpa
In the process of performing the edits on clause 4
for D4.1, the clause editor (mea) forgot to incorporate
part of the response to comment #105 from Pat Thaler which
was accepted by the subtask force. The part ommitted was:

"Also pick up reference to 802.1-1990 from second paragraph
of subclause 5.1.2 [of 802.3-1996], and insert in 4.2.2.4,
and make it general enough so that it also applies to [the]
clause 5 Pascal"

Note that the last part of this response is important because
subclause 5.1.2 has been deprecated, thus, this important reference
is not currently in 802.3.

*SuggestedRemedy*

Instantiate change instructions for subclause 4.2.2.4 in D4.2, and add the text:

The Layer Management facilities provided by the CSMA/CD MAC and
Physical Layer management definitions provide the ability to
manipulate management counters and initiate actions within the layers.

The managed objects within this International Standard are defined
as sets of attributes, actions, notifications, and behaviors in
accordance with IEEE Std 802.1F-1993, and ISO/IEC International Standards for network
management.

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **22** *SC* **22.1.5** *P* **22.3** *L* **1** # **28**

Brad Booth Jato Technologies

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

Bad grammar in last sentence.

*SuggestedRemedy*

Change to:
"MII operation of these signals and clocks is specified within clause 22, and GMII operation is specified within clause 35."

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **22** *SC* **22.2.4** *P* **22.3** *L* **16** # **29**

Brad Booth Jato Technologies

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

Sentence refers to the GMII incorporating "an extended basic register set..." Extended register set refers to registers 2 through 10.

*SuggestedRemedy*

Change "extended" to "enhanced" so sentence reads:
"All PHYs that provide a GMII shall incorporate an enhanced basic register set consisting of..."

*Proposed Response* *Response Status* **C**

REJECT. The recommended fix is incomplete and would create inconsistencies (e.g., 22.3 line 49).

*Cl* **22** *SC* **22.2.4** *P* **22.3** *L* **17** # **30**

Brad Booth Jato Technologies

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

The sentence:
"The status and control functions defined here are considered basic and fundamental to 100 Mb/s and 1000 Mb/s PHYs."
is misleading and incorrect. Registers 9 and 10 are fundamental to the operation of 1000BASE-T and 100BASE-T2.

*SuggestedRemedy*

Remove the sentence.

*Proposed Response* *Response Status* **C**

REJECT. The sentence is correct. 100BASE-T2 is a 100 Mb/s PHY, and 1000BASE-T is a 1000 Mb/'s PHY, and multiple registers are basic and fundamental to their operation (i.e., 0-10 and 0-8,15 respectively). Not all registers need be basic and fundamental to all PHYs for the sentence to be true (e.g., registers 4-8 are not used with 100BASE-FX).

*Cl* **22** *SC* **22.2.4.1.3** *P* **22.5** *L* **14** # **31**

Brad Booth Jato Technologies

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

"any invalid attempt..." is undefined and unclear.

*SuggestedRemedy*

Change to read:
"... and any attempt to change the bits to an invalid setting shall be ignored."

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.1** *P* **30.2** *L* **1 to 3** # **94**
David Law 3Com

*Comment Type* **E** *Comment Status* **A**
This note seems to be in the incorrect paragraph style.

*SuggestedRemedy*
See comment

*Proposed Response* *Response Status* **C**
ACCEPT.

*Cl* **30** *SC* **30.1.1.10** *P* **30.19** *L* **30** # **102**
David Law 3Com

*Comment Type* **E** *Comment Status* **A**
Remove the unnecessary comma between slotTime and from.

*SuggestedRemedy*
See comment

*Proposed Response* *Response Status* **C**
ACCEPT.

*Cl* **30** *SC* **30.1.4** *P* **30.4** *L* **18** # **96**
David Law 3Com

*Comment Type* **E** *Comment Status* **A**
Suggest the text 'NOTE-NOTE-This ...' should read 'NOTE-This ...'

*SuggestedRemedy*
See comment

*Proposed Response* *Response Status* **C**
ACCEPT.

*Cl* **30** *SC* **30.1.4** *P* **30.4** *L* **18 to 21** # **97**
David Law 3Com

*Comment Type* **E** *Comment Status* **A**
This note seems to be in the incorrect paragraph style.

*SuggestedRemedy*
See comment

*Proposed Response* *Response Status* **C**
ACCEPT.

*Cl* **30** *SC* **30.1.4** *P* **30.4** *L* **6 to 16** # **95**
David Law 3Com

*Comment Type* **E** *Comment Status* **A**
The arrow between the Manager block and Local system environment block is now broken. Please return it to the state it was in as published in 802.3u

*SuggestedRemedy*
See comment

*Proposed Response* *Response Status* **C**
ACCEPT.

*Cl* **30** *SC* **30.2.1** *P* **30.5** *L* **5 to 8** # **98**
David Law 3Com

*Comment Type* **E** *Comment Status* **A**
The last two sentences of this sub-clause do not make sense. Suggest the text should read "Counters in 30.3, 30.4, 30.5 and 30.6 that have maximum increment rates specified for 10 Mb/s operation, and are appropriate to 100 Mb/s operation, have ten times the stated maximum increment rate for 100 Mb/s operation unless otherwise indicated. Counters that are appropriate to 1000 Mb/s operation have one hundred times the stated maximum increment rate for 1000 Mb/s operation unless otherwise indicated."

*SuggestedRemedy*
See comment

*Proposed Response* *Response Status* **C**
ACCEPT.

*Cl* **30** *SC* **30.2.2.1** *P* **30.5** *L* **34 & 35** # **99**

David Law 3Com

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

There seems to be a spurious
between
oMACControlFunctionsEntity and oMACEntity, please delete.

*SuggestedRemedy*

See comment

*Proposed Response* *Response Status* **C**

ACCEPT.

Note:- It is believed the comment originally read 'There seems to be a spurious Carriage Return between oMACControlFunctionsEntity and oMACEntity, please delete.'

Note: The commenter used open angle brackets, uppercasel C, uppercasel R, close angle brackets to represent carriage return. Unfortunatly this is also used within the database and stripped out. This is why the comment appears to be missing what the statement of what was missing.'

*Cl* **30** *SC* **30.2.2.2** *P* **30.8** *L* **36 & 37** # **100**

David Law 3Com

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

The text 'is asserted. The FCSError' should not be marked as new as it is not new.

*SuggestedRemedy*

See comment

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.3.1.1.26** *P* **30.23** *L* **38** # **103**

David Law 3Com

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

Add a space between the words variable. and Setting.

*SuggestedRemedy*

See comment

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.3.1.1.7** *P* **30.18** *L* **32 & 33** # **101**

David Law 3Com

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

This note seems to be in the incorrect paragraph style. The word Note should be aligned with the rest of the behavior text. See subclause 30.3.1.1.24 for an example.

*SuggestedRemedy*

See comment

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.3.2.1.2** *P* **30.26** *L* **43 & 44** # **104**

David Law 3Com

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

This note seems to be in the incorrect paragraph style. The word Note should be aligned with the rest of the appropriate syntax text. See subclause 30.3.1.1.24 for an example.
Remove the unnecessary period at the end of this note. The period is not required as this is APPROPRIATE SYNTAX text. Also need to remove the spurious
after this note. The above changes need to be also done to subclause 30.3.2.1.3.

*SuggestedRemedy*

See comment

*Proposed Response* *Response Status* **C**

ACCEPT.

Note:- It is believed the last part of the comment originally read 'Also need to remove the spurious Carriage Return after this note.'

*Cl* **30** *SC* **30.3.2.1.3** *P* **30.27** *L* **20 & 21** # **105**

David Law 3Com

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

Suggest the text or 'If clause 28, Auto-Negotiation, is present ...' should read 'If clause 28 or clause 37, Auto-Negotiation, is present ...'

*SuggestedRemedy*

See comment

*Proposed Response* *Response Status* **C**

ACCEPT.

Also need to add after 'local technology ability' 'or advertised ability of the local device'

*Cl* **30** *SC* **30.4.3.1.20** *P* **30.41** *L* **46** # **30004**

David Law

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

"ports" should be "port"

also, remove extra leading space on lines 39 and 40

*SuggestedRemedy*

see comment

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.4.3.2.1** *P* **30.42** *L* **4** # **106**

David Law 3Com

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

Suggest the text 'it should' should read 'it shall'.

*SuggestedRemedy*

See comment

*Proposed Response* *Response Status* **C**

REJECT.

*Cl* **30** *SC* **30.5.1.1.10** *P* **30.46** *L* **37** # **2**

howard frazier cisco systems, inc

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

Comment resolution was entered incorrectly. "160 000" should be "1 600 000" to align with accepted response to comment #136 from Tom Mathey.

*SuggestedRemedy*

change "160 000" to "1 600 000" on page 30.46, line 37

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.5.1.1.10** *P* **30.64** *L* **35** # **3**

Paul Woodruff Bay Networks

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

There should either be an obvious relation between the behaviour of this counter at 100M vs 1000M, or a stated indication why there is no obvious relation.

*SuggestedRemedy*

Make it obvious. Preferred solution (in line with the 100M standard):

APPROPRIATE SYNTAX:
Generalized nonresettable counter. This counter has a maximum increment rate of 160 000 counts per second under maximum network load, and 10 counts per second under zero network load, for 100 Mb/s implementations. This counter has a maximum increment rate of 1 600 000 counts per second under maximum network load, and 100 counts per second under zero network load, for 1000 Mb/s implementations.

BEHAVIOUR DEFINED AS:
A count of the number of false carrier events during IDLE in 100BASE-X and 1000BASE-X links. This counter does not increment at the symbol rate. For 100BASE-X it can increment after a valid carrier completion at a maximum rate of once per 100 ms until the next CarrierEvent. For 1000 BASE-X it can increment after a valid carrier completion at a maximum rate of once per 10 ms until the next CarrierEvent.

*Proposed Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

[I believe this comment refers to page 30.46, not 30.64 as stated.]

The different behavior between 100Mb/s and 1000Mb/s was in response to a D3.1 Technical Required Comment ( #725) which is included below.

This new comment gives a choice of either undoing this previous Technical Required change or adding a explanation for the difference between 100Mb/s and 1000Mb/s behavior. To avoid undoing the previous Technical Required change, and the risk this would bring of a new disapprove vote, the second option is accepted. A note will be added to this attribute.

This note will read:-

Note:-The increased increment rate for this attribute at 1000Mb/s relative to its increment rate at 100Mb/s has been provided to improve its use as an indication of line quality.

D3.1 Comment #725
Commenter Name: Pat Thaler
Commenter Company: HP
Clause: 30
Subclause: 30.5.1.1.10
Page: 30.48
Line: 27
CommentType: TR
Comment:-
I don't understand why the increment rate on an idle network is so low. It diminishes the usefulness of the object as an indicator of line quality.

Suggested Remedy:-
Replace the last sentence of the behavior with "For 100BASE- X, it can increment after a valid carrier completion at a maximum rate of once per 100 ms until the next carrier eventCarrierEvent. For 1000BASE- X, it can increment after a valid carrier completion at a maximum rate of once per 10 us until the next carrier eventCarrierEvent."

*Cl* **30** *SC* **30.5.1.1.2** *P* **30.43** *L* **29** # **107**

David Law 3Com

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

Suggest that the usual note is added here about 1000BASE-T rather than using a numbered note. The note needs to also apply to Half and Full Duplex mode 1000BASE-T.

*SuggestedRemedy*

See comment

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **30** *SC* **30.5.1.1.2** *P* **30.43** *L* **39** # **108**

David Law 3Com

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

"Suggest the text 'Auto-Negotiation is operational' should read 'Auto-Negotiation, is operational' as it did in 802.3u."

*SuggestedRemedy*

See comment

*Proposed Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Remove comma between "37" and "Auto-Negotiation".

*Cl* **30** *SC* **30.5.1.1.2** *P* **30.43** *L* **43** # **109**

David Law 3Com

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

Suggest the text 'The types ...' should read 'The enumerations ...' as these are enumerations, not types.

*SuggestedRemedy*

See comment

*Proposed Response* *Response Status* **C**

ACCEPT.

---

*Cl* **30** *SC* **30.6.1.1.5** *P* **30.49** *L* **21 & 22** # **110**

David Law 3Com

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

Add a space after between the ')' and 'as' on both lines.

*SuggestedRemedy*

See comment

*Proposed Response* *Response Status* **C**

ACCEPT.

---

*Cl* **30** *SC* **30A.7.1** *P* **30A.27** *L* **32** # **30003**

David Law 3Com

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

The text '100 and 1000 Mb/s Monitor capability' should read '100/1000 Mb/s Monitor capability' to match the name of the capability used elsewhere.

*SuggestedRemedy*

See comment.

*Proposed Response* *Response Status* **C**

ACCEPT.

---

*Cl* **30** *SC* **30A.7.1** *P* **30A.27** *L* **38** # **111**

David Law 3Com

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

The registration arc needs to be completed, it still reads .??.

*SuggestedRemedy*

Complete the registration arc.

*Proposed Response* *Response Status* **C**

ACCEPT.

The registration authority has been contacted and the allocated registration arcs have been checked. Taking into account all utilized arcs the next available leaf under the package branch (4) is 18.

The full arc for pBursts will therefore be {1 2 840 10006 30 4 18}.

---

*Cl* **30** *SC* **30A.7.1** *P* **30A.33** *L* **20** # **30001**

David Law 3Com

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

The registration arc for aBursts dupicates the registration arc for aMAUID. Both attributes have an arc of {1 2 840 10006 30 7 68}.

*SuggestedRemedy*

Please contact the registration authority and obtain the correct arc for this attribute.

*Proposed Response* *Response Status* **C**

ACCEPT.

The registration authority has been contacted and the allocated registration arcs have been checked. Taking into account all utilized arcs the next available leaf under the attribute branch (7) is 100.

The full arc for aBursts will therefore be {1 2 840 10006 30 7 100}

---

*Cl* **30** *SC* **30A.7.2** *P* **30A.29** *L* **7** # **30002**

David Law 3Com

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

Please delete the spurious text that reads 'Note-' with no other text associated with it.

*SuggestedRemedy*

See comment

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **34** *SC* **34.4** *P* **34.4** *L* **22** # **113**

Geoff Thompson
Bay Networks, Inc.

*Comment Type* **TR** *Comment Status* **A** *RESUBMIT*

Review and revise table entries with respect to final outcome of jitter reallocation and link budgets

*SuggestedRemedy*

*Proposed Response* *Response Status* **C**

ACCEPT.

The table will be modified to reflect the outcome of our Feb. 2-3 interim.

The commentor chooses to disapprove of this response, in order to force recirculation of this comment in future rounds of balloting as needed pending a final outcome of clause 38.

New information as of March 11:
The optics group has now concluded its work.
On 62um fiber, -LX optics will now work to 550 m.
Change the table cell for -LX, building backbone cabling, 62um MMF, from "I" to "N".
That's the only change.

*Cl* **35** *SC* **35.2.1.6** *P* **35.6** *L* **36** # **13**

Bill Quackenbush cisco Systems, Inc.

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

There is asymmetery between the requirements as to when to signal carrier extend error and when to signal transmit error propagation. I believe that "may be asserted" for transmit error propagation should be "shall be asserted" to match the requirement for carrier extend error.

*SuggestedRemedy*

Change "may" to "shall" and add PICS item.

*Proposed Response* *Response Status* **C**

ACCEPT.
Add PICs PL3a before PL3.

"PL3a, Propagation of errors in frame, 35.2.1.6, Assert TX_ER while TX_EN asserted, O, Yes[]No[]"

Modify Feature of PL3 to read: "Propagation of errors in extension".

---

*Cl* **35** *SC* **35.2.2.1** *P* **35.7** *L* **27** # **10**

Bill Quackenbush cisco Systems, Inc.

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

The frequency and tolerance of GTX_CLK is now specified in Table 35-8 making the "shall" in this subclause redundant.

*SuggestedRemedy*

Change the sentence to be informative such as
"The GTX_CLK frequency is nominally 125 MHz, one-eigth of the nominal transmit data rate." and remove PICS item SF1 on page 35.29

*Proposed Response* *Response Status* **C**

ACCEPT IN PRINCIPLE. Change sentence to read:

"The GTX_CLK frequency is nominally 125 MHz, one-eighth of the transmit data rate."

Delete PICS SF1.

---

*Cl* **35** *SC* **35.2.2.1** *P* **35.7** *L* **41-45** # **12**

Bill Quackenbush cisco Systems, Inc.

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

Change the refrences to the undefined "nominal clock" to something more appropriate.

*SuggestedRemedy*

Lines 41, 43: change "nominal clock" to "local clock"
Line 45: change "nominal clock" to "a local clock" in two places

*Proposed Response* *Response Status* **C**

ACCEPT.

---

*Cl* **35** *SC* **35.2.2.2** *P* **35.7** *L* **35-37** # **11**

Bill Quackenbush cisco Systems, Inc.

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

The term "nominal clock" is not defined and the frequency of RX_CLK when not derived from the received data is not specified.

*SuggestedRemedy*

Replace the first sentence with
"RX_CLK has a nominal frequency of 125 MHZ and may be derived from the received data or from a local clock such as GTX_CLK."

*Proposed Response* *Response Status* **C**

ACCEPT IN PRINCIPLE. Change the paragraph to read:

"The PHY may recover the RX_CLK reference from the received data, or it may derive the RX_CLK reference from a local clock (e.g., GTX_CLK). When derived from the received data, RX_CLK shall have a frequency equal to one-eighth of the data rate of the received signal, and when derived from a local clock a nominal frequency of 125 MHz."

Change Value/Comment of SF2 to read "One-eighth of received data rate or nominal 125 MHz."

---

*Cl* **35** *SC* **35.2.2.2** *P* **35.8** *L* **2** # **32**

Brad Booth Jato Technologies

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

Extra "." in sentence.

*SuggestedRemedy*

Change sentence to read:
"See additional information in 35.4."

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **35** *SC* **35.2.2.3** *P* **35.8** *L* **6** # **14**

Bill Quackenbush cisco Systems, Inc.

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

The first sentence of the paragraph is in conflict with Table 35-1. Specifically, data is presented on the GMII for transmission when TX_EN is asserted and TX_ER is deasserted. When both are asserted, the data on TXD is not for transmission, rather it is signaling a request to transmission of an error

*SuggestedRemedy*

change "TX_EN indicates that" to "TX_ER in combination with TX_ER indicates when"

*Proposed Response* *Response Status* **C**

ACCEPT. Change sentence to read:

"TX_EN in combination with TX_ER indicates the Reconciliation. . ."

---

*Cl* **35** *SC* **35.2.2.4** *P* **35.8** *L* **36** # **15**

Bill Quackenbush cisco Systems, Inc.

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

The second sentence of the paragraph is in conflict with Table 35-1. Specifically, data is presented on the GMII for transmission when TX_EN is asserted and TX_ER is deasserted. When both are asserted, the data on TXD is not for transmission, rather it is signaling a request to transmission of an error

*SuggestedRemedy*

change "For each GTX_CLK period while TX_EN is also asserted," to "For each GTX_CLK period in which TX_EN is asserted and TX_ER is deasserted,"

*Proposed Response* *Response Status* **C**

ACCEPT.

---

*Cl* **35** *SC* **35.2.2.4** *P* **35.8** *L* **37** # **33**

Brad Booth Jato Technologies

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

Plural form of verb used.

*SuggestedRemedy*

Change to read:
"... data is presented on..."

*Proposed Response* *Response Status* **C**

REJECT. Data is plural, "data are" is correct.

---

*Cl* **35** *SC* **35.2.2.4** *P* **35.8** *L* **40** # **34**

Brad Booth Jato Technologies

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

Singular form of verb used for TXD<7:0>. Change to plural to follow form used in 35.2.2.7.

*SuggestedRemedy*

Change to read:
"... TXD<7:0> are used to..."

*Proposed Response* *Response Status* **C**

ACCEPT.

---

*Cl* **35** *SC* **35.2.2.6** *P* **35.11** *L* **16** # **35**

Brad Booth Jato Technologies

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

Missing lightning bolt in line of RX_DV in Figure 35-8 and Figure 35-11 (page 35.13).

*SuggestedRemedy*

Add lightning bolt.

*Proposed Response* *Response Status* **C**

ACCEPT.

---

*Cl* **35** *SC* **35.2.2.8** *P* **35.13** *L* **26** # **37**

Brad Booth Jato Technologies

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

Sentence in parantheses is confusing.

*SuggestedRemedy*

Change sentence to read:
"(e.g., any error that the PHY is capable of detecting that may be undetectable at the MAC sublayer)"

*Proposed Response* *Response Status* **C**

ACCEPT IN PRINCIPLE. Change to read:

"(e.g., a coding error or another error that the PHY is capable of detecting that may be undetectable at the MAC sublayer)"

*Cl* **35** *SC* **35.2.3** *P* **35.15** *L* **44-50** # **38**
Brad Booth Jato Technologies

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

Box around Figure 35-15.

*SuggestedRemedy*

Remove box or move "Figure 35-15 - GMII data stream" outside of box.

*Proposed Response* *Response Status* **C**

ACCEPT. The box was added to please the editor-in-chief. Move the title outside the box.

*Cl* **35** *SC* **35.2.3.1** *P* **35.16** *L* **30** # **39**
Brad Booth Jato Technologies

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

Duplicated text "is an" in sentence.

*SuggestedRemedy*

Change sentence to read:
"... or receive path is an interval during..."

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **35** *SC* **35.2.3.2.2** *P* **35.17** *L* **21** # **40**
Brad Booth Jato Technologies

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

Sentence states that "the relationship between RX_DV assertion and the SFD is not assured" due to preamble shrinkage. This is not true. RX_DV assertion is assured to start no later than the SFD as per 35.2.2.6.

*SuggestedRemedy*

Remove sentence.

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **35** *SC* **35.3** *P* **35.19** *L* **39** # **16**
Bill Quackenbush cisco Systems, Inc.

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

Remove extra word

*SuggestedRemedy*

delete "signals" following "GMII, MII and TBI"

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **35** *SC* **35.3** *P* **35.19** *L* **44-50** # **41**
Brad Booth Jato Technologies

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

Combination of interfaces is implementation specific. The two paragraphs are confusing and add no useful information.

*SuggestedRemedy*

Remove 2nd and 3rd paragraphs of 35.3.

*Proposed Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.
The paragraphs should not be deleted. They were added in response to D4.0 comments striking similar information earlier in the clause.

Change line 44 to read: "In an implementation supporting the MII and GMII, some signal pins are not used in both intefaces."

Change line 49-50 to read (missing edits for D4.0 comment #235): "Similarly, an implementation supporting both the GMII and TBI interfaces will map TBI data signals onto the GMII control signal pins of TX_ER, TX_EN, RX_ER and RX_DV."

*Cl* **35** *SC* **35.4.2.1** *P* **35.22** *L* **24** # **5**
Bill Quackenbush cisco Systems, Inc.

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

The title of Figure 35-17 would be clearer if "receiver" was inserted before "input".

*SuggestedRemedy*

See comment.

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **35** *SC* **35.4.2.1** *P* **35.23** *L* **13** # **6**
Bill Quackenbush cisco Systems, Inc.

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

The title of Figure 35-18 would be clearer if "receiver" was inserted before "input".

*SuggestedRemedy*

*Proposed Response* *Response Status* **C**

ACCEPT. The referenced page/line number is for Figure 35-19, where the change is to be made.

*Cl* **35** *SC* **35.4.2.2** *P* **35.23** *L* **39** # **42**

Brad Booth — Jato Technologies

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

Use of "reactance" is not recommended.

*SuggestedRemedy*

Change "reactance" to "load" or "capacitance".

*Proposed Response* *Response Status* **C**

ACCEPT IN PRINCIPLE. Reactance is the imaginary part of impedance (as susceptance is the imaginary part of admittance) and can result from either capacitive reactance (-1(/2*pi*f*C)) or inductive reactance (2*pi*f*L). And since the input network of a GMII receiver contains both lead inductance and pin and pad capacitance, the term is appropriate and correct.

[Reaction of commenter to proposed response: I agree with your formulas, but reactance is a combination of inductance and capacitance. Seeing that we don't specify the inductance, I'd prefer to call the 5 pF capacitor a load, rather than a reactance. The only way I would leave reactance in there is to call it what it is, an 'input capacitive reactance'. It can't be called 'input reactance' because reactance is a summation of inductive reactance and capacitive reactance. Without the inductance specified, we cannot call it just 'input reactance'."]

Action of the committee was to change "reactance" to "load".

*Cl* **35** *SC* **35.4.2.3** *P* **35.24** *L* **41** # **43**

Brad Booth — Jato Technologies

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

Missing hyphenation.

*SuggestedRemedy*

Change "point to point" to "point-to-point".

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **35** *SC* **35.4.2.3** *P* **35.25** *L* **50** # **44**

Brad Booth — Jato Technologies

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

The last paragraph of 35.4.2.3 is unnecessary informative text. To tell designers of components how to perform their jobs is outside the scope of this draft. This issue is being placed squarely on the shoulders of the component designers, when in reality, there are trade-offs between components and board designs. These trade-offs are implementation specific; therefore, the trade-offs are also outside the scope of this draft.

*SuggestedRemedy*

Remove paragraph.

*Proposed Response* *Response Status* **C**

ACCEPT IN PRINCIPLE. Change page 35.25 line 50 to read:

"Designers of GMII components and systems should note . . ."

Change page 35.26 line 2-4 to read:

"The GMII receiver designer is responsible for defining the GMII implementation constraints that ensure the receiver operates reliably for all permissile input signal slew rates."

Action of committee is to strike the last sentence of the paragraph. We have verbal acceptance of the response from the commenter.

*Cl* **35** *SC* **35.5.3.2** *P* **35.29** *L* **6-52** # **9**

Bill Quackenbush — cisco Systems, Inc.

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

Due to the removal of the previous subclause 35.2.2.1, all subclause references are off by one in this table, i.e. 35.2.2.n should be 35.2.2.n-1.

*SuggestedRemedy*

correct subclause references

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **35** *SC* **35.5.3.6** *P* **35.31** *L* **19** # **45**

Brad Booth — Jato Technologies

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

35.5.3.6 has no title or data associated with it.

*SuggestedRemedy*

Change 35.5.3.7 to 35.5.3.6.

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **35** *SC* **35.5.3.7** *P* **35.31** *L* **29** # **7**

Bill Quackenbush cisco Systems, Inc.

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

The "Value/Comment" field entry restricts the PICS item to worst case driver parameters. The "shall" on page 35.25, lines 46-49 is much broader.

*SuggestedRemedy*

delete "driver" from the "Value/Comment" field entry

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **35** *SC* **35.5.3.7** *P* **35.31** *L* **35** # **8**

Bill Quackenbush cisco Systems, Inc.

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

The reference to "vendor" is ambiguous.

*SuggestedRemedy*

Change "vendor" to "GMII driver implementor" to match the "shall"

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **35** *SC* **Table 35-2** *P* **35.12** *L* # **36**

Brad Booth Jato Technologies

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

Table 35-2 is split awkwardly across two pages.

*SuggestedRemedy*

Put table on one page.

*Proposed Response* *Response Status* **C**

ACCEPT. This will be done prior to final publication. The diff text and change tables cause pagination to change with each draft.

*Cl* **36** *SC* **36.1.4.3** *P* **36.5** *L* **38** # **63**

Brad Booth Jato Technologies

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

multi-mode should be multimode as in clause 38

*SuggestedRemedy*

Change "multi-mode" to "multimode" to match clause 38.

*Proposed Response* *Response Status* **C**

REJECT. Leave to publications editor. Should be aligned with ISO 11801.

*Cl* **36** *SC* **36.3.3.1** *P* **36.39** *L* **34** # **1**

howard frazier cisco systems

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

"GMII TX_CLK" should be "GMII GTX_CLK", as the TX_CLK signal is an MII signal which flows in the wrong direction (from PHY to MAC) and is not even applicable to the GMII.

*SuggestedRemedy*

Change "GMII TX_CLK" to "GMII GTX_CLK".
Also, please search clause 36 for any other references to TX_CLK, and make sure they are all changed to GTX_CLK.

*Proposed Response* *Response Status* **C**

ACCEPT. Accepted per suggested remedy

*Cl* **36B** *SC* *P* **36B.1** *L* **3** # **64**

Brad Booth
Jato Technologies

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

unnecessary period

*SuggestedRemedy*

change "(informative)." to "(informative)"

*Proposed Response* *Response Status* **C**

ACCEPT. Accepted per suggested remedy

*Cl* **37** *SC* *P* **37.22** *L* **16** # **18**

Amrit Kalla VLSI Technology Inc.

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

The transition equation out of state NEXT_PAGE_WAIT contains (toggle_rx ^ rx_Config_Reg<D11>=1). This might lock up the state machine.

*SuggestedRemedy*

Change (toggle_rx ^ rx_Config_Reg<D11>=1) to ((toggle_rx ^ rx_Config_Reg<D11>)=1)

*Proposed Response* *Response Status* **C**

ACCEPT. Accepted per suggested remedy

*Cl* **37** *SC* *P* **37.22** *L* **16** # **19**

Amrit Kalla VLSI Technology Inc.

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

The transition equation out of state NEXT_PAGE_WAIT contains (toggle_rx ^ rx_Config_Reg<D11>=1). This might lock up the state machine.

*SuggestedRemedy*

Change (toggle_rx ^ rx_Config_Reg<D11>=1) to ((toggle_rx ^ rx_Config_Reg<D11>)=1)

*Proposed Response* *Response Status* **C**

ACCEPT. Accepted as a duplicate of comment #18

*Cl* **37** *SC* **37.1.1** *P* **37.2** *L* **34** # **17**

Amrit Kala VLSI Technology Inc.

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

Receipt of three consecutive identical copies of /C/ ordered sets by a local device does not yield a rx_Config_Reg<D15:D0>. See definition of rx_Config_Reg<D15:D0> in 36.25.1.3.

*SuggestedRemedy*

Receipt of /C/ ordered sets by a local device, yield a rx_Config_Reg<D15:D0> value that identifies the operational modes supported by the link partner.

*Proposed Response* *Response Status* **C**

ACCEPT IN PRINCIPLE. Delete the last sentence in 37.1.1 and the last sentence of the second paragraph in 37.2.3.1.

*Cl* **38** *SC* **38.** *P* **38.1** *L* **8** # **114**

Geoff Thompson Bay Networks, Inc.

*Comment Type* **T** *Comment Status* **A** *RESUBMIT*

Referencing the objectives:

11. Provide a family of Physical Layer specifications which support a link distance of:
    a. At least 500 m on multimode fiber

13. Support media selected from ISO/IEC 11801

It is not clear from the discussion at the MBI meeting in Florida, Jan 19-20 that these objectives are being reliably met on an interoperable basis with adequate margins for jitter and allowance for the uncharacterized behaviour of fiber that is being utilized.

*SuggestedRemedy*

Unclear

*Proposed Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

The changes to D4.1 to incorporate these ranges as defined by the link model are:

1000BASE-SX
---

In table 38-2, introduce bandwidth and link length cells.

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

In table 38-5:
The power budget is increased from 7.0 to 7.5 dB.
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change llnk lengths to above table.
Change "channel insertion loss" columns to : 2.33, 2.53, 3.37, and 3.56.
Change "link power penalties" column to: 4.30, 4.31, 4.10, and 3.59.
Change "unallocated margin " column to: 0.88, 0.66, 0.02, and 0.34.

1000BASE-LX
---

In table 38-6, introduce bandwidth and link length cells.

In table 38-8, add additional line for "stressed receiver sensitivity", -13.9 dBm. Add a "stress ISI" line having 2.6 ps. Add notes a. and b. from conformance test document.

In table 38-9:
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change "channel insertion loss" columns to : 2.35, 2.35, and 2.35.
Change "link power penalties" column to: 3.50, 5.11, and 3.99.
Change "unallocated margin " column to: 1.65, 0.04, and 1.16.

In table 38-10, change the jitter budget as indicated in the attached foil.

In table 38-11:

| | Wavelength | 850 | 1300 | 850 | 1300 |
|---|---|---|---|---|---|
| Add the length cells in a new second line: | | 220, 275, | 550, | 500, 550, | 550 |
| Change channel attenuation numbers to: | | 2.33, 2.53, | 2.32, | 3.25, 3.42, | 2.32 |

In table 38-12:
Add new row showing second set of cells for 200/500 and 500/500 bandwidths.

In new subclause 38.6.11, remove table 1 since it has been incorporated into tables 38-4 and 38-8.

*Cl* **38** *SC* **38.11** *P* **38.14** *L* **51** # **115**

Geoff Thompson Bay Networks, Inc.

*Comment Type* **TR** *Comment Status* **A** *RESUBMIT*

Effective modal bandwidth and Differential Mode Delay are undefined terms that are of no use in purchasing fiber on the open market nor do they have any utility in terms of any established industry standard test method in characterizing the installed base of multi-mode fiber.

However, it seems that these are critical factors in establishing the suitability of particular fibers for use with Gigabit Ethernet

*SuggestedRemedy*

Provide a convincing case for the position that no new parameters are need to characterize multi-mode fiber for laser launched systems or establish specifications and test methods for multi-mode fiber that characterize their performance in laser launched systems of the type being specified by P802.3z

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

The changes to D4.1 to incorporate these ranges as defined by the link model are:

1000BASE-SX
---

In table 38-2, introduce bandwidth and link length cells.

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

In table 38-5:
The power budget is increased from 7.0 to 7.5 dB.
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change llnk lengths to above table.
Change "channel insertion loss" columns to : 2.33, 2.53, 3.37, and 3.56.
Change "link power penalties" column to: 4.30, 4.31, 4.10, and 3.59.
Change "unallocated margin " column to: 0.88, 0.66, 0.02, and 0.34.

1000BASE-LX
---

In table 38-6, introduce bandwidth and link length cells.

In table 38-8, add additional line for "stressed receiver sensitivity", -13.9 dBm. Add a "stress ISI" line having 2.6 ps. Add notes a. and b. from conformance test document.

In table 38-9:
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change "channel insertion loss" columns to : 2.35, 2.35, and 2.35.
Change "link power penalties" column to: 3.50, 5.11, and 3.99.
Change "unallocated margin " column to: 1.65, 0.04, and 1.16.

In table 38-10, change the jitter budget as indicated in the attached foil.

In table 38-11:

| | Wavelength | 850 | 1300 | 850 | 1300 |
|---|---|---|---|---|---|
| Add the length cells in a new second line: | | 220, 275, | 550, | 500, 550, | 550 |
| Change channel attenuation numbers to: | | 2.33, 2.53, | 2.32, | 3.25, 3.42, | 2.32 |

In table 38-12:
Add new row showing second set of cells for 200/500 and 500/500 bandwidths.

In new subclause 38.6.11, remove table 1 since it has been incorporated into tables 38-4 and 38-8.

*Cl* **38** *SC* **38.11.2** *P* **38.15** *L* **31** # **62**

Joe Gwinn Raytheon

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

I agree that using "connection" is clearer than "connector" here and related places, as what has the loss being specified is a mated pair of connectors, but think we don't quite drive the nail home.

*SuggestedRemedy*

Add a sentence saying that the loss is specified for a connection consisting in all cases of a mated pair of connectors, the SC plug and SC recepticle.

*Proposed Response* *Response Status* **C**

ACCEPT.

Add a sentence at line 32 stating: "The insertion loss is specified for a connection consisting of a mated pair of connectors including a SC plug and SC recepticle.

*Cl* **38** *SC* **38.11.2.4** *P* **38.17** *L* **25-34** # **66**

Brad Booth Jato Technologies

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

Table 38-13 missing vertical lines on the ends

*SuggestedRemedy*

add the vertical lines on the edges of Table 38-13

*Proposed Response* *Response Status* **C**

ACCEPT.

add the vertical lines on the edges of Table 38-13

*Cl* **38** *SC* **38.2.4** *P* **38.4** *L* **36** # **87**

Jonathan Thatcher IBM -- Rochester, MN

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

Subject: P(sub:input)Receiver
---

The variable P(sub:input,) Receiver is not easily understood for one not conversent in the history of the standard.

*SuggestedRemedy*

Perhaps the phrase "Average receive power" as used in table 38-4 should be used.

*Proposed Response* *Response Status* **C**

ACCEPT.

Replace variable "P(sub:input,) Receive" with "Input_optical_power" as used in table 38-1 three places

Replace "Receive power)" with "Average Receive power" as used in table 38-1 in three places, and in section 38.2.4

*Cl* **38** *SC* **38.2.4** *P* **38.4** *L* **39** # **59**

Joe Gwinn Raytheon

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

Note b to table 38-1 largely answers my previous TR about the need for AC signal detect. However, I fear that the present note is too telegraphic for non-participants to understand.

*SuggestedRemedy*

Add a sentence saying that the signal detect function should depend on the amplitude of the 8B/10B modulation, and not directly on the average optical flux received, so that receivers will not be fooled into declaring SD=OK for unmodulated light.

*Proposed Response* *Response Status* **C**

ACCEPT In Principal.

Add a sentence at line 40, stating: "The SIGNAL DETECT values should respond to the amplitude of the 8B/10B modulation signal and not respond directly to the average optical power received".

*Cl* **38** *SC* **38.3, 38.5** *P* **Multiple** *L* **Multiple** # **116**

Ray Lin Ascend Communicatio

*Comment Type* **TR** *Comment Status* **A** *RESUBMIT*

The remedy proposed by the Modal Bandwidth Task Group (MBI) to mitigate what is characterized as the differential mode delay (DMD) addressed in each of the P802.3z Draft 3.2 comments listed below has not eliminated the additional jitter contribution to ensure 1000BASE-SX link lengths as specified in P802.3z Draft 4 , Table 38-2.

P802.3z Draft 3.2 DMD comments:

1. Geoff Thompson, Bay Networks, Comment #187
2. Howie Johnson , Signal Consulting, Comment #186
3. Ray Lin, Digital Equipment Corp., Comment #88
4. Paul Kolesar, Lucent Technologies, Comment #86

Based on jitter measurements presented to the Modal Bandwidth Task Group (MBI) by Digital Equipment Corporation and Hewlett-Packard it is clear that the addition of the Coupled Power Ratio (CPR) specification has not proven sufficient to mitigate what is characterized as the differential mode delay (DMD) problem for 1000BASE-SX links.
The presentations show jitter in access of the 96 ps (TP2 to TP3) using transmitters that have been selected to exhibit a CPR over the range of 9<CPR<29 dB as specified in P802.3z Draft 4, when measured with a common receiver.

*SuggestedRemedy*

Intent--

I will borrow Geoff Thompsons words extracted from his TR to preamble the intent of the proposed remedy which is to address 1000BASE-SX interoperabilty. I quote Geoff here.

"The success of 802.3 as a standard is based on the ability for customers to purchase or utilize existing system components that meet the specifications in the standard and plug them together and have them work in a predictable reliable and useful manner. This includes being able to replace any one component with an equivalent compliant component from another manufacturer and resume predictable reliable and useful operation. The discussions surrounding the operation of multi-mode fiber links with laser based transceivers have not assured me that we will meet this level of quality and reliability with the current set of specifications.

Goeffs Suggested Rem.

Provide sufficient data and revisions to specifications to provide reliable system elements for multi-mode transceivers and fiber. Revise specifications so that fiber, transceiver and any added launch conditioning devices or methods assure reliable operation under specification worst case operating conditions. Such conditions will be reviewed by 802.3 for their adequacy against the 5 Criteria and the project objectives."

End of quote.

Ray Lin Remedy--

1. Change jitter contribution allocated to TP3 (but recognized as derivative of the fiber, receiver and transmitter) in subclause 38.5, Table 38-10 to values that shall not exceed (ffs) of DJ and ( ffs) RJ when measured per the Jitter Characterization Test Method proposed to Fiber Channel.

2. Modify transceivers specifications in subclause 38.3 to guarantee specified jitter at reference test points by including specifications for transmitter Mode Power Distribution (ffs), receiver jitter tolerance (ffs), and mode conditioning patch cords (ffs).

ffs = for further study.

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

The changes to D4.1 to incorporate these ranges as defined by the link model are:

1000BASE-SX

---

In table 38-2, introduce bandwidth and link length cells.

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

In table 38-5:
The power budget is increased from 7.0 to 7.5 dB.
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change llnk lengths to above table.
Change "channel insertion loss" columns to : 2.33, 2.53, 3.37, and 3.56.
Change "link power penalties" column to: 4.30, 4.31, 4.10, and 3.59.
Change "unallocated margin " column to: 0.88, 0.66, 0.02, and 0.34.

1000BASE-LX

---

In table 38-6, introduce bandwidth and link length cells.

In table 38-8, add additional line for "stressed receiver sensitivity", -13.9 dBm. Add a "stress ISI" line having 2.6 ps. Add notes a. and b. from conformance test document.

In table 38-9:
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change "channel insertion loss" columns to : 2.35, 2.35, and 2.35.
Change "link power penalties" column to: 3.50, 5.11, and 3.99.
Change "unallocated margin " column to: 1.65, 0.04, and 1.16.

In table 38-10, change the jitter budget as indicated in the attached foil.

In table 38-11:

| Wavelength | 850 | 1300 | 850 | 1300 |
|---|---|---|---|---|
| Add the length cells in a new second line: | 220, 275, | 550, | 500, 550, | 550 |
| Change channel attenuation numbers to: | 2.33, 2.53, | 2.32, | 3.25, 3.42, | 2.32 |

In table 38-12:
Add new row showing second set of cells for 200/500 and 500/500 bandwidths.

In new subclause 38.6.11, remove table 1 since it has been incorporated into tables 38-4 and 38-8.

*Cl* **38** *SC* **38.3.1** *P* **38.5** *L* **25-55** # **117**

Mark Nowell Hewlett-Packard

*Comment Type* **TR** *Comment Status* **A** *RESUBMIT*

The intention of having a transmitter coupled power ratio (CPR) specification was to mitigate the additional jitter induced by certain laser/fiber combinations. Results presented to the
Modal Bandwidth Investigation task group (MBI), by both Hewlett-Packard and Digital Equipment Corporation, have shown that for 1000BASE-SX a CPR specification is not sufficient to ensure the jitter budget in Table 38-10 is met.

*SuggestedRemedy*

Modify table 38-3 "1000BASE-SX transmit characteristics" to include another specification which ensures sufficient launch conditioning to mitigate any DMD-induced excess jitter breaking the jitter budget. This may also require adjusting the values in the jitter budget (Table 38-10).

The form of the additional transmitter specification is not clear as there has been no proposal made to the committee. Candidates for this specification are the mode power distribution (MPD) but no results have been presented.

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

The changes to D4.1 to incorporate these ranges as defined by the link model are:

1000BASE-SX
---

In table 38-2, introduce bandwidth and link length cells.

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

In table 38-5:
The power budget is increased from 7.0 to 7.5 dB.
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change llnk lengths to above table.
Change "channel insertion loss" columns to : 2.33, 2.53, 3.37, and 3.56.
Change "link power penalties" column to: 4.30, 4.31, 4.10, and 3.59.
Change "unallocated margin " column to: 0.88, 0.66, 0.02, and 0.34.

1000BASE-LX
---

In table 38-6, introduce bandwidth and link length cells.

In table 38-8, add additional line for "stressed receiver sensitivity", -13.9 dBm. Add a "stress ISI" line having 2.6 ps. Add notes a. and b. from conformance test document.

In table 38-9:
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change "channel insertion loss" columns to : 2.35, 2.35, and 2.35.
Change "link power penalties" column to: 3.50, 5.11, and 3.99.
Change "unallocated margin " column to: 1.65, 0.04, and 1.16.

In table 38-10, change the jitter budget as indicated in the attached foil.

In table 38-11:

| | Wavelength | 850 | 1300 | 850 | 1300 |
|---|---|---|---|---|---|
| Add the length cells in a new second line: | | 220, 275, | 550, | 500, 550, | 550 |
| Change channel attenuation numbers to: | | 2.33, 2.53, | 2.32, | 3.25, 3.42, | 2.32 |

In table 38-12:
Add new row showing second set of cells for 200/500 and 500/500 bandwidths.

In new subclause 38.6.11, remove table 1 since it has been incorporated into tables 38-4 and 38-8.

*Cl* **38** *SC* **38.3.1** *P* **38.5** *L* **45** # **47**

Mike Dudek Cielo Communications

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

The test procedure for RIN in appendix 38A, calls out measurement with a 12dB return loss and defines this as RIN12. It is not totally clear that this measurement is to be done with a 12dB return loss.

*SuggestedRemedy*

Change "RIN" on line 45 table 38-3 to "RIN12".

*Proposed Response* *Response Status* **C**

ACCEPT in Principal.

Add statement on page 38-11, line 6 which states:
"RIN is reffered to as RIN12 in the referenced document."

*Cl* **38** *SC* **38.3.1** *P* **38.5** *L* **46** # **75**

David Cunningham Hewlett-Packard

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

In table 38-3 the CPR values are not correct.

*SuggestedRemedy*

For 62.5 MMF change 29 to 50 and for 50 MMF 24 to 50.

*Proposed Response* *Response Status* **C**

ACCEPT.

In table 38-3, change the CPR values to "9" for 62.5 MMF and for 50 MMF, and change the description to "Coupled Power Ratio (CPR) (min)"

*Cl* **38** *SC* **38.3.1** *P* **38.5** *L* **51** # **20**

Dan Brown AMP

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

the sentence "During all conditions when the PMA is powered the AC signal..." needs a comma.

*SuggestedRemedy*

change to "During all conditions when the PMA is powered, the AC signal..."

*Proposed Response* *Response Status* **C**

ACCEPT.

On page 38.5, line 51, add comma as indicated: change to "During all conditions when the PMA is powered, the AC signal..."

*Cl* **38** *SC* **38.3.1** *P* **38.6** *L* **1-15** # **118**

Thomas Dineen LSI Logic, 1551 McCar

*Comment Type* **TR** *Comment Status* **A** *RESUBMIT*

From user's prospective the subclause fails to provide a sufficient description of the "Mode conditioned hybrid patch cord". Detailed information on the identification, use, and installation should be required by the standard.

1) Each end of the patch cord should be labeled as per the intended connection.
a) "To Equipment".
b) "To Building".

2) The patch cord should have an indelible label attached identifying it as an "802.3z Gigabit Ethernet Hybrid Patch Cord". Information on the intended application should be provided. A warning should be included that this hybrid patch cord is NOT usable for normal single mode or multimode patch cord applications.

This labeling should serve to produce a easy to use and install hybrid patch cord product.

*SuggestedRemedy*

At the top of page 38.6, subclause 38.3.1 add the following descriptive text at line 15:

"Mode conditioned hybrid patch cord assemblies shall be manufactured to include the following characteristics and product labeling:

1) Each end of the hybrid patch cord assembly shall be labeled to indicate the required connection:
a) "To Equipment" label attached to the PMD MDI connector.
b) "To Building" label attached to the multimode cable plant connector.

2) The hybrid patch cord shall include an attached indelible label specifying the following:
a) "802.3z Gigabit Ethernet Hybrid Patch Cord."
b) "This product is intended to provide conditioned laser launch for 1000BASE-SX laser transceivers operating over multimode fiber plants."
c) "This product is not usable for normal patch cord applications."

*Proposed Response* *Response Status* **C**

ACCEPT.

Subclause 38.11.2.4 has been added to the clause 38.

38.11.2.4 Mode conditioning patch cord for MMF operation of 1000BASE-LX

This subclause specifies an example embodiment of a mode conditioner for 1000BASE-LX operation with MMF cable plant. The MMF cable plant should meet all of the specifications of 38.10. For 1000BASE-LX the mode conditioner consists of a singlemode fiber permanently coupled off-center to a graded index cable plant fiber. This example embodiment of a patch cord is not intended to exclude other physical implementations of offset launch mode conditioners. However, any implementation of offset launch mode

conditioner used for 1000BASE-LX shall meet the specifications of Table 38-13. The offset launch must be contained within the patch cord assembly.

Table 38-13 Offset launch mode conditioner specifications

| Description | 62.5 um MMF | 50 um MMF | Unit |
|---|---|---|---|
| Maximum insertion loss | 0.5 | 0.5 | dB |
| Coupled power ratio (CPR) | 28 < CPR < 40 | 12 < CPR < 20 | dB |
| Optical center offset between SMF and MMF | 17 < Offset < 23 | 10 < Offset < 16 | um |
| Angular offset (max) | 1 | 1 | degree |

Note: All patch cord connecting ferrules containing the singlemode-to-multimode offset launch shall have singlemode tolerances (IEC 61754-4 grade 1 ferrule).

Mode conditioners based on different physical mechanisms may be discovered in the future. These new mode conditioners are not excluded from use with 1000BASE-LX. However, the specifications of Table 38-13 are specific to the singlemode fiber offset launch mode conditioner and may not ensure that mode conditioners based on other physical mechanisms will have adequate performance for 1000BASE-LX.

The singlemode fiber used to manufacture the offset launch mode conditioner shall meet the requirements of 38.10. The multimode fiber used in the construction of the offset launch mode conditioner shall be of the same type as the cable plant over which 1000BASE-LX is to be operated. If the cable plant is 62.5 um MMF then the MMF used in the construction of the mode conditioner should be of type 62.5 um MMF. If the cable plant is of type 50 um MMF, then the MMF used in the construction of the mode conditioner should be of type 50 um MMF.

Figure 38-5 shows the preferred embodiment of the offset patch cord. This patch cord consists of duplex fibers represented by a singlemode-to-multimode offset launch fiber connected to the transmitter MDI and a second conventional cable plant graded index fiber connected to the receiver MDI. The preferred configuration is a plug-to-plug patch cord since it maximises the power budget margin of the 1000BASE-LX link. The single mode end of the patch cord shall be labelled "To equipment". The patch cord connected to the cable plant shall be labelled "To cable plant". The "strain relief boot" of the singlemode fiber connector plug shall be colored blue. The "strain relief boot" of all multimode fiber connector plugs shall be colored beige. The patch cord assembly is labelled "Offset Launch Mode Conditioning Patch Cord Assembly". Labelling identifies which size multimode fiber is used in the construction of the patchcord. The polarity of the SC duplex optical plug ensures that the singlemode fiber end is automatically aligned to the transmitter MDI.

---

*Cl* **38** *SC* **38.3.1** *P* **38.6** *L* **10** # **24**

Dan Brown AMP

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

The words "mode-conditioning" are hyphenated here, however in other sections of the document such as page 38.17 Line 16, no hyphen is used.

*SuggestedRemedy*

Make a global change to remove all hyphens from the terms "mode-conditioner" and "mode-conditioning".

*Proposed Response* *Response Status* **C**

ACCEPT.

Make a global change to remove all hyphens from the terms "mode-conditioner" and "mode-conditioning".

---

*Cl* **38** *SC* **38.3.1** *P* **38.6** *L* **18** # **79**

Steve Swanson Corning Inc.

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

The last sentence in the deleted text would appear to still apply to the SX case.

*SuggestedRemedy*

Add the following text: "Some sources may produce CL directly and thus not require the use of external mode conditioning patchcords.

*Proposed Response* *Response Status* **C**

ACCEPT in principal.

P 38.6, line 5 change "Conditioned launch (CL) produces" to "The CPR specification provides"

Remove note c from table 38-3, page 38.5, line 53.
Page 38.6, lines 10-14, Delete paragraph

*Cl* **38** *SC* **38.3.1** *P* **38.8** *L* **23** # **48**

Mike Dudek — Cielo Communications

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

The test procedure for RIN in appendix 38A, calls out measurement with a 12dB return loss and defines this as RIN12. It is not totally clear that this measurement is to be done with a 12dB return loss.

*SuggestedRemedy*

Change "RIN" on line 23 table 38-7 to "RIN12".

*Proposed Response* *Response Status* **C**

ACCEPT in Principal.

Add statement on page 38-11, line 6 which states:
"RIN is reffered to as RIN12 in the referenced document."

*Cl* **38** *SC* **38.3.2** *P* **38.6** *L* **20** # **119**

Paul Kolesar — Lucent Technologies

*Comment Type* **TR** *Comment Status* **A** *RESUBMIT*

Receiver bandwidth specification insufficient for interoperability.

*SuggestedRemedy*

Add a minimum receiver bandwidth must be specified. Suggest using 1000 MHz as the 3-dB electical bandwidth minimum.

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

Now that there is a defined receiver bandwidth measurement method and the low end of the receiver upper cutoff range is included in the stressed receiver sensitivity conformance test, make the following change:

On page 38.6, line 25, change "should" to "shall" be less than 1500 MHz, as defined in ??????.

*Cl* **38** *SC* **38.3.2** *P* **38.6** *L* **25** # **21**

Dan Brown — AMP

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

the phrase "receiver upper electrical 3dB bandwidth" is not a proper electrical engineering term for what is really being refered to here.

*SuggestedRemedy*

change to "receiver upper 3dB electrical cutoff frequency"

*Proposed Response* *Response Status* **C**

ACCEPT.

On page 38.6, line 25, change "bandwidth" to "cutoff frequencyl"

*Cl* **38** *SC* **38.3.2** *P* **38.6** *L* **37** # **88**

Jonathan Thatcher — IBM -- Rochester, MN

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

Subject: Average receive power (min)
---

The variable "Average receive power (min)" is misleading. According to the calculations used to create the spefications for clause 38, the minimum receiver power will never get anywhere near -17 dBm.

*SuggestedRemedy*

This should be called "Receive sensitivity (min)".
Another line, perhaps, should be added with the "Average receive power (min)" of -12.5 dBm.

Same should be done for longwave.

Appropriate corrections should be made for Signal Detect (which is currently too restrictive due to the fact that the receiver will never see anything approaching -17 dBm in normal operation.

*Proposed Response* *Response Status* **C**

REJECT.

This comment was elevated from "E" to "T" status.

*Cl* **38** *SC* **38.3.2=44 117 9222928** *P* **38.6** *L* **20** # **120**

David Cunningham Hewlett-Packard

*Comment Type* **TR** *Comment Status* **A** *RESUBMIT*

In sections 38.3.2 and 38.4.2 there is a statement "To limit jitter, the receiver upper 3 dB bandwidth should be less than 1500 MHz." The lower 3 dB electrical bandwidth is not defined. To limit jitter the lower 3 dB low pass cut-off frequency of the receiver should be defined. The optical link model used by IEEE 802.3z assumed that the lower 3 dB electrical, low pass, cut-off frequency of the receiver was 1000 MHz.

Not specifying both the receiver lowest and highest 3 dB electrical, low pass, cut-off frequencies will cause ISI, jitter and lead to inter-operation problems.

This issue is made worse because there is no test to measure the bandwidth of a digital integrated receiver.

*SuggestedRemedy*

As a minimum change the statement in section 38.3.2 and 38.4.2 to read, "To limit intersymbol interference and jitter, the receiver lower 3 dB electrical, low pass, cut-off frequency should be greater than 1000 MHz and less than 1500 MHz".

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

Now that there is a defined receiver bandwidth measurement method and the low end of the receiver upper cutoff range is included in the stressed receiver sensitivity conformance test, make the following changes:

1. on page 38.6, line 25, change "should" to "shall" be less than 1500 MHz.
2. on page 38.9, line 1, change "should" to "shall" be less than 1500 MHz.

Add two PICs items as appropriate.

*Cl* **38** *SC* **38.3.3** *P* **38.7** *L* **1** # **86**

Jonathan Thatcher IBM -- Rochester, MN

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

Subject: SW Power Penalties Need Correction
---

>From work done by the MBI group during the February time frame it is clear that the calculations for power penalties (those used by all other standards up until this point) have not included a necessary power penalty due to random jitter. The magnitude of this penalty is dependent upon the amount of DJ at TP2; the bandwidth rolloff of the fiber; fiber distance; and the launch conditions (including rise/fall time; wavelength; etc).

The power budget with all the necessary trade offs will have to be readdressed and corrected.

*SuggestedRemedy*

Reduce the jitter allocation to the transitter and/or the fiber.
OR
Reduce the link length
OR
Increase the effective bandwidth
OR
Some or all of the above, as necessary.

If the link lengths are further reduced, support for multiple bandwidths of fiber should be put back into the standard.

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

The changes to D4.1 to incorporate these ranges as defined by the link model are:

1000BASE-SX
---

In table 38-2, introduce bandwidth and link length cells.

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

In table 38-5:
The power budget is increased from 7.0 to 7.5 dB.
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change llnk lengths to above table.
Change "channel insertion loss" columns to : 2.33, 2.53, 3.37, and 3.56.

Change "link power penalties" column to: 4.30, 4.31, 4.10, and 3.59.
Change "unallocated margin " column to: 0.88, 0.66, 0.02, and 0.34.

1000BASE-LX
---

In table 38-6, introduce bandwidth and link length cells.

In table 38-8, add additional line for "stressed receiver sensitivity", -13.9 dBm. Add a "stress ISI" line having 2.6 ps. Add notes a. and b. from conformance test document.

In table 38-9:
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change "channel insertion loss" columns to : 2.35, 2.35, and 2.35.
Change "link power penalties" column to: 3.50, 5.11, and 3.99.
Change "unallocated margin " column to: 1.65, 0.04, and 1.16.

In table 38-10, change the jitter budget as indicated in the attached foil.

In table 38-11:
Wavelength 850 1300 850 1300
Add the length cells in a new second line: 220, 275, 550, 500, 550, 550
Change channel attenuation numbers to: 2.33, 2.53, 2.32, 3.25, 3.42, 2.32

In table 38-12:
Add new row showing second set of cells for 200/500 and 500/500 bandwidths.

In new subclause 38.6.11, remove table 1 since it has been incorporated into tables 38-4 and 38-8.

---

*Cl* **38** *SC* **38.3.3** *P* **38.7** *L* **11** # **51**

Del Hanson Hewlett-Packard Co

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

In table 38-5, the channel insertion loss and unallocated margin were not recalculated after the 62MMF attenuation was changed from 3.5 dB/km to 3.75/km in table 38-12.

*SuggestedRemedy*

With current 3.75/km in table 38-12, change following parameters in 62MMF column in table 38-5: change 2.47 dB to 2.54 dB, and change unallocated margin in link from 0.12 dB to 0.05 dB.

*Proposed Response* *Response Status* **C**

ACCEPT.

Change the following parameters in 62MMF column in table 38-5:

change 2.47 dB to 2.54 dB, and change unallocated margin in link from 0.12 dB to 0.05 dB.

However, subsequent changes during this meeting superceed making these changes to the document.

---

*Cl* **38** *SC* **38.4** *P* **38.7** *L* **1** # **89**

Jonathan Thatcher IBM -- Rochester, MN

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

"Table 38-5 Worst case 1000BASE-SX link power budget and penalties"

*SuggestedRemedy*

Change to:
"Table 38-5 Worst case 1000BASE-LX link power budget and penalties"

*Proposed Response* *Response Status* **C**

REJECT.

Descriptive title properly references SX case

---

*Cl* **38** *SC* **38.4** *P* **38.7** *L* **11** # **80**

Steve Swanson Corning Inc.

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

The channel insertion loss for 50 um MMF and the unallocated margin in Table 38-5 appear incorrect.

*SuggestedRemedy*

Change the channel insertion loss for 50 um from 3.47 to 3.34 dB

Change the unallocated margin for 50 um from 0.04 to 0.17 dB

*Proposed Response* *Response Status* **C**

REJECT.

The numbers in table 38-5 for 50MMF are correct.

*Cl* **38** *SC* **38.4.1** *P* **38.8** *L* **23** # **49**

Mike Dudek — Cielo Communications

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

With the recent changes to output power in single mode fiber there is a large unallocated margin in the link power budget. The RIN12 specification is much tighter than is necessary for single mode operation.

*SuggestedRemedy*

Change the single mode column specification for RIN on line 23 table 38-7 from"-120" to "-116".
Also change page 38.9 the single mode column on table 38-9 line 34 (Link power penalties) from "1.20" to "1.30" and the unallocated margin for the single mode column on line 35 from "3.26" to "3.16"

*Proposed Response* *Response Status* **U**

REJECT.

1. It was established when the -120 dB/Hz specification was set that vendors could easily meet this specification.

2. Even if there is more than adequate margin in the LX SMF link to relax the RIN specification, this change would impact the margin for the MMF cases where the ISI penalty is critical to the stressed receiver conformance test.

Motion to adopt this response 9-mar-98 8:28 pm: Y:11 N:3 A:8

*Cl* **38** *SC* **38.4.1** *P* **38.8** *L* **30** # **60**

Joe Gwinn — Raytheon

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

Note b to table 38-7 fails to fully drive the nail home on why one should avoid radial overfilled launches.

*SuggestedRemedy*

Add a sentence saying that the point is to reduce the fraction of the total optical flux carried in mode groups that pass through the centerline defects found in all practical multimode fiber.

*Proposed Response* *Response Status* **U**

REJECT.

Given the use of offset jumpers, Radial Over-Filled Launches are no longer an issue for 1000BASE-LX on MMF, thus the note can be deleted.

Delete note b under table 38-7.

[ Editor's note: During the PMD meeting, there were no objections to this response ]

[ Editor's note: By deleting the entire note b in table 38-7, Mr. Gwinn's comment has been rendered moot. However, a similar note exists in the SX table 38-3 which was not specifically called out in Mr. Gwinn's comment. We are recirculating this comment at this time to ensure that this issue is widely understood. Regarding Mr. Gwinn's proposed changes, it is the policy of 802.3z to be definitive in our standards, but not to make unnecessary tutorial statements. The proposed changes would have been tutorial in nature. ]

*Cl* **38** *SC* **38.4.1** *P* **38.8** *L* **37-47** # **23**

Dan Brown AMP

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

Line 37 says "A CL may be produced using...". Line 46 says "Some sources may produce CL directly and thus do not require the use of external mode conditioning patch cords"

Both of these statements are inconsistent with Table 38-7 footnote 'a' which says "...fulfillment of this standard requires a SMF offset-launch mode conditioning patch cord..."

*SuggestedRemedy*

Line 38 change "A CL may be produced..." to "A CL shall be produced..."

Remove lines 44-47. To change them properly would make them redundant with Table 38-7 footnote 'a'.

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

Replace the sentence in line 38 on page 38.8 with:

"A CL is produced by using mode-conditioning hybrid patch cords inserted at both ends of a full duplex link between the optical PMD MDI and the cable plant."

Delete lines 44-47.

Motion to adopt this response, 9-Mar-98 8:52pm: Y: 15 N: 0 A: 13

*Cl* **38** *SC* **38.4.1** *P* **38.8** *L* **38** # **90**

Jonathan Thatcher IBM -- Rochester, MN

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

Subject: Inconsistent requirements for CL jumper

---

The phrase: "A CL may be produced by using a mode-conditioning hybrid patch cord inserted at one or both transmit ends of a full duplex link between the optical PMD MDI and the cable plant," is not consistent with the text 38.4.1 on page 38.7 or in the footnote "a" for table 38-7 on page 38.8.

*SuggestedRemedy*

Replace with:

"A CL is produced by using mode-conditioning hybrid patch cords inserted at both transmit ends of a full duplex link between the optical PMD MDI and the cable plant."

*Proposed Response* *Response Status* **C**

ACCEPT.

Replace the sentence in line 38 on page 38.8 with:

"A CL is produced by using mode-conditioning hybrid patch cords inserted at both ends of a full duplex link between the optical PMD MDI and the cable plant."

Delete lines 44-47.

*Cl* **38** *SC* **38.4.1** *P* **38.8** *L* **46** # **91**

Jonathan Thatcher IBM -- Rochester, MN

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

Subject: Inconsistent requirements for CL jumper

---

The phrase: "Some sources may produce CL directly and thus not require the use of external mode-condition-ing patch cords." is not consistent with the text 38.4.1 on page 38.7 or in the footnote "a" for table 38-7 on page 38.8.

*SuggestedRemedy*

Remove text

*Proposed Response* *Response Status* **C**

ACCEPT.

See response to comment 23.

*Cl* **38** *SC* **38.4.1** *P* **38.8** *L* **46** # **81**

Steve Swanson Corning Inc.

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

The last sentence, which may apply to SX but does not apply to LX.

*SuggestedRemedy*

Delete the last sentence "Some sources may produce CL directly and thus not require the use of external mode-conditioning patch cords."

*Proposed Response* *Response Status* **C**

ACCEPT.

As a result of resolving comments 23 and 90, this sentence is deleted.

*Cl* **38** *SC* **38.4.2** *P* **38.8** *L* **38** # **121**

Paul Kolesar Lucent Technologies

*Comment Type* **TR** *Comment Status* **A** *RESUBMIT*

Receiver bandwidth specification insufficient for interoperability.

*SuggestedRemedy*

Add a minimum receiver bandwidth must be specified. Suggest using 1000 MHz as the 3-dB electical bandwidth minimum.

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

Now that there is a defined receiver bandwidth measurement method and the low end of the receiver upper cutoff range is included in the stressed receiver sensitivity conformanc test, make the following change:

On page 38.9, line 1, change "should" to "shall" be less than 1500 MHz.

*Cl* **38** *SC* **38.4.2** *P* **38.9** *L* **1** # **22**

Dan Brown AMP

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

the phrase "receiver upper electrical 3dB bandwidth" is not a proper electrical engineering term for what is really being refered to here.

*SuggestedRemedy*

change to "receiver upper 3dB electrical cutoff frequency"

*Proposed Response* *Response Status* **C**

ACCEPT.

On page 38.9, line 1, change "bandwidth" to "cutoff frequency"

*Cl* **38** *SC* **38.4.3** *P* **38.9** *L* **23** # **85**

Jonathan Thatcher IBM -- Rochester, MN

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

Subject: LW Power Penalties Need Correction
---

*** JT Note: This is same comment as for subclause 38.3.3 for SW ***

>From work done by the MBI group during the February time frame it is clear that the calculations for power penalties (those used by all other standards up until this point) have not included a necessary power penalty due to random jitter. The magnitude of this penalty is dependent upon the amount of DJ at TP2; the bandwidth rolloff of the fiber; fiber distance; and the launch conditions (including rise/fall time; wavelength; etc).

The power budget with all the necessary trade offs will have to be readdressed and corrected.

*SuggestedRemedy*

Reduce the jitter allocation to the transitter and/or the fiber.
OR
Reduce the link length
OR
Increase the effective bandwidth of the link
OR
Some or all of the above, as necessary.

If the link lengths are further reduced, support for multiple bandwidths of fiber should be put back into the standard.

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

The changes to D4.1 to incorporate these ranges as defined by the link model are:

1000BASE-SX
---
In table 38-2, introduce bandwidth and link length cells.

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

In table 38-5:
The power budget is increased from 7.0 to 7.5 dB.
Introduce a second line showing the modal bandwidth cases.

Modify the links lengths in accordance with the above cells.
Change llnk lengths to above table.
Change "channel insertion loss" columns to : 2.33, 2.53, 3.37, and 3.56.
Change "link power penalties" column to: 4.30, 4.31, 4.10, and 3.59.
Change "unallocated margin " column to: 0.88, 0.66, 0.02, and 0.34.

1000BASE-LX
---

In table 38-6, introduce bandwidth and link length cells.

In table 38-8, add additional line for "stressed receiver sensitivity", -13.9 dBm. Add a "stress ISI" line having 2.6 ps. Add notes a. and b. from conformance test document.

In table 38-9:
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change "channel insertion loss" columns to : 2.35, 2.35, and 2.35.
Change "link power penalties" column to: 3.50, 5.11, and 3.99.
Change "unallocated margin " column to: 1.65, 0.04, and 1.16.

In table 38-10, change the jitter budget as indicated in the attached foil.

In table 38-11:

| Wavelength | 850 | 1300 | 850 | 1300 |
|---|---|---|---|---|
| Add the length cells in a new second line: | 220, 275, | 550, | 500, 550, | 550 |
| Change channel attenuation numbers to: | 2.33, 2.53, | 2.32, | 3.25, 3.42, | 2.32 |

In table 38-12:
Add new row showing second set of cells for 200/500 and 500/500 bandwidths.

In new subclause 38.6.11, remove table 1 since it has been incorporated into tables 38-4 and 38-8.

---

*Cl* **38** *SC* **38.4.3** *P* **38.9** *L* **29** # **57**

Del Hanson — Hewlett-Packard Co.

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

The LX SMF power budget has been increased from 5.5 dB to 8.0 dB to be compatible with MMF launched power specifications with an external SMF offset launch patch cord. This increased power budget can be used to extend the SMF link length from 3 km to 5 km with adequate margins.

*SuggestedRemedy*

On page 38.9, in table 38-9 10 um SMF column: change 3000 to 5000, change 3.54 to 4.57, change 1.20 to 2.43, change 3.26 to 1.00.

On page 38.15, in table 38-11 10 um SMF column: change 3.5 to 4.5.

*Proposed Response* *Response Status* **C**

ACCEPT.

On page 38.9, in table 38-9 10 um SMF column: change 3000 to 5000, change 3.54 to 4.57, change 1.20 to 2.43, change 3.26 to 1.00.

On page 38.15, in table 38-11 10 um SMF column: change 3.5 to 4.5.

Motion to adopt this response 9-Mar-98, 9:07pm Y:21 N:0 A:5

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*Cl* **38** *SC* **38.4.3** *P* **38.9** *L* **32** # **46**

Del Hanson — Hewlett-Packard Co

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

In table 38-8, the link power penalty and unallocated margin in link were calculated in error for the 62MMF column in table 38-9.

*SuggestedRemedy*

In the 62MMF column in table 38-9: change 4.02 dB to 5.02 dB, and change unallocated margin in link from 1.43 dB to 0.13 dB.

*Proposed Response* *Response Status* **C**

ACCEPT.

Based on the comment to D4.1, in the 62MMF column in table 38-9: change 4.02 dB to 5.02 dB, and change unallocated margin in link from 1.43 dB to 0.13 dB.

However, subsequent changes during this meeting superceed making these changes to the document.

*Cl* **38** *SC* **38.4.3** *P* **38.9** *L* **37** # **77**

David Cunningham Hewlett-Packard

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

Note (a) on line 37 states that link penalties are for link budget calculations, that they are not required and are not meant to be tested. However, receiver conformance tests will include launching an optical test signal having "worst case" ISI into a receiver under test. The ISI for 1000BASE-LX on 62.5 MMF was based on a modal bandwidth of 325 MHz.km and for 50 MMF on a modal bandwidth of 375 MHz.km. Because of this the ISI penalties are unrealistically high.

An enormous amount of experimental and theoretical evidence has been presented to IEEE 802.3z proving that the OFL bandwidth of the cable can be achieved with conditioned launch. Also that the bandwidth is such that jitter will be within the jitter budget.

The above comments apply to the equivalent 1000BASE-SX sub-clause: 38.4 and table 38-5.

*SuggestedRemedy*

Use the OFL bandwidth for 62 MMF (500 MHz.km) and 50 MMF (400 MHz.km) for the calculation of ISI power penalties for 1000BASE-LX and use the reduced power penalty for receiver conformance testing. Modify table 38-9 on page 38.9 appropriately.

At the March Plenary the committee must discuss and decide what modal bandwidth to use for 1000BASE-SX as the basis for table 38-5, link length and the receiver conformance testing.

*Proposed Response* *Response Status* **C**

PROPOSED ACCEPT.

Note that the resolution of this comment affects the resolution of comment 82.
On page 38.9 in table 38-9,

In 62MMF column, change 5.02 (was 4.02) to 2.83, change 0.13 to 2.32

In 50MMF column, change 4.55 to 4.21, change 0.60 to 0.94

*Cl* **38** *SC* **38.4.3** *P* **38.9** *L* **46** # **82**

Steve Swanson Corning Inc.

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

The link power penalties and unallocated margin values for 62.5 um fiber are incorrect.

*SuggestedRemedy*

Change the link power penalty for 62.5 from 4.02 to 5.02 dB.

Change the unallocated margin for 62.5 from 1.43 to 0.13 dB.

*Proposed Response* *Response Status* **C**

PROPOSED ACCEPT.

In table 38-9:

Change the link power penalty for 62.5 from 4.02 to 5.02 dB.

Change the unallocated margin for 62.5 from 1.43 to 0.13 dB.

*Cl* **38** *SC* **38.4.3** *P* **38.9** *L* **46** # **83**

Steve Swanson Corning Inc.

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

The link power penalties and unallocated margin values for 62.5 um fiber are incorrect.

*SuggestedRemedy*

Change the link power penalty for 62.5 from 4.02 to 5.02 dB.

Change the unallocated margin for 62.5 from 1.43 to 0.13 dB.

*Proposed Response* *Response Status* **C**

PROPOSED ACCEPT.

In table 38-9:

Change the link power penalty for 62.5 from 4.02 to 5.02 dB.

Change the unallocated margin for 62.5 from 1.43 to 0.13 dB.

*Cl* **38** *SC* **38.5** *P* **38.10** *L* **11-16** # **93**

Jonathan Thatcher IBM -- Rochester, MN

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

Subject: Jitter allocation problems

---

The allocation of 96 ps of DJ from TP2 to TP3 in unreasonably high. While the reduction of DJ from TP3 to TP4 (especially with the new stress tests being created by the MBI group) from 184 to 120 ps is far too severe.

*SuggestedRemedy*

Allocate 46 ps of DJ to the fiber (TP2 to TP3) and 170 ps to the receiver (TP3 to TP4). Fine tune these numbers as required by the overall table calculations to get self consistency.

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

The changes to D4.1 to incorporate these ranges as defined by the link model are:

1000BASE-SX

---

In table 38-2, introduce bandwidth and link length cells.

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

In table 38-5:
The power budget is increased from 7.0 to 7.5 dB.
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change llnk lengths to above table.
Change "channel insertion loss" columns to : 2.33, 2.53, 3.37, and 3.56.
Change "link power penalties" column to: 4.30, 4.31, 4.10, and 3.59.
Change "unallocated margin " column to: 0.88, 0.66, 0.02, and 0.34.

1000BASE-LX

---

In table 38-6, introduce bandwidth and link length cells.

In table 38-8, add additional line for "stressed receiver sensitivity", -13.9 dBm. Add a "stress ISI" line having 2.6 ps. Add notes a. and b. from conformance test document.

In table 38-9:
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change "channel insertion loss" columns to : 2.35, 2.35, and 2.35.
Change "link power penalties" column to: 3.50, 5.11, and 3.99.
Change "unallocated margin " column to: 1.65, 0.04, and 1.16.

In table 38-10, change the jitter budget as indicated in the attached foil.

In table 38-11:

| Wavelength | 850 | 1300 | 850 | 1300 |
|---|---|---|---|---|
| Add the length cells in a new second line: | 220, 275, | 550, | 500, 550, | 550 |
| Change channel attenuation numbers to: | 2.33, 2.53, | 2.32, | 3.25, 3.42, | 2.32 |

In table 38-12:
Add new row showing second set of cells for 200/500 and 500/500 bandwidths.

In new subclause 38.6.11, remove table 1 since it has been incorporated into tables 38-4 and 38-8.

*Cl* **38** *SC* **38.5** *P* **38.10** *L* **11-16** # **92**

Jonathan Thatcher IBM -- Rochester, MN

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

Subject: Jitter allocation problems

---

The allocation of 96 ps of DJ from TP2 to TP3 in unreasonably high. While the reduction of DJ from TP3 to TP4 (especially with the new stress tests being created by the MBI group) from 184 to 120 ps is far too severe.

*SuggestedRemedy*

Allocate 46 ps of DJ to the fiber (TP2 to TP3) and 170 ps to the receiver (TP3 to TP4). Fine tune these numbers as required by the overall table calculations to get self consistency.

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

The changes to D4.1 to incorporate these ranges as defined by the link model are:

1000BASE-SX

---

In table 38-2, introduce bandwidth and link length cells.

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

In table 38-5:
The power budget is increased from 7.0 to 7.5 dB.
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change llnk lengths to above table.
Change "channel insertion loss" columns to : 2.33, 2.53, 3.37, and 3.56.
Change "link power penalties" column to: 4.30, 4.31, 4.10, and 3.59.
Change "unallocated margin " column to: 0.88, 0.66, 0.02, and 0.34.

1000BASE-LX

---

In table 38-6, introduce bandwidth and link length cells.

In table 38-8, add additional line for "stressed receiver sensitivity", -13.9 dBm. Add a "stress ISI" line having 2.6 ps. Add notes a. and b. from conformance test document.

In table 38-9:
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change "channel insertion loss" columns to : 2.35, 2.35, and 2.35.
Change "link power penalties" column to: 3.50, 5.11, and 3.99.
Change "unallocated margin " column to: 1.65, 0.04, and 1.16.

In table 38-10, change the jitter budget as indicated in the attached foil.

In table 38-11:

| Wavelength | 850 | 1300 | 850 | 1300 |
|---|---|---|---|---|
| Add the length cells in a new second line: | 220, 275, | 550, | 500, 550, | 550 |
| Change channel attenuation numbers to: | 2.33, 2.53, | 2.32, | 3.25, 3.42, | 2.32 |

In table 38-12:
Add new row showing second set of cells for 200/500 and 500/500 bandwidths.

In new subclause 38.6.11, remove table 1 since it has been incorporated into tables 38-4 and 38-8.

*Cl* **38** *SC* **38.5** *P* **38.10** *L* **22** # **78**

Del Hanson Hewlett-Packard

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

With the revised proposed jitter budget, the note under table 38-10 is no longer correct.

*SuggestedRemedy*

Remove the note on page 38.10, line 22, describing the identical jitter parameters at TP1 and TP4 for the optical PMD and 1000BASE-CX.

*Proposed Response* *Response Status* **C**

ACCEPT.

Remove the note on page 38.10, line 22, describing the identical jitter parameters at TP1 and TP4 for the optical PMD and 1000BASE-CX.

*Cl* **38** *SC* **38.5** *P* **38.9** *L* **39** # **122**

Paul Kolesar Lucent Technologies

*Comment Type* **TR** *Comment Status* **A** *RESUBMIT*

Jitter allocation from TP2 to TP3 is insufficient.

*SuggestedRemedy*

The jitter allocation from TP2 to TP3 is presently 96 ps, all of which is devoted only to randon jitter (RJ). This is unrealistic. The budget must be reallocated to provide workable jitter allocation to the fiber media. Historically, the jitter allocated to the fiber has been in the form of deterministic jitter (DJ), or more specifically data dependent jitter (DDJ) attributed to the limited bandwidth of the media. FDDI, for example, allocated 10% of the available budget to DDJ of the media. Based on that model, the DJ component from TP2 to TP3 should be at least 57 ps. The present 96 ps RJ equates to only 24 ps DJ.

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

The changes to D4.1 to incorporate these ranges as defined by the link model are:

1000BASE-SX
---

In table 38-2, introduce bandwidth and link length cells.

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

In table 38-5:
The power budget is increased from 7.0 to 7.5 dB.
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change llnk lengths to above table.
Change "channel insertion loss" columns to : 2.33, 2.53, 3.37, and 3.56.
Change "link power penalties" column to: 4.30, 4.31, 4.10, and 3.59.
Change "unallocated margin " column to: 0.88, 0.66, 0.02, and 0.34.

1000BASE-LX
---

In table 38-6, introduce bandwidth and link length cells.

In table 38-8, add additional line for "stressed receiver sensitivity", -13.9 dBm. Add a "stress ISI" line having 2.6 ps. Add notes a. and b. from conformance test document.

In table 38-9:
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change "channel insertion loss" columns to : 2.35, 2.35, and 2.35.
Change "link power penalties" column to: 3.50, 5.11, and 3.99.
Change "unallocated margin " column to: 1.65, 0.04, and 1.16.

In table 38-10, change the jitter budget as indicated in the attached foil.

In table 38-11:

| Wavelength | 850 | 1300 | 850 | 1300 |
|---|---|---|---|---|
| Add the length cells in a new second line: | 220, 275, | 550, | 500, 550, | 550 |
| Change channel attenuation numbers to: | 2.33, 2.53, | 2.32, | 3.25, 3.42, | 2.32 |

In table 38-12:
Add new row showing second set of cells for 200/500 and 500/500 bandwidths.

In new subclause 38.6.11, remove table 1 since it has been incorporated into tables 38-4 and 38-8.

*Cl* **38** *SC* **38.6.10** *P* **38.13** *L* **10** # **76**

David Cunningham Hewlett-Packard

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

The title of this sub-clause is wrong.

*SuggestedRemedy*

Change the title to " Coupled Power Ratio (CPR) measurements".

*Proposed Response* *Response Status* **C**

ACCEPT.

Change the title of subclause 38.6.10 to " Coupled Power Ratio (CPR) measurements".

*Cl* **38** *SC* **38.6.3** *P* **38.10** *L* **46** # **25**

Dan Brown AMP

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

"TIA/EIA-526-4" is an obsolete reference.

*SuggestedRemedy*

Replace with "TIA/EIA-526-4A" (published 8/20/97)

*Proposed Response* *Response Status* **C**

ACCEPT.

On page 38.10, line 46, replace"TIA/EIA-526-4" with "TIA/EIA-526-4A" and change corresponding PICs item.

*Cl* **38** *SC* **38.6.5** *P* **38.11** *L* **14** # **65**

Brad Booth — Jato Technologies

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

extra space

*SuggestedRemedy*

Change to "... respectively."

*Proposed Response* *Response Status* **C**

ACCEPT.

On page 38.11, line 14, remove space before the period, change to "... respectively."

*Cl* **38** *SC* **38.6.5** *P* **38.11** *L* **52** # **26**

Dan Brown — AMP

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

"CCITT G.957" is an incorrect reference.

*SuggestedRemedy*

Replace with "ITU-T G.957"

*Proposed Response* *Response Status* **C**

ACCEPT.

On page 38.11, line 52, change "CCITT G.957" to "ITU-T G.957"

*Cl* **38** *SC* **38.6.6** *P* **38.12** *L* **10** # **61**

Joe Gwinn — Raytheon

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

What change was made in line 9? There is a change bar, but no evidence of a change. It looks like the fix made to answer my prior TR saying that use of the equation should be mandated failed to make it into the text, in spite of the WG vote to accept the change.

*SuggestedRemedy*

In line 10, change the "should" to "shall".

*Proposed Response* *Response Status* **U**

REJECT.

[Editor's note: We have checked our records and believe Mr. Gwinn is mistaken in his understanding of the committee's previous action. The comment to which he refers is D4/#92. This comment was considered at our Feb. 2-3 interim meeting in Seattle, WA.]

The previous response to this same comment at the February interim meeting (comment D4/#92) was:

PROPOSED REJECT.
If the specified transmitter rise/fall times can be achieved using a filter to meet the transmit eye mask, there is no need to remove the response-time characteristic of the filter.

This PROPOSED REJECT response to #92 was accepted by acclaimation, as noted in the minutes of the PMD meeting.

[Editor's note: the effect of the previous committee action was to NOT accept Mr. Gwinn's comment. We cannot explain why he believes the committee voted to accept his change. No change was made to the document as a result of his comment. In light of Mr. Gwinn's new comment D4.1/#61 (this comment) the committee took up the issue once again at our plenary session Mar. 8-12 in Irvine, CA. After careful consideration, a motion was brought forth to re-affirm our previous response to Mr. Gwinn.
The results of that motion were: Y:24 N:0 A:2
The commentor has indicated verbally to the PMD chairman that he is satisfied with our response, however, to ensure that any lingering issues surrounding this comment are widely understood we are choosing to recirculate this comment at this time. ]

[Editor's note: In answer to the commenter's first question, there was no change made in line 9, the change bar at that location is merely an artifact of the FrameMaker DIFF utility used to produce this draft. ]

*Cl* **38** *SC* **38.6.7** *P* **38.12** *L* **18** # **52**

Del Hanson Hewlett-Packard Co.

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

The D4.1 document does not define a receiver conformance test signal which accounts for imposed jitter and ISI.

*SuggestedRemedy*

Add a new sub-clause defined by the MBI committee which defines the signal at TP3 for receiver Conformance Testing. This is in FrameMaker format and will be posted as a PDF file.

*Proposed Response* *Response Status* **C**

ACCEPT.

Add a new sub-clause 38.6.11defined by the MBI committee which defines the signal at TP3 for receiver Conformance Testing.

38.y.y becomes 38.6.12
In title of 38.6.12, "Bandwidth" becomes upper "cutoff frequency",
and other references to "bandwidth" become "upper cutoff frequency".

Caption of Figure 3 becomts "Test setup for reciever UCF measurement"

In line after figure3.1, "data stream" becomes "data stream consisting of the characters defined in 36A.5 which is"

end of step 4 "from the measured data" changes to "to the measured response from step 3".

Changes to 38.6.8 as noted in the FrameMaker file, with the following changes:
38.x.x becomes 38..

*Cl* **38** *SC* **38.6.7** *P* **38.12** *L* **23** # **53**

Del Hanson Hewlett-Packard Co.

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

The D4.1 document does not define receiver sensitivity with imposed jitter and ISI.

*SuggestedRemedy*

Add "The stressed receiver sensitivity shall be measured using the conformance test signal at TP3, as specified in 38.6.7 (new subclause inserted). After correcting for extinction ratio of the source, the stressed receiver sensitivity shall meet the conditions specified in table 38-4 for 1000BASE-SX and in table 38-8 for 1000BASE-LX.

Add new bottom line to table 38-4:"Stressed receiver sensitivity for 62.5 um MMF; -12.8 a,b; dBm.

Under table 38-4, add note a. Measured with TP3 test signal, defined in new sub-clause 38.6.7, for BER = 10^-12 at eye center.

Under table 38-4, add note b. Measured with transmitter signal that has 9 dB extinction ratio. If other extinction ratio is used, the receiver sensitivity is corrected for the extinction ratio penalty, as shown in Annex 38C.

Add new bottom line to table 38-8:"Stressed receiver sensitivity for 62.5 um MMF; -14.5 a,b; dBm.

Under table 38-8, add note a. Measured with TP3 test signal, defined in new sub-clause 38.6.7, for BER = 10^-12 at eye center.

Under table 38-8, add note b. Measured with transmitter signal that has 9 dB extinction ratio. If other extinction ratio is used, the receiver sensitivity is corrected for the extinction ratio penalty, as shown in Annex 38C.

*Proposed Response* *Response Status* **C**

ACCEPT.

Add "The stressed receiver sensitivity shall be measured using the conformance test signal at TP3, as specified in 38.6.11 (new subclause). After correcting for extinction ratio of the source, the stressed receiver sensitivity shall meet the conditions specified in table 38-4 for 1000BASE-SX and in table 38-8 for 1000BASE-LX.

Add new bottom line to table 38-4:"Stressed receiver sensitivity for 62.5 um MMF; -13.6 a,b; dBm.

Under table 38-4, add note a. Measured with TP3 test signal, defined in new sub-clause 38.6.11, for BER = 10^-12 at eye center.

Under table 38-4, add note b. Measured with transmitter signal that has 9 dB extinction ratio. If other extinction ratio is used, the receiver

sensitivity is corrected for the extinction ratio penalty.

Add new bottom line to table 38-8:"Stressed receiver sensitivity for 62.5 um MMF; -13.9; dBm.

Under table 38-8, add note a. Measured with TP3 test signal, defined in new sub-clause 38.6.11 for BER = 10^-12 at eye center.

Under table 38-8, add note b. Measured with transmitter signal that has 9 dB extinction ratio. If other extinction ratio is used, the receiver sensitivity is corrected for the extinction ratio penalty.

---

*Cl* **38** *SC* **38.6.7** *P* **38.12** *L* **24** # **55**

Del Hanson Hewlett-Packard Co.

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

The D4.1 document does not define a test method for measuring the receiver

*SuggestedRemedy*

Add new subclause 38.6.9 : Measurement of the receiver 3 dB electrical bandwidth.

(This is described in MBI reviewed conformance test document as clause 38.y.y)

*Proposed Response* *Response Status* **C**

ACCEPT.

Add new subclause 38.6.12 : Measurement of the receiver 3 dB electrical bandwidth.

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*Cl* **38** *SC* **38.6.8** *P* **38.12** *L* **26** # **56**

Del Hanson Hewlett-Packard Co.

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

The D4.1 document subclause 38.6.8 on total jitter measurements does not include an imposed conformance test signal.

*SuggestedRemedy*

To subclause 38.6.8 add:
Page 38.12, line 26, following the words "Total jitter", add at TP2.

Page 38.12, line 29, place a period after K28.5 and delete remainder of the sentence.

Page 38.12, line 31, insert the following paragraph: "Total jitter at TP4 shall be measured using the conformance test signal at TP3, as specified in (new) sub-clause 38.6.7. The optical power shall be set at -12.5 dBm for 1000BASE-SX and -13.9 dBm for 1000BASE-LX. This power level shall be corrected is the extinction ratio differs from the the specified extinction ratio (min) of 9 dB. The total jitter shall be measured according to the method in ANSI X3.230-1994 FC-PH Annex A, subclause A.4.2, Active output interface eye opening measurement (reproduced here as Annex 38A). Measurements shall be taken directly at TP4 without additional Bessel-Thompson filters.

*Proposed Response* *Response Status* **C**

ACCEPT.

To subclause 38.6.8 add:
Page 38.12, line 26, following the words "Total jitter", add at TP2.

Page 38.12, line 29, place a period after K28.5 and delete remainder of the sentence.

Page 38.12, line 31, insert the following paragraph: "Total jitter at TP4 shall be measured using the conformance test signal at TP3, as specified in (new) sub-clause 38.6.11. The optical power shall be set per table 38-4 for 1000BASE-SX and table 38-8 for 1000BASE-LX. This power level shall be corrected if the extinction ratio differs from the the specified extinction ratio (min) of 9 dB. The total jitter shall be measured according to the method in ANSI X3.230-1994 FC-PH Annex A, subclause A.4.2, Active output interface eye opening measurement (reproduced here as Annex 38A). Measurements shall be taken directly at TP4 without additional Bessel-Thompson filters.

*Cl* **38** *SC* **Table 38-12** *P* **38.16** *L* **24** # **84**

Steve Swanson Corning Inc.

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

There are currently three commonly specified "standardized" bandwidth cells:

160/500 for 62.5 um fiber (specified in TIA 568A)
200/500 for 62.5 um and 50 um fiber (currently specified in IS 11801)
500/500 for 50 um fiber (specified in Fibre Channel and proposed in TIA 568 and IS 11801)

In addition, the bulk of the embedded base of multimode fiber has been supplied to a 160/500 Mhz.km specification for 62.5 um fiber and 400/600 MHz.km for 50 um fiber, although 160/200 MHz.km and 400/400 MHz.km are also common. Since the installed base is not uniform and specifying only two bandwidth values limits the applicability of the standard, other values should be included.

*SuggestedRemedy*

Several remedies exist:

1. Add other values and associated link lengths to table 38.12

2. Add other values and associated link lengths as notes to table 38.12

3. Add an informative table or chart showing other bandwidths and link lengths to section or an annex.

4. Add a normative table or chart showing other bandwidths and link lengths to section 38 or an annex

*Proposed Response* *Response Status* **C**

ACCEPT In Principal

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

The changes to D4.1 to incorporate these ranges as defined by the link model are:

1000BASE-SX
---

In table 38-2, introduce bandwidth and link length cells.

In table 38-4, add additional line for "stressed receiver sensitivity", -13.0 dBm for 50MMF and -12.0 for 62MMF. Add a "stress ISI" line having 2.6 ps for 50 MMF and 2.20 ps for 62MMF. Add notes a. and b. from conformance test document.

In table 38-5:
The power budget is increased from 7.0 to 7.5 dB.
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change llnk lengths to above table.
Change "channel insertion loss" columns to : 2.33, 2.53, 3.37, and 3.56.
Change "link power penalties" column to: 4.30, 4.31, 4.10, and 3.59.
Change "unallocated margin " column to: 0.88, 0.66, 0.02, and 0.34.

1000BASE-LX
---

In table 38-6, introduce bandwidth and link length cells.

In table 38-8, add additional line for "stressed receiver sensitivity", -13.9 dBm. Add a "stress ISI" line having 2.6 ps. Add notes a. and b. from conformance test document.

In table 38-9:
Introduce a second line showing the modal bandwidth cases.
Modify the links lengths in accordance with the above cells.
Change "channel insertion loss" columns to : 2.35, 2.35, and 2.35.
Change "link power penalties" column to: 3.50, 5.11, and 3.99.
Change "unallocated margin " column to: 1.65, 0.04, and 1.16.

In table 38-10, change the jitter budget as indicated in the attached foil.

In table 38-11:

| Wavelength | 850 | 1300 | 850 | 1300 |
|---|---|---|---|---|
| Add the length cells in a new second line: | 220, 275, | 550, | 500, 550, | 550 |
| Change channel attenuation numbers to: | 2.33, 2.53, | 2.32, | 3.25, 3.42, | 2.32 |

In table 38-12:
Add new row showing second set of cells for 200/500 and 500/500 bandwidths.

In new subclause 38.6.11, remove table 1 since it has been incorporated into tables 38-4 and 38-8.

*Cl* **38A** *SC* *P* **38.26-31** *L* # **67**

Brad Booth — Jato Technologies

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

Annex page numbering is incorrect.

*SuggestedRemedy*

Change page 38.26 to 38A.1; change 38.27 to 38A.2; change 38.28 to 38A.3; change38.29 to 38A.4; change 38.30 to 38A.5; and change 38.31 to 38A.6.

*Proposed Response* *Response Status* **C**

REJECT.

This issue was reviewed as a comment in the D4 cycle. The current numbering is consistent with the document format.

*Cl* **38A** *SC* **38A** *P* **38.25** *L* **16** # **123**

Howie Johnson — Signal Consulting

*Comment Type* **TR** *Comment Status* **A** *RESUBMIT*

It's not clear to me that our standard benefits from the inclusion of this annex.

*SuggestedRemedy*

Let's either:
(1) please include in the annex a brief note at the beginning of each section explaining how the information in that section is used in clause 28, or
(2) delete the annex

*Proposed Response* *Response Status* **C**

ACCEPT IN PRINCIPLE.

Remove Annex 38A and all references to it.

It has been useful to retain the Fibre Channel Test Methods listed in Annex 38A in this standard for ease of reference while the MBI conformance tests were being completed. However, it is evident by several comments against 38A that the needed revisions and maintenance to make it consistent with this 802.3z standard now significantly out weighs the benefit of having this reference included beyond this point.

*Cl* **38A** *SC* **38A.4** *P* **38.29** *L* **14** # **27**

Dan Brown — AMP

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

RIN test procedure specifies use of a polarization rotator and a singlemode fiber. This part of the procedure is not appropriate for making multimode RIN measurements.

*SuggestedRemedy*

Add a note stating "For multi longitudinal mode lasers, the polarization rotator should be omitted. The singlemode fiber should be replaced with a multimode fiber."

*Proposed Response* *Response Status* **C**

ACCEPT.

P 38.11, line 6 add the sentence:

"For multimode fiber measurements, the polarization rotator referenced in ANSI X3.230-1994 FC-PH should be omitted, and the singlemode fiber should be replaced with a multimode fiber."

*Cl* **38B** *SC* *P* **38.22-33** *L* # **68**

Brad Booth Jato Technologies

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

Annex page numbering is incorrect.

*SuggestedRemedy*

Change page 38.32 to 38B.1, and change 38.33 to 38B.2.

*Proposed Response* *Response Status* **C**

REJECT.

This issue was reviewed as a comment in the D4 cycle. The current numbering is consistent with the document format.

*Cl* **38B** *SC* **38C** *P* **38.33** *L* **52** # **54**

Del Hanson Hewlett-Packard Co.

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

The D4.1 document does not define the calculation of stressed receiver sensitivity with imposed ISI.

*SuggestedRemedy*

Add Annex C: Calculation of the required stressed receiver sensitivity

Insert text from MBI reviewed PDF file (described as Appendix X).

*Proposed Response* *Response Status* **C**

REJECT.

No need to define separate annex, handled as note in text

*Cl* **39** *SC* **39.2.3** *P* **39.2** *L* **11** # **58**

Haluk Aytac Hewlett-Packard

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

The intent here is to have margin between 400 mV (receiver min. diff. sensitivity) and the signal detect circuit trip point. Adding receiver coupled noise to 400 mV allows the trip point to be too close to 400 mV.

*SuggestedRemedy*

remove "plus receiver coupled noise"

*Proposed Response* *Response Status* **C**

ACCEPT.

Delete the words "plus receiver coupled noise" from the end of the sentence. Also change the reference in the previous sentence to "receiver minimum differential sensitivity" to match the deffiniition in table 39-4.

*Cl* **39** *SC* **39.2.3** *P* **39.2** *L* **8** # **69**

Brad Booth Jato Technologies

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

First reference of NEXT should be defined.

*SuggestedRemedy*

Change to read "... the PMD due to near end cross talk (NEXT), reflections, power supply noise, etc."

*Proposed Response* *Response Status* **C**

ACCEPT.

While I do not believe that this is specifically necessary, since NEXT is present in the IEEE dictionary, it will be expanded at its first occurance in the clause for clarity. However, since the first occurance is on page 39.1, it will be added there instead of the recommended location.

*Cl* **39** *SC* **39.3.1** *P* **39.5** *L* **22** # **124**

Geoff Thompson Bay Networks, Inc.

*Comment Type* **TR** *Comment Status* **A** *RESUBMIT*

TDR measurements are called out without a reference that I can find to a standardized measurement technique with standardized test equipment setup.

Or perhaps since all of the references to TDR are in notes the objection is that there is no specified measurement procedure.

*SuggestedRemedy*

*Proposed Response* *Response Status* **C**

PROPOSED PARTIAL ACCEPT.

Since no international standards have been located on how to make these measurements, the following text is proposed as an addition to clarify the usage of these tests.

39.6.8 Differential TDR measurement procedure
The differential time-domain reflectometry (TDR) test setup measures the reflected waveform returned from a load when driven with a step input. It is obtained by driving the load under test with a step waveform using a driver with a specified source impedance and risetime. The reflected waveform is the difference between (a) the observed waveform at the device under test when driven with the specified test signal, and (b) the waveform that results when driving a standard test load with the same specified test signal. From this measured result we can infer the impedance of the device under test. The time-domain reflectometry measurement is the time-domain equivalent of S11 parameter testing used in carrier-based systems.

For the measurement of 1000BASE-CX jumper cables, the following test conditions apply:
(a) The driving waveform is sourced from a balanced, differential 150-ohm source with an 85-ps risetime (see 39.6.8.1)
(b) The test setup is calibrated (see 39.6.8.2)

39.6.8.1 Driving waveform
If the natural differential output impedance of the driving waveform is not 75 ohms, it may be adjusted to within 75 +/- 5 ohms by an attenuating resistive pad. When the driving point resistance is 100 ohms (as would be the case with a differential signal source having two independant, antipodal, 50-ohm sources), a good pad design shown below, where R1=173.2 ohms and R2=43.3 ohms. All resistors are surface-mount packages soldered directly to the test fixture with no intervening leads or traces, and the whole structure is mounted on a solid ground plane (used in three places):

```
driving signal + --(50 ohms)---------+---R2-----(75 ohms)-----
      return ----------------gnd  |                          +
                                  |                          |
                                  R1   gnd for twinax shield    150
```

ohms differential load

```
                          |                       |
                          |                       -
driving signal - --(50 ohms)---------+---R2-----(75 ohms)-----
      return ----------------gnd
```

If the natural risetime of the driver is less than 85 ps, the resulting measured time-waveforms must be filtered to reduce the apparant risetime to 85 +/- 10 ps.

39.6.8.2 Calibration of the test setup
Three measurements are made, with a short, and open, and a known test load. The value of the test resistance should be constant to within 1% over the frequency range DC to 6 GHz, and of known value. The value of the test resistance should be within the range 75 +/- 5 ohms.
The differential voltages measured across the device-under-test terminals in these three cases are called Vshort, Vopen, and Vtest, respectively.
From these three measurements we will compute three intermediate quantities:

A = (Vopen - Vshort ) /2
B = (Vopen + Vshort ) /2
Z0 = Ztest * (Vopen - Vtest)/(Vtest - Vshort)

The value of Z0 is the actual driving point impedance of the tester. It must be within 75 +/- 5 ohms.

For any device under test, the conversion from measured voltage Vmesaured to impedance is as follows:

Measured impedance = Z0*(1 + V')/(1 - V'),
where V' = (Vmeasured -B)/A

---

*Cl* **39** *SC* **39.6.8.2** *P* **39.13** *L* **54** # **70**

Brad Booth — Jato Technologies

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

Incorrect spelling of measured.

*SuggestedRemedy*

Change to read "... voltage Vmeasured to impedance..."

*Proposed Response* *Response Status* **C**

ACCEPT.

Changed spelling as suggested.

*Cl* **41** *SC* *P* **41.12** *L* **1** # **72**

Brad Booth Jato Technologies

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

Reason for text "State diagrams"?

*SuggestedRemedy*

Should this text be:
- removed
- made into a sentence, or

*Proposed Response* *Response Status* **C**

ACCEPT.
Make it a section heading.
(duplicate of #73)

*Cl* **41** *SC* *P* **41.12** *L* **1** # **73**

Brad Booth Jato Technologies

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

Reason for text "State diagrams"?

*SuggestedRemedy*

Should this text be:
- removed,
- made into a sentence, or
- made into a heading

*Proposed Response* *Response Status* **C**

ACCEPT.
Make it a section heading.
(duplicate of #72)

*Cl* **41** *SC* **41.2.2.1.6** *P* **41.11** *L* **9** # **71**

Brad Booth Jato Technologies

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

Double period at end of sentence.

*SuggestedRemedy*

Remove extra period.

*Proposed Response* *Response Status* **C**

ACCEPT.

*Cl* **42** *SC* **42.1.1** *P* **42.4-5** *L* # **50**

Koichiro Seto Hitachi Cable

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

I see a few uses of a word "TW-Style Cable", but there is no definition or mentioning of this cable in any clause including Clause 39.

*SuggestedRemedy*

Do not use the word "TW-Style Cable". Use something like "1000BASE-CX Cable" instead.

*Proposed Response* *Response Status* **C**

ACCEPT.
Use the media type names used in Clause 34:
1000BASE-CX: Shielded Jumper Cable.
1000BASE-T: Category 5 UTP.

*Cl* **42** *SC* **42.3.1.1** *P* **42.5** *L* **17** # **74**

Brad Booth Jato Technologies

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

plural form used where singular should be used.

*SuggestedRemedy*

Change to read:
"Figure 42-5 shows a schematic representation of a one-repeater path."

*Proposed Response* *Response Status* **C**

ACCEPT.