Cl **00** *SC* *P* *L* # 1

Swenson, Norman

Comment Type **TR** *Comment Status* **X** *Page num: . PDF page:*

Assuming that we retain normalization by OMA for TWDP, a subclause should be added to the informative annex that suggests a method for measuring OMA. The method in this comment is an alternative to the other method I submitted in a related comment. This approach estimates the ""steady-state"" OMA. A preferred approach is expected to be resolved before September meeting.

SuggestedRemedy

Add the a subclause that descibes a method to measure OMA as follows:

ant=4; mem=20; %anticipation and memory. These parameters can be varied to improve linear fit
X=zeros(ant+mem+1,PtrnLength); %Size data matrix for linear fit
Y=zeros(OverSampleRate,PtrnLength); %Size observation matrix for linear fit
for ind=1:ant+mem+1
  X(ind,:)=circshift(XmitData,ind-ant-1)';%Wrap appropriately for lin fit
end
X=[X;ones(1,PtrnLength)]; %The all-ones row is included to compute the bias
for ind=1:OverSampleRate
Y(ind,:)=yout0([0:PtrnLength-1]*OverSampleRate+ind)'; %Each column is one bit period
end
Qmat=Y*X'*(X*X')^(-1); %Coefficient matrix resulting from linear fit. Each column (except the %last) is one bit period of the pulse response. The last column is the bias.
SteadyZeroPower=mean(Qmat(:,ant+mem+2));
MeasuredOMA=sum(sum(Qmat(:,1:ant+mem+1))/OverSampleRate;

Consesus on a preferred approach between this method and others proposed is expected to emerge before the September meeting.

Proposed Response *Response Status* **O**

Cl **00** *SC* *P* **16** *L* **1** # 2

Booth, Brad

Comment Type **E** *Comment Status* **X** *Page num: 16. PDF page: 16*

Make sure each clause or annex starts on a new page to improve readability.

SuggestedRemedy

As per comment.

Proposed Response *Response Status* **O**

Cl **00** *SC* **68.6.2** *P* **31** *L* **4** # 3

Swanson, Steve

Comment Type **ER** *Comment Status* **X** *Page num: 31. PDF page: 32*

General comment that the Figures and Tables are not placed properly in the document, making it difficult to find references to them.

SuggestedRemedy

Place Figures and Tables near the text that references them.

Proposed Response *Response Status* **O**

Cl **30B** *SC* **30B** *P* **24** *L* **12** # 4

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 24. PDF page: 24*

Title is in wrong font (might be a bug in 802.3am)

SuggestedRemedy

Fix, or get fixed.

Proposed Response *Response Status* **O**

Cl **44** *SC* **44.1.4.4** *P* **16** *L* **36** # 5

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 16. PDF page: 16*

D2.1 comment 1016 imperfectly executed; need a comma

SuggestedRemedy

Add comma after '68'

Proposed Response *Response Status* **O**

Cl **44** *SC* **Table 44-1** *P* **17** *L* # 6

BABANEZHAD, JOSEPH

Comment Type **E** *Comment Status* **X** *Page num: 0. PDF page: 0*

In Table 44-1 on page 17 a reference to 10GBASE-T standard is missing.

SuggestedRemedy

Add a row pertaining to 10GBASE-T.

Proposed Response *Response Status* **O**

Cl **44** *SC* **44.3** *P* **18** *L* **24** # 7

Booth, Brad

Comment Type **E** *Comment Status* **X** *Page num: 18. PDF page: 18*

Information provided is slightly incorrect.

SuggestedRemedy

Change to read: Serial PMA and PMD (except LRM)
Change LRM PMD to read: LRM PMA and PMD

Proposed Response *Response Status* **O**

Cl **44** *SC* **44.5** *P* **19** *L* **16** # 8

John George

Comment Type **TR** *Comment Status* **X** *Page num: 19. PDF page: 19*

Comment: Distances for 10GBASE-LRM in Table 44-4 are not consistent with those in table 68-2. Additionally, fiber designations are not consistent with those used in ISO 11801-2002.

SuggestedRemedy

In table 44-4 under "Maximum channel length", insert a first column labeled "OM3 50 um fiber" and show distances of 300 meters each for 10GBASE-SR/SW, 10GBASE-LX4, and 10GBASE-LRM. Change the column labeled "50 um fibre" to 'OM2 50 um fibre", and change the distance for 10GBASE-LRM in this column to 220 meters. Change the column labeled "62.5 um fibre" to 'OM1 62.5 um fibre", and change the distance for 10GBASE-LRM in this column to 220 meters.

Proposed Response *Response Status* **O**

Cl **44** *SC* **Table 44-4** *P* **19** *L* **24** # 9

Bergmann, Ernest

Comment Type **T** *Comment Status* **X** *Page num: 19. PDF page: 19*

As a result of the compromise worked out in July, the maximum range claimed for 62.5/125 multimode fiber is reduced to 220 meters. It appears an oversight not to include this change in the table.

SuggestedRemedy

in the rightmost, lowermost entry change ""300"" to ""220"".

Proposed Response *Response Status* **O**

Cl **44** *SC* **44.5** *P* **19** *L* **25** # 10

Swanson, Steve

Comment Type **T** *Comment Status* **X** *Page num: 19. PDF page: 19*

Incorrect maximum channel length.

SuggestedRemedy

Change ""300"" to ""220"" for 10GBASE-LRM entry for 62.5um fibre.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.6.1** *P* **20** *L* **42** # 11

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 20. PDF page: 20*

Title for 45.2.1.6.1 should be included; contains a change to 802.3am

SuggestedRemedy

Reinstate title for 45.2.1.6.1

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.6** *P* **20** *L* **45** # 12

Booth, Brad

Comment Type **E** *Comment Status* **X** *Page num: 20. PDF page: 20*

Move editor's note to before the text it impacts.

SuggestedRemedy

As per comment, move editor's note to proceed table.

Proposed Response *Response Status* **O**

Cl **45** *SC* **45.2.1.7.15** *P* **21** *L* **31** # 13

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 21. PDF page: 21*

Full stop is bold

SuggestedRemedy

Reset to normal

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.1.2** *P* **22** *L* **35** # 14

Swanson, Steve

Comment Type **TR** *Comment Status* **X** *Page num: 22. PDF page: 22*

Incorrect reference; 1995 edition of 11801 does not have the fibers called out in the LRM standard.

SuggestedRemedy

Change ""d) Support cable plants using optical fiber compliant with ISO/IEC 11801: 1995 as specified in Clause 52 and Clause 68."" with ""d) Support cable plants using optical fiber compliant with ISO/IEC 11801: 2002 as specified in Clause 68.""

Proposed Response *Response Status* **O**

Cl **49** *SC* **49.1.4** *P* **23** *L* **30** # 15

Booth, Brad

Comment Type **T** *Comment Status* **X** *Page num: 23. PDF page: 23*

In Figure 49-1, the reference to M = MULTIMODE FIBER could be considered misleading as S is also MMF. I made this comment technical because I didn't want it put in the editorial bucket without the TF reviewing it.

SuggestedRemedy

Change to read: M = PMD WITH DISPERSION COMPENSATION FOR MULTIMODE FIBER

Proposed Response *Response Status* **O**

Cl **68** *SC* **00** *P* *L* # 16

Kolesar, Paul

Comment Type **TR** *Comment Status* **X** *Page num: 0. PDF page: 0*

The recirculation package failed to comply with the agreement reached at the conclusion of the previous task force meeting whereby the comments related to completing modeling, D2.0 #115 and #160, and interoperability demo, D2.0 #2, would be re-circulated.

SuggestedRemedy

Treat these comments as being open against D2.2.

Proposed Response *Response Status* **O**

Cl **68** *SC* **Recirculation Comme** *P* *L* # 17

Dudek, Mike

Comment Type **TR** *Comment Status* **X** *Page num: 0. PDF page: 0*

This comment is in support of extracting the OMA and decision threshold from the waveform presented to the TWDP code. This will minimize the errors in calculating TWDP.

SuggestedRemedy

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.2** *P* **24** *L* **52** # 18

Booth, Brad

Comment Type **E** *Comment Status* **X** *Page num: 24. PDF page: 25*

Use number for values greater than ten.

SuggestedRemedy

Change eighteen to be 18.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.2** *P* **24** *L* **52** # 19

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 24. PDF page: 25*

I think style guide would prefer numerals here

SuggestedRemedy

Consider changing 'eighteen' to '18'

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.4.1** *P* **25** *L* **15** # 20

Swanson, Steve

Comment Type **TR** *Comment Status* **X** *Page num: 25. PDF page: 26*

Specify a single launch for each fiber type.

SuggestedRemedy

Replace: ""The optical launch condition at TP2 is either the preferred launch or the alternative launch (at the userÆs choice), as specified in 68.5.1. A compliant PMD shall support both options. The launch is selected by using either a single-mode fiber offset-launch mode-conditioning patch cord or a regular multimode fiber patch cord inserted between the MDI and TP2, consistent with the media type."" with ""The optical launch condition a TP2 is specified in Table 68-3. A compliant PMD shall support both options. The launch is selected by using either a single-mode fiber offset-launch mode-conditioning patch cord or a regular multimode fiber patch cord inserted between the MDI and TP2, consistent with the media type.""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.1** *P* **25** *L* **32** # 21

van Doorn, Schelto

Comment Type **E** *Comment Status* **X** *Page num: 24. PDF page: 25*

Fig: 68-1. Overlapping white box hiding bottom part of the PHY bracket.

SuggestedRemedy

Move bracket to front.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.4** *P* **25** *L* **8** # 22

Abbott, John

Comment Type **TR** *Comment Status* **X** *Page num: 25. PDF page: 26*

INTEROPERABILITY:
In Fall of 2004 the LRM group passed a motion specifying the minimum terms of acceptance for demonstration of interoperability and requiring a demonstratrion prior to sponsor ballot. Interoperability has not been demonstrated. The results in http://ieee802.org/3/aq/public/mar05/bhoja_1_0305.pdf draw attention to a problem with center launch. In the OM2 fibers in the cable all 3 Tube 5 fibers are expected to fail CL based on the RNFs. Only one was tested (5 Orange) which failed. Thus 3/6 of the 12/96 OM2 fibers are expected to fail CL launch using this cable.

SuggestedRemedy

Remedy: Demonstration interoperabiilty per 802.3aq LRM TaskForce Motion from Fall 2004.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.4.4** *P* **27** *L* **28** # 23

van Doorn, Schelto

Comment Type **T** *Comment Status* **X** *Page num: 26. PDF page: 27*

I don't believe the PMD signal detect can detect a ""Compliant 10GBASE-R input signal"". The Rx could pick up some chattering caused by electrical crosstalk, to the Tx or Rx, as stated in the following paragraphs. This signal looks like a valid signal, but it is not a Compliant 10GBASE-R signal. The compliants is validated in the layers above the PMD.

SuggestedRemedy

Remove the words ""Compliant 10GBASE-R"" or change to ""Compliant 10GBASE-R input signal level""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5** *P* **27** *L* **39** # 24

Swanson, Steve

Comment Type **TR** *Comment Status* **X** *Page num: 27. PDF page: 28*

Modify the maximum channel insertion loss values to reflect the operating range for each fiber type.

SuggestedRemedy

Replace ""2"" with the following:

""1.83 for 62.5um 160/500
1.83 for 62.5um 200/500
1.83 for 50 um 500/500
1.65 for 50 um 400/400
1.95 for 50 um 1500/500""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5** *P* **27** *L* **44** # 25

Kolesar, Paul

Comment Type **TR** *Comment Status* **X** *Page num: 27. PDF page: 28*

The operating distance ranges in table 68-2 for 62.5um fibers are based on seriously flawed assumptions regarding launch conditions. These distances assume the deployment of the best performing of either the preferred or alternative launch condition. The flaw is that the user has no guidance as to how to determine which is the better choice. The resulting failure rate and link coverage statistics are not only flawed, but highly skewed towards overly optimistic predictions.

SuggestedRemedy

Either provide the user with guidance on how to determine the better of the two launch conditions, or drop the use of alternative launch conditions in the analysis of failure rate and link coverage, and reflect the effect of this more realistic methodology in the operating range table. Specifically to this latter alternative, the presentation of ewen_2_1104 shows that the operating range with~4.0 dB PIE-D stressors using the offset launch alone is 160m, therefore replace 220m with 160m for 62.5um fibers.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.2** *P* **27** *L* **47** # 26

Kolesar, Paul

Comment Type **TR** *Comment Status* **X** *Page num: 27. PDF page: 28*

The operating distance range for OM2 fiber has not been substantiated by modeling. John Abbott has provided fiber delay sets for the OM2 fiber type to the task force web site. This comment should ride with the draft until such time as results of such simulations are reflected in this table.

SuggestedRemedy

Complete simulations using Abbott's OM2 fiber files and indicate the corresponding maximum link length in the operating range for OM2 fiber in Table 68-2.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5** *P* **27** *L* **52** # 27

Swanson, Steve

Comment Type **TR** *Comment Status* **X** *Page num: 27. PDF page: 28*

Clarify footnote on fiber types.

SuggestedRemedy

Replace: ""aEach fiber types is identified by its core diameter followed by a pair of modal bandwidth values separated by ô/ö. The modal bandwidths are in MHz.km and are for 850 nm and 1300 nm respectively."" with ""aEach fiber types is identified by its core diameter followed by a pair of OFL modal bandwidth values separated by ô/ö. The OFL modal bandwidths are in MHz.km and are for 850 nm and 1300 nm respectively. OM-3 fiber is designed to operate with lasers and includes specifications in addition to OFL modal bandwidth that allow it to support longer link lengths.""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5** *P* **27** *L* **52** # 28

Booth, Brad

Comment Type **E** *Comment Status* **X** *Page num: 27. PDF page: 28*

Footnote a in Table 68-2 has a line break in it.

SuggestedRemedy

Remove line break.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5** *P* **27** *L* **52** # 29

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 27. PDF page: 28*

Grammar

SuggestedRemedy

Change 'fiber types is' to 'fiber type is'

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5** *P* **28** *L* **1** # 30

Swanson, Steve

Comment Type **ER** *Comment Status* **X** *Page num: 28. PDF page: 29*

There is no reason to highlight that this operating range is ""conservative.""

SuggestedRemedy

Delete footnote 3 or establish an operating range for 50um 400/400.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.1** *P* **28** *L* **36** # 31

Swanson, Steve

Comment Type **E** *Comment Status* **X** *Page num: 28. PDF page: 29*

Editorial; reverse order of referenced material to reflect it's location in the document.

SuggestedRemedy

Replace ""The 10GBASE-LRM transmitter shall meet the specifications given in Table 68û3 and Figure 68û3, per definitions in 68.6."" with ""The 10GBASE-LRM transmitter shall meet the specifications given in Figure 68û3 and Table 68û3, per definitions in 68.6.""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.2** *P* **28** *L* **42** # 32

Swanson, Steve

Comment Type **ER** *Comment Status* **X** *Page num: 28. PDF page: 29*

Informative text is not clear.

SuggestedRemedy

Replace ""...can not..."" with ""...cannot...""

Add an example that explains how a signal with power values with the ranges is not necessarily compliant.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.3.1** *P* **28** *L* **51** # 33

John George

Comment Type **TR** *Comment Status* **X** *Page num: 28. PDF page: 29*

If channel responses are expected to vary by 10 Hz, receivers should be required to tolerate this condition given the clear expectation that such variations will be present in the field.

SuggestedRemedy

SuggestedRemedy: Change "recommended" to required".

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.3.1** *P* **28** *L* **53** # 34

Swanson, Steve

Comment Type **TR** *Comment Status* **X** *Page num: 28. PDF page: 29*

Replace informative text with requirement on dynamic response.

SuggestedRemedy

Replace ""Channel responses are expected to vary with time at rates of up to 10 Hz. It is recommended that receivers tolerate such time varying channel responses."" with ""The receiver shall tolerate time varying channel responses to 10 Hz.""

Add appropriate PICs.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.3.1** *P* **28** *L* **53** # 35

Kolesar, Paul

Comment Type **TR** *Comment Status* **X** *Page num: 28. PDF page: 29*

The guidance regarding dynamic channel response is insufficient and non-normative. It provides no information on the likely causes of channel response variation, not even a hint as to how to test the receiver for its dynamic abilities, nor any mandatory performance level requirements. In short it is wholey ineffectual. Such casual treatment of a significant link impairment is irresponsible and unacceptable.

SuggestedRemedy

Replace the content of this subclause with the following: ""Channel responses are expected to vary with time at rates up to 10 Hz due, for example, to mechanical perturbations of the patch cords or cables. Receivers shall tolerate such time varying channel responses. One way of testing the reciever is to vary the tap weights of the ISI generator in fugure 68-11 to produce waveforms that continuously vary between the pre-cursor and post-cursor stressors at a 10 Hz rate during the comprehensive stressed receiver test.""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.31** *P* **28** *L* **53** # 36

Abbott, John

Comment Type **TR** *Comment Status* **X** *Page num: 28. PDF page: 29*

See 1066: Dynamic Penalty.
This clause gives no real guidance to the problem of dynamic variation of the link. In the fall of 2004 the task force looked into this problem, showed a number of examples where it occurs, both for true dynamic and quasi-static cases. The task force was unable to resolve how to solve the problem. This is a particular issue for LRM and within the scope of clause 68. because EDC will work for some pulses and not all.

SuggestedRemedy

REMEDY: reword to
""Receivers shall tolerate such time varying channel responses.""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6** *P* **29** *L* **23** # 37

Dawe, Piers

Comment Type **TR** *Comment Status* **X** *Page num: 29. PDF page: 30*

I'm confident that it is now quite clear how to build a product for 10GBASE-LRM, and that we have a very good theory-driven spec. On the other hand, I believe that the measurement methods are not yet stable and proven; therefore the spec items that depend on them are questionable. Both the measurement methods and the spec limits need experimental verification. This is not the same requirement as showing interop of the prototype product. If we wish not to make technical changes in sponsor ballot, we need to prove out the tests to a much more stable level than we did in 802.3ae, or face a running sore of wasted ongoing cost.

SuggestedRemedy

Before going to sponsor ballot, determine experimentally that the measurement procedures work stably and accurately enough for our purposes, and that the spec limits have the intended effect on quality/cost.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.1** *P* **29** *L* **32** # 38

Swanson, Steve

Comment Type **E** *Comment Status* **X** *Page num: 29. PDF page: 30*

Clarification of intent.

SuggestedRemedy

Replace ""The test patterns include square waves, pattern 1, pattern 2 and pattern 3, defined in 52.9.1.1 and 52.9.1.2, and the PRBS9 pattern."" with ""The test patterns include square waves, pattern 1, pattern 2 and pattern 3, defined in 52.9.1. as well as the PRBS9 pattern.""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.1** *P* **29** *L* **35** # 39

Dudek, Mike

Comment Type **E** *Comment Status* **X** *Page num: 29. PDF page: 30*

The page and line above is in the change document, however in the document with the incorporated changes the note is moved under table 68-4. In this position it is very confusing.

SuggestedRemedy

Somehow stop the note from becoming an orphan (ie keep it with the text it refers to.).

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.4** *P* **29** *L* **52** # 40

Dawe, Piers

Comment Type **T** *Comment Status* **X** *Page num: 29. PDF page: 30*

The new text overstates its case. If a signal has no undershoot, overshoot or inter-symbol interference, the approximation is excellent. This concern doesn't arise in SONET or 100BASE or 1000BASE, just in 10GBASE. Editorial - would help to say what equations we are talking about.

SuggestedRemedy

Change to:
Note that due to the difference in measurement methods for OMA and extinction ratio in 10GBASE, the equations given in 58.7.6 become approximate for signals with undershoot, overshoot or inter-symbol interference.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.4** *P* **31** *L* **32** # 41

Swanson, Steve

Comment Type **E** *Comment Status* **X** *Page num: 31. PDF page: 32*

Editorial; non necessary text.

SuggestedRemedy

Delete ""...(shown shaded)...""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6** *P* **32** *L* **36** # 42

Abbott, John

Comment Type **TR** *Comment Status* **X** *Page num: 32. PDF page: 33*

Table 68-3
Encircled Flux. EF parameters cannot be the same for OM1 and OM2/OM3 because of differences in NA/CD. Check calculations. We already have different matrices for modeling that predict power in group g as a function of offset x, just need to sum over Psi^2's to check.

SuggestedRemedy

Remedy: EF parameters should be changed to be consistent between the fiber types.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6** *P* **32** *L* **39** # 43

Lindsay, Tom

Comment Type **E** *Comment Status* **X** *Page num: 32. PDF page: 33*

Not clear what 'standard' means here. TWDP uses reference fibers and a reference receiver, and I feel that 'reference' would be a better term. 'Reference' is also used elsewhere in the TWDP description.

SuggestedRemedy

Replace 'standard' with 'reference'.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6Table68-3** *P* **33** *L* # 44

Abbott, John

Comment Type **TR** *Comment Status* **X** *Page num: 33. PDF page: 34*

Worst Case Design Philosophy: linkage to new OM1 & OM2 link lengths and stressors in draft 2.2.
Link length & stressors need to be chosen to accomodate IEEE worst case design philosophy. The PIE-D and finite equalization penalties & link length need to be consistent with less than a 1% failure rate on duplex links with a 2- and 1- connector design. Need to show the new stressors meet a 1% failure rate on OM1 and OM2 fiber. New data will be presented indicating that the assumption of zero correlation between center and offset launch for OM1 is incorrect. Analysis is required on OM2 fiber to establish the % failure rate on duplex links with connectors.

SuggestedRemedy

Remedy: Review OM1 data, redo analysis, Complete detailed OM2 analysis analogous to OM1.

Proposed Response *Response Status* **O**

Cl **68** *SC* **Table 68-3** *P* **33** *L* **27** # 45

Weiner, Nick

Comment Type **TR** *Comment Status* **X** *Page num: 33. PDF page: 34*

The Tx noise spec in Table 68-3 was inherited from Clause 52 (10GBASE-L). Time and technology have moved on and any marginal tightening of the tx noise spec (that can be achieved without significant cost implication) would be worth having.

(This comment addresses topic raised by Tom Lindsay's (unsatisfied) comment 1155 on Draft 2.1)

SuggestedRemedy

Change RINxOMA spec from -128 dB to -130 dB. - i.e. tightening by 20%.
or
Change RINxOMA spec from -128 dB to -129 dB. - i.e. tightening by 11%.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6** *P* **33** *L* **29** # 46

Ali, Ghiasi

Comment Type **TR** *Comment Status* **X** *Page num: 33. PDF page: 34*

Eye mask parameters

SuggestedRemedy

Eye mask parameters listed table should be listed for BER of 1E-12.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.1** *P* **33** *L* **31** # 47

Dawe, Piers

Comment Type **TR** *Comment Status* **X** *Page num: 33. PDF page: 34*

Even when we have got the input parameters to the TWDP algorithm 'right', we still see some unreasonably pessimistic TWDP scores. Have identified~0.1 dB of error, estimate~0.5 dB may remain. Until we have learnt how to use this algorithm to give stable answers, we cannot know if the spec limit here is reasonable or not. I still believe TWDP is the right approach and we need to persevere with debugging and trialling it. We should not attempt to go to sponsor ballot with critical tests not proven to work - not just in concept but also as written in the draft and against realistic transmitters.

SuggestedRemedy

Find out what's up with the TWDP algorithm and fix it! Establish that the spec limit is fair for cost-effective transmitters. Do not go to sponsor ballot until spec limits are stable and validated by experimental work.

Proposed Response *Response Status* **O**

Cl **68** *SC* **Table 68-3** *P* **33** *L* **31** # 48

Lindsay, Tom

Comment Type **TR** *Comment Status* **X** *Page num: 33. PDF page: 34*

4.7 dB is 0.5 dB above the TP3 PIE-D stress level for post-cursor, 0.7 dB for pre-cursor, and 0.9 dB above split symmetrical. The agreed objective for TWDP is that it should protect receivers in the field, but allowing these margins will allow transmitters to pass which are more stressful than the levels receivers are tested to.

We dropped link distance to 220 meters because of a concern of too much stress to receivers, yet allowing 4.7 dB immediately turns around and allows even more stress than 300 meters would have required.

Margin is already built into our specs, so we must be careful to not add more. We already know that TWDP and the mask do not catch all Tx limitations, and I suspect that the TP3 stress test does not represent all allowed impairment from real transmitters such as nonlinearities and uncorrelated jitter.

Unless technical rationale shows why these margins are required, set the TWDP limits to be the same as the TP3 PIE-D stress levels that receivers are tested to. Further, individual TWDP limits should be used, not the most relaxed limit based on the highest TP3 stress level.

Note - another approach would be to add more/other stresses into the TP3 test such as DCD or other nonlinearities or jitter.

SuggestedRemedy

Add 3 lines (note, I rounded up):
""Pre-cursor channel 4.1 dB""
""Split symmetrical channel 3.9 dB""
""Post-cursor channel 4.2 dB""

On page 35, line 44, change the text to read ""A separate limit is given to each of the pre-cursor, split symmetrical, and post-cursor channels that are emulated in the algorithm. Each limit is to be satisfied.""

The code must also change. As the code may get modified for other reasons, details for the code change will brought into the September meeting after the other proposed changes are sorted out and merged.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6** *P* **33** *L* **33** # 49

Ali, Ghiasi

Comment Type **TR** *Comment Status* **X** *Page num: 33. PDF page: 34*

The only parameter which limits the DCD to 0.5 UI is the Eye mask

SuggestedRemedy

To eliminate some pathological scenario propose to add maximum DCD parameter in the table with value of 0.2 UI p-p

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.1** *P* **33** *L* **34** # 50

Swanson, Steve

Comment Type **ER** *Comment Status* **X** *Page num: 33. PDF page: 34*

Make optical launch designations consistent.

SuggestedRemedy

Replace ""Optical launch for 62.5 Ám fiber"" with ""Optical launch for OM-1 and 160/500 62.5 Ám fiber""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.1** *P* **33** *L* **35** # 51

Swanson, Steve

Comment Type **TR** *Comment Status* **X** *Page num: 33. PDF page: 34*

10GBASE-LRM should specify a defined launch for guaranteed operation on each fiber type rather than complicate the standard and field implementation of 10GBASE-LRM for the sole purpose of improving the statistical probability of success.

SuggestedRemedy

Delete ""Preferred"" two places in Table 68-3.

Delete ""Encircled flux for alternative launch"" two places in Table 68-3.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6Table68-3** *P* **33** *L* **35** # 52

Abbott, John

Comment Type **ER** *Comment Status* **X** *Page num: 33. PDF page: 34*

OM1 fiber refers to 200/500 fiber and this line should read OM1 and 160/500 fiber, analogous to line 41 which reads OM2 and 400/400 fiber. See comment 1047.

SuggestedRemedy

REMEDY: add ""and 160/500 fiber"" to line 35

Proposed Response *Response Status* **O**

Cl **68** *SC* **68-6** *P* **33** *L* **35** # 53

John George

Comment Type **TR** *Comment Status* **X** *Page num: 33. PDF page: 34*

The alternative launch specified in table 68-3, which is a center launch as specified by encircled flux, will result in about a 35% link failure rate for 220 meter links of FDDI or OM1 (i.e. 62.5 micron), OM2, or 400/400 50 micron fibers, based on the comprehensive stressed receiver test and test pulses signals specified in 68.6.9. Given that most end users will attempt to use the lower cost alternative launch and that 30% of building backbone links are between 201 and 300 meters (per flatman_1_0304 slide 7), end users will in aggregate frequently (for 10 - 15% of links) have to experiment with using mode conditioning patch cords on one or both ends of the link to achieve functionality. An end user having most links close to the 220 meter limit will have to perform such unwieldy experiments for 30% of links. This is an undesirable and unacceptable end user mitigation burden that is not required by other IEEE 802.3 optical standards, and thus market acceptance is unlikely.

SuggestedRemedy

SuggestedRemedy: In table 68-3 remove center launch for 62.5 micron, OM2, and 400/400 50 micron fibers from table 68.3. Specifically, remove all content between lines 38 and 40, and lines 44 and 46, of table 68.3. Also delete note d for table 68.3. Change comprehensive stressed receiver test signals to reflect PIE-D = ~ 4.9 dB to assure 99% coverage of installed 62.5 micron, OM2, and 400/400 50 micron fibers with offset launch.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6Table68-3** *P* **33** *L* **36** # 54

Abbott, John

Comment Type **TR** *Comment Status* **X** *Page num: 33. PDF page: 34*

Refer to comment 1031. Because OM1 and OM2 are not laser-optimized fiber, the 802.3aq LRM standard should not allow centered laser launch as a normative option. The offset launch previously specified for 1000BASE-LX on multimode fiber and 10GBASE-LX-4 on multimode fiber in the Current Ethernet standard should be used. Center launch should only be included as part of an informative annex.

SuggestedRemedy

REMEDY: change ""preferred"" to ""normative"". Move center launches for OM1, OM2 to informative annex.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.1** *P* **33** *L* **37** # 55

Kolesar, Paul

Comment Type **T** *Comment Status* **X** *Page num: 33. PDF page: 34*

In table 68-3 the reference to the mode conditioining patch cord specifications within clauses 38 and 59 is incommplete and in conflict with clause 68.9.3 due to the additional return loss requirement imposed by 68.9.3. For clarity clause 68.9.3 should be the single place that references clauses 38 and 59 MCPC specifications.

SuggestedRemedy

Change ""specified in 38.11.4 or 59.9.5"" to ""specified in 68.9.3"" in two places. Search the document for other occurrences of these references and correct them similarly.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.1** *P* **33** *L* **38** # 56

Kolesar, Paul

Comment Type **TR** *Comment Status* **X** *Page num: 33. PDF page: 34*

The specification of multiple launch conditions to achieve higher probability of link operation is unprecidented in the history of Ethernet specifications and places an undue burden on the end user to experiment with up to four launch condition combinations per channel to find an operative combination by means of exchanging two types of patch cords. This complexity encumbers the PMD to the point where it runs an unreasonable risk of no longer satisfing the broad market potential criterion. And while deployment of the specified mode conditioning patch cord for 1000BASE-LX may often be on an as-needed basis, the link length at which the cord is needed is almost always in excess of 200 m. The user may choose to ignore the specification at their own risk, but the standard specifies a single launch condition that is functional at for the entire operating range. By comparison, the link failure rate for LRM on legacy fibers with center launch is expected to be about 25% for links of 200 m length, rendering the endorsement of such a solution by inclusion in the standard an act of irresponsiblity.

SuggestedRemedy

Delete the alternative launch specifications. Delete the word preferred and move the callout for footnote d to the end of the lines that begin ""Optical launch ..."". Modify footnote d to read: ""The PMD must support both the use of a single-mode fiber offset-launch mode-conditioning patch cord and a regular multimode fiber patch cord between the MDI and TP2.""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6** *P* **33** *L* **39** # 57

Abbott, John

Comment Type **E** *Comment Status* **X** *Page num: 33. PDF page: 34*

Table 68-3 lines 39ff.
editorial change: change to 62.5um mode conditioning patch core, 50um mode conditioning patch cord for clarity, so reader knows 62.5um and 50um fiber use different patch cords.

SuggestedRemedy

REMEDY: insert 62.5uminto text line 37, 50um into text lin 42

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6** *P* **33** *L* **51** # 58

Ali, Ghiasi

Comment Type **TR** *Comment Status* **X** *Page num: 33. PDF page: 34*

Optical return loss tolerance

SuggestedRemedy

This line should read ""cable Plant Return Loss""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.134** *P* **34** *L* **16** # 59

Swanson, Steve

Comment Type **T** *Comment Status* **X** *Page num: 34. PDF page: 35*

Table 68-4 is an informative Table that provides little new information. The ""highest"" values as well as the peak power are the same as specified in Table 68-3. The ""lowest"" values appear to take the Table 68-3 values and add the channel insertion loss.

SuggestedRemedy

Consider deleting this Table. If not, modify the Table to include each fiber type since the channel insertion loss will be different for each of the fiber types.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.5** *P* **34** *L* **5** # 60

Dudek, Mike

Comment Type **E** *Comment Status* **X** *Page num: 34. PDF page: 35*

The statement ""The range of losses must be accounted for."" is not very helpful

SuggestedRemedy

Change the sentence to ""The range of losses must be accounted for to ensure the output at TP2 is compliant with all possible compliant patch cords.""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.1** *P* **34** *L* **7** # 61

Swanson, Steve

Comment Type **ER** *Comment Status* **X** *Page num: 34. PDF page: 35*

Editorial.

SuggestedRemedy

Replace ""dThe PMD must support both the preferred and alternative launch types by the use of a single-mode fiber offset-launch mode-conditioning patch cord or a regular multimode fiber patch cord between the MDI and TP2."" with ""dThe PMD must support both launch types by the use of a single-mode fiber offset-launch mode-conditioning patch cord or a regular multimode fiber patch cord between the MDI and TP2.""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.1** *P* **34** *L* **9** # 62

Kolesar, Paul

Comment Type **TR** *Comment Status* **X** *Page num: 34. PDF page: 35*

The guidance on the encircled flux specification in footnore e is misleading and easily misinterpreted regarding the location at which the launch must meet the specification. The specification is to be met when measured at TP2, but the present wording can be misinterpreted as defining the measurment point as the MDI.

SuggestedRemedy

Restate footnore e as follows: ""This encircled flux specification, measured per IEC 61280-1-4, defines the launch at TP2 when the MDI is coupled directly into a patch cord of the same fiber type as that of the supported cable plant.""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **35** *L* **1** # 63

Booth, Brad

Comment Type **E** *Comment Status* **X** *Page num: 35. PDF page: 36*

Tables 68-5 (deleted), 68-6 and 68-7 are inserted in the middle of the MATLAB code.

SuggestedRemedy

Ensure that table settings prevent it from being inserted in the middle of a paragraph.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.9** *P* **36** *L* **11** # 64

Dudek, Mike

Comment Type **TR** *Comment Status* **X** *Page num: 36. PDF page: 37*

In the process of relaxing TWDP beyond the Pie-D used to test the Rx in the stressed sensitivity test the link is no longer closing. The stressed sensitivity should be reduced to compensate for this. (Note that with the reduction in stressor Pie-D amplitude from the previous values this change can be accomplished without requiring the Rx noise spectral density to be reduced from it's D2.0 value (The requirement is still somewhat easier). Some justification for a change in the stressed sensitivity rather than a change to stressors is that one potential cause of the need for the TWDP relaxation is the difficulty in measuring OMA accurately. An over-estimate in the OMA of 0.5dB would be one cause of TWDP needing to be at it's D2.2 value. However this same over-estimate would enable a Tx to emit 0.5dB less OMA and require the suggested 0.5dB better stressed sensitivity.

SuggestedRemedy

Change the stressed sensitivity in OMA from -6.5dBm to -7.0dBm.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.3** *P* **36** *L* **18** # 65

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 36. PDF page: 37*

Quantities that might be variables should be in italics

SuggestedRemedy

Put Qsq in italics (here and in note to table). Consider whether A1...A4 and Delta_t in this table, and X1...Y3 in table 68-3, should be in italics.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.5.3** *P* **36** *L* **25** # 66

Dawe, Piers

Comment Type **TR** *Comment Status* **X** *Page num: 36. PDF page: 37*

It will be very challenging to make the split-symmetric stressor accurately and reproducibly, because its tap weights are 0 0.513 0 0.487, and the frequency response is strongly affected by the difference between the two taps (2.6% of their sum). Very small errors in either will affect the response. This stressor has a PIE-D of 3.83 dB; a stressor of 0.03 0.545 0 0.425 has a PIE-D of 3.85 dB - hardly different - but would be 4x more stable in practice.

SuggestedRemedy

Change the split-symmetric tap weights from 0 0.513 0 0.487 to 0.03 0.545 0 0.425.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6** *P* **36** *L* **34** # 67

Ali, Ghiasi

Comment Type **TR** *Comment Status* **X** *Page num: 36. PDF page: 37*

The maximum jitter tolerance specified is at 200 KHz, but IEEE 802.3ae, XFI, andThis document on page 41 defines CRU with 4 MHz bandwidth. The disconnect between transmitter and receiver may cause significant interoperability issues. Passing transmitters may fail to operate with receivers, because the receiver can not handle SJ frequency up to 4 MHz which comes through the transmitter CDR.

SuggestedRemedy

Add addtional line to jitter tolerance at 4 MHz with 0.1 UI of SJ p-p amplitude.

Proposed Response *Response Status* **O**

Cl **68** *SC* **6.6** *P* **36** *L* **35** # 68

Ali, Ghiasi

Comment Type **E** *Comment Status* **X** *Page num: 36. PDF page: 37*

Units for jitter frequncy is written as kHz

SuggestedRemedy

Replace kHz with KHz.

Proposed Response *Response Status* **O**

Cl **68** *SC* **Table 68-7** *P* **37** *L* **21** # 69

Lindsay, Tom

Comment Type **E** *Comment Status* **X** *Page num: 37. PDF page: 38*

Need a space.

SuggestedRemedy

Insert a space between '1' and 'or'.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* # 70

Lindsay, Tom

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

This is a pile-on comment to Unsatisfied comment 1150. 1150 traces back to the recommended use of standard deviation (OMSD) of the waveform as the optical power basis for TWDP.

It was understood in the San Francisco meeting that some improvements to TWDP, including the use of OMSD normalization, would be considered and that if those improvements were not completed by the comment deadline, they could be brought into the September meeting.

SuggestedRemedy

If the improvement is required, then a complete solution including drop-in text for the draft will be presented at the meeting.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* # 71

Lindsay, Tom

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

This is a pile-on comment to Unsatisfied comment 1151. 1151 recommended the use automated extraction of OMA and SteadyStateZero for TWDP.

It was understood in the San Francisco meeting that some improvements to TWDP, including the use of automated power extraction would be considered, and that if those improvements were not completed by the comment deadline, they could be brought into the September meeting.

A study group has made progress on this topic, but its work has not been completed by the comment deadline.

SuggestedRemedy

If the improvement is required, then a complete solution including drop-in text for the draft will be presented at the meeting.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* # 72

Lindsay, Tom

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

This is a pile-on comment to Unsatisfied comment 1089. 1089 recommended the use of a 14,5 finite length DFE equalizer for TWDP.

It was understood in the San Francisco meeting that some improvements to TWDP, including the use of finite equalizers, would be considered and that if those improvements were not completed by the comment deadline, they could be brought into the September meeting.

SuggestedRemedy

If the improvement is required, then a complete solution including drop-in text for the draft will be presented at the meeting.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* **15** # 73

Dawe, Piers

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

TWDP code gives inaccurate answer almost in proportion to any error in 'MeasuredOMA'; these errors are significant. Philosophical discussion about what 'MeasuredOMA' should represent: settled 1 minus settled 0, run-of-8 1 minus run-of-8 0, RMS signal strength of PRBS, the level that gives the best~TWDP/OMA, what? If the first or last, can use the methods to best find 'SteadyZeroPower' (see another comment). If the second (but I don't believe it is), 'case 3' (modes of short runs in PRBS waveform) is probably the best algorithm. If the third, would need a clear reason as to why, but at least an RMS can be calculated robustly from the PRBS waveform.

SuggestedRemedy

Option A: settled 1 - settled 0
Option B: 1 - 0 in short runs
Option C: RMS signal + additional criterion to control the speed of the transmitter (e.g. OMA - RMS)
Option D: difference between 'natural' 1 and 0 as seen by TWDP code
and more options, separate to the above:
Option P: roll this calculation into core (step 5) of TWDP code
Option Q: Insert a separate section into TWDP code
Option R: Add a subroutine to be called by main TWDP code
Option S: normatively (in words) instruct implementer to what to do
Option T: include a minimisation loop in the code
Option U: provide a separate, recommended but not normative, algorithm.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* **16** # 74

Dawe, Piers

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

TWDP code gives inaccurate (pessimistic) answer unless 'SteadyZeroPower' is accurate. The range of TWDPs from 'perfect' (TWDP=3.36) to poor is just 1 to 2 dB, so accuracy is important. I believe that the TWDP algorithm can be modified to find its own 'SteadyZeroPower'. If this modification is not available, I believe the best method we have seen yet is a simplified version of 'case 1 OMA calculation based on linear fit ...' giving the settled zero level as far as it can be known - which is what 68A.2 says. Another approach is to try different values and look for a minimum in TWDP. This comment does not address the issue of finding the 'right MeasuredOMA'.

SuggestedRemedy

Preferred approach (option A): roll this calculation into core (step 5) of TWDP code
Option B: Insert a simplified version of 'case 1' into TWDP code
Option C: normatively (in words) instruct implementer to find the SteadyZeroPower that gives a minimum in TWDP
Option D: include a minimisation loop in the code
Option E: provide simplified version of 'case 1' as a separate, recommended but not normative, algorithm.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* **17** # 75

Dawe, Piers

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

I never got an answer to what the point of using an OverSampleRate of 16 is, when the initial measurement might be just 7 samples/UI. Are we believing in 'information' that isn't there? Would an OverSampleRate of 8 work as well? I can see the need for an even number.

SuggestedRemedy

Determine if OverSampleRate=8 is equally good. If so, change 16 to 8.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* **22** # 76

Abbott, John

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

Validation of Modeling Results with Experiments
Gen67 data set used for determination of stressors does not agree with actual data for center launch. Also the OFL BW distribution diverges from OFL BW statistics for higher BW fibers. This leads to erroneous statistics with dual launch and center launch for OM1.

The premise that a center launch will statistically improve the chances of the link working are flawed because the Gen67 set was constructed with the center perturbations uncorrelated with the outer perturbations. This does not affect the result for single launches but gives an erroneous impression of improvement with a dual launch. Actual DMD data has been presented showing that the data is somewhat correlated reducing the benefit. Mode Delays from measured index data will also be contributed showing a modest correlation underming the premise of the dual launch.

SuggestedRemedy

REMEDY: verify the center launch and offset launch are uncorrelated to the satisfaction of the committee, or shift to single launch.
REMEDY 2: the duplex link statistics are to be calculated assuming the link uses either all center launch or all offset launch, but not a mixed launch which complicates things for the customer

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* **22** # 77

Abbott, John

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

See Also p. 36 Table 68-6
CENTER LAUNCH and 0.75UI specification for stressors.
Use of 0.75UI is inappropriate with center launch because the low order modes can have extremely large lag- or precede-times. Within the TWDP code we are not limited by the spacing of the impulses.

SuggestedRemedy

REMEDY: review pulse shapes with center launch compared to proposed stressors. Expand set of stressors if necessary

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* **22** # 78

Abbott, John

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

In software can use multiple stressors. No reason to limit to 3. Can fully test. Solution. include stressors for center & offset launches, OM1, OM2,OM3. Include other UIs than 0.75.

SuggestedRemedy

Remedy: use multiple stressors in TWDP to reduce customer risk at little cost.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* **22** # 79

Abbott, John

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

See also p.36 Table 68-6.
OM3 & Stressors
(e) OM3 uses only center launch and this issue is key to guaranteeing OM3 300m performance. Recall OM2 and OM3 fibers have the same mode group structure but differ only in the magnitude of index perturbations

SuggestedRemedy

Remedy: Need specific OM3 stressors tailored for center launch.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* **22** # 80

Abbott, John

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

Also see p. 36 Table 68-6.
OM2 FIBERS AND STRESSORS
analysis of OM2 center launch shows a large difference between penalty for PIE-D and finite equalizers.
This suggests that the assumption during the generation of stressors http://ieee802.org/3/aq/public/mar05/ewen_1_0305.pdf does not apply to pulses generated by center launch.
This suggests that
(a) a different procedure is needed
(b) stressors are needed for both center & offset launch
(c) OM1 center launch should be reviewed
(d) OM1 stressors and OM2 stressors are not necessarily the same and need to be checked with modeling.
(e) OM3 uses only center launch and this issue is key to guaranteeing OM3 300m performance. Recall OM2 and OM3 fibers have the same mode group structure but differ only in the magnitude of index perturbations.

SuggestedRemedy

REMEDY: model OM2 fibers, determine if OM1 stressors are adequate and address above issues. Incorporate OM2 stressors if necessary. Resolve discrepancy between PIE-D and finite equalizer penalty for center launches and how current stressors were generated.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* **22** # 81

Abbott, John

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

There is an issue of variations in the channel (Quasi-static Time variation, see http://ieee802.org/3/aq/public/nov04/king_2_1104.pdf
http://ieee802.org/3/aq/public/nov04/king_1_1104.pdf slide 10). In order to include this effect the modeling of LRM channels needs to include additional worst case mode power distributions beyond those used for simple gaussian beams (see ROFL launch in Gigabit Ethernet Networking). For center launches
this means a more equal sharing of power between low order modes. Needs to be incorporated into coverage curves and derivation of stressors.

SuggestedRemedy

Remedy: modeling must be consistent with experimental results showing effects of quasi-static variation of the channel. Stressors must be based on this modeling. Worst Case Modal Bandwidth using equal sharing of power among mode groups improves agreement with quasi-static experimental data indicated above.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* **35** # 82

Dawe, Piers

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

This algorithm has many more taps than it should need, which would allow flaws in stressed signal generators to go undetected by 'back-to-back TWDP' screening. At present the 'far away' taps in the FFE are trying to correct the zero level, and the DFE taps approaching 25 are correcting the FFE taps, and the DFE taps above 30 appear to do nothing, even for real measured waveforms. If we decide to go to a 'short equalizer' this comment would not apply; but if we decide to stay with a 'long equalizer', we can fix the zero level (see another comment) and remove the unnecessary taps that just make the algorithm less discriminating. Further, it's bad to have the equalizer length be a significant fraction of the pattern length - this allows a fraction of uncorrectable transmitter impairments to be forgiven as if it were correctable. The remedy below is not intended to make TWDP dimensioned like real equalisers; it's still a 'long equaliser' but more discriminating. The proposed change makes no difference to TrialTWDP with the D2.2 stressors and the standard Gaussian waveform.

SuggestedRemedy

Change EqNf from 100 to 60, change EqNb from 50 to 10.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **38** *L* **37** # 83

Dawe, Piers

Comment Type **T** *Comment Status* **X** *Page num: 38. PDF page: 39*

In another comment I point out that our 'long equalizer' now has more taps than is beneficial, and propose reducing the number. Another comment (1089 against D2.1) proposes equaliser dimensions that are thought to be an upper bound of practical equaliser lengths necessary or desirable for this application. Either way, when the equaliser gets shorter, placing the cursor appropriately is good practice, and EqNf/2 is probably not ideal. For the 'shorter long equalizer', this can be a constant in the program; for a truly short equalizer it will have to be a variable.

SuggestedRemedy

Change EqDel from ceil(EqNf/2) to ceil(EqNf*0.6).

Proposed Response *Response Status* **O**

Cl **68** *SC* **6.6.2** *P* **38** *L* **49** # 84

Swenson, Norman

Comment Type **TR** *Comment Status* **X** *Page num: 38. PDF page: 39*

i should not be used as the index in the for loop. The reason is that i is predefined in Matlab to be the square root of -1. One can overwrite that definition and use i as a general variable, as is done here, but that can create other problems when the user subsequently runs a script that expects i to be defined according to the default value of square root of -1.

SuggestedRemedy

Change i to ii on this line and in other occurences inside the for loop.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **39** *L* **3** # 85

Dawe, Piers

Comment Type **T** *Comment Status* **X** *Page num: 39. PDF page: 40*

It's clumsy to normalize the OMA three times over when it could have been done just once outside the loop of three stressors.

SuggestedRemedy

If the normalization doesn't become channel specific, move the line:
yout = (yout - SteadyZeroPower)/MeasuredOMA;
to after
yout0 = load(MeasuredWaveformFile);
but before
%% Process through fiber model....
and change it to:
yout0 = (yout0 - SteadyZeroPower)/MeasuredOMA;
And keep 68A.2 aligned: swap steps 1) and 2) around.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.6.2** *P* **39** *L* **7** # 86

Dawe, Piers

Comment Type **TR** *Comment Status* **X** *Page num: 39. PDF page: 40*

The functions butter and freqs are toolbox functions (extra cost for some, possibly not so portable). As the details of the anti-aliasing filter are not supposed to matter, we should replace this with something more accessible. It's easy to avoid butter, if one knows that a = 1 123.14 7581.8 273450 4931300 and b = 0 0 0 0 4931300. Not sure how to get rid of freqs. Can we just write down a filter in a form like 1+cos(f/f0)^4 ?
This is a more specific version of D2.0 comment 303 (unsatisfied), piled on by D2.1 comment 1005 (also unsatisfied).

SuggestedRemedy

Replace toolbox functions with 'plain vanilla' code, changing the filter type if it helps. Start by replacing:
[b,a] = butter(4, 2*pi*EFilterBW,'s');
with:
a = [1 123.14 7581.8 273450 4931300]; % Denominator
b = [0 0 0 0 4931300]; % Numerator

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.9** *P* **41** *L* **47** # 87

Dawe, Piers

Comment Type **TR** *Comment Status* **X** *Page num: 41. PDF page: 42*

Need to see evidence that a complete real stressed eye generator can be made with adequate tolerance and stability. We were doing very well back in March with presentations from Massara and from McVey, now need more.

SuggestedRemedy

Assure ourselves that a complete real stressed eye generator can be made with adequate tolerance and stability, and give the intended/expected results. Do not proceed to sponsor ballot without this.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.9.3** *P* **46** *L* **1** # 88

Dawe, Piers

Comment Type **TR** *Comment Status* **X** *Page num: 46. PDF page: 47*

These pulse responses, and the matching values in table 68-8, are not normalised as requested in D2.0 comment 245 (response: 'REJECT. Can not be accepted at present.'). They aren't consistent with each other, having different OMAs.

SuggestedRemedy

Recalculate these so that the area under each curve is 1.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.11** *P* **49** *L* **3** # 89

Dawe, Piers

Comment Type **T** *Comment Status* **X** *Page num: 49. PDF page: 50*

This NOTE allowing alternative implementations is important, to allow test equipment makers to do their work - at present as an informative note it isn't part of the standard. We need to give it effect.

SuggestedRemedy

Turn the paragraph into regular text, remove 'NOTE - '.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.6.11** *P* **49** *L* **3** # 90

Dudek, Mike

Comment Type **E** *Comment Status* **X** *Page num: 49. PDF page: 50*

The page and line numbers above apply to the Change version, however in the version that incorporates the change the note at the end of Section 68.6.11 has been separated from it's correct position by figure 68-13.

SuggestedRemedy

Somehow stop the note from being orphaned from the text it refers to.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.9** *P* **50** *L* **18** # 91

Swanson, Steve

Comment Type **TR** *Comment Status* **X** *Page num: 50. PDF page: 51*

Given changes to the channel insertion loss in Table 68-2, changes are needed here.

SuggestedRemedy

Replace ""The channel consists of one or more sections of fiber optic cable and any intermediate connections required to connect sections together. The fiber optic cabling shall meet the requirements of Table 68û8."" with The channel consists of one or more sections of fiber optic cable and any intermediate connections required to connect sections together. The fiber optic cabling shall meet the maximum channel insertion loss specified in Table 68û2.""

Delete Table 68-8.

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.10.2.3** *P* **53** *L* **26** # 92

Swanson, Steve

Comment Type **ER** *Comment Status* **X** *Page num: 53. PDF page: 54*

Major capabilities/options PIC missing.

SuggestedRemedy

Add new item:

""*LRM/10GBASE-LRM/68.5/Device supports longwave (1310 nm) operation LAN PHY/Yes/No""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.10.3.1** *P* **54** *L* **6** # 93

Swanson, Steve

Comment Type **ER** *Comment Status* **X** *Page num: 54. PDF page: 55*

Optical launch PIC needs revised.

SuggestedRemedy

Replace ""PMD supports both preferred and alternative launches"" with ""PMD supports both the offset and the center launches""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.10.3.3** *P* **55** *L* **35** # 94

Swanson, Steve

Comment Type **E** *Comment Status* **X** *Page num: 55. PDF page: 56*

Editorial

SuggestedRemedy

""LRM3"" should read ""LRM2""

Proposed Response *Response Status* **O**

Cl **68** *SC* **68.10.3.4** *P* **56** *L* **13** # 95

Swanson, Steve

Comment Type **E** *Comment Status* **X** *Page num: 56. PDF page: 57*

Editorial

SuggestedRemedy

""...(TWPD)"" should read ""...(TWDP)""

Proposed Response *Response Status* **O**

Cl **68A** *SC* *P* **58** *L* # 96

Swenson, Norman

Comment Type **TR** *Comment Status* **X** *Page num: 58. PDF page: 59*

Assuming that we retain normalization by OMA for TWDP, a subclause should be added to the informative annex that suggests a method for measuring OMA that gives results consistent with the method for measuring OMA specified elsewhere in the 802.3 standard.

SuggestedRemedy

Include a subclause that includes the following code for measuring OMA:

```
% OMA calculation based on linear fit and synthesized square wave
% The OMA of the synthesized square wave is computed per Clause 52.9.5
ant=4; mem=40; %These parameters can be varied to improve linear fit
X=zeros(ant+mem+1,PtrnLength); %Size data matrix for linear fit
Y=zeros(OverSampleRate,PtrnLength); %Size observation matrix for linear fit
for ind=1:ant+mem+1
X(ind,:)=circshift(XmitData,ind-ant-1)';%Wrap appropriately for lin fit
end
X=[X;ones(1,PtrnLength)]; %The all-ones row is included to compute the bias
for ind=1:OverSampleRate
Y(ind,:)=yout0([0:PtrnLength-1]*OverSampleRate+ind)'; %Each column is one bit period
end
Qmat=Y*X'*(X*X')^(-1); %Coefficient matrix resulting from linear fit. Each column (except
%the last) is one bit period of the pulse response.  The last column is the bias.
SqWvPer=16; %Must be even. Period of the square wave used to compute the OMA
SqWv=[zeros(SqWvPer/2,1);ones(SqWvPer/2,1)]; %One period of square wave (column)
X=zeros(ant+mem+1,SqWvPer); %Size data matrix for synthesis
for ind=1:ant+mem+1
X(ind,:)=circshift(SqWv,ind-ant-1)'; %Wrap appropriately for synthesis
end
X=[X;ones(1,SqWvPer)]; %Include the bias
Y=Qmat*X;Y=Y(:); %Synthesize the modulated square wave, put into one column
avgpos=[.4*SqWvPer/2*OverSampleRate:.6*SqWvPer/2*OverSampleRate]; %samples to
average over
SteadyZeroPower=mean(Y(round(avgpos),:)); %Average over middle 20% of ""zero"" run
%Average over middle 20% of ""one"" run, compute OMA
MeasuredOMA=mean(Y(round(SqWvPer/2*OverSampleRate+avgpos),:))-
SteadyZeroPower;
```

(Other methods have also been proposed. A consensus viewpoint on which method should be included will hopefully be reached before the September meeting, in which case this comment will be modified appropriately.)

Proposed Response *Response Status* **O**

Cl **68A** *SC* **68A.1** *P* **58** *L* **35** # 97

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 58. PDF page: 59*

If variables go in italics and functions don't:

SuggestedRemedy

Q in eq.68A-1 not italic, Q in eq.68A-2 ?, Qsq in footnote in italics.

Proposed Response *Response Status* **O**

Cl **68A** *SC* **68A.1** *P* **59** *L* **47** # 98

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 59. PDF page: 60*

Missing space between two sentences

SuggestedRemedy

Insert a space just before 'The reference DFE'

Proposed Response *Response Status* **O**

Cl **99** *SC* **99** *P* **1** *L* # 99

Booth, Brad

Comment Type **E** *Comment Status* **X** *Page num: 1. PDF page: 1*

Expiration date is a bit far out in time.

SuggestedRemedy

Use expiration dates that are at the end of the week of the next scheduled meeting; otherwise, it would appear that the draft is valid beyond that point in time.

Proposed Response *Response Status* **O**

Cl **99** *SC* **99** *P* **3** *L* **1** # 100

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 3. PDF page: 3*

Gratuitous capitals in title, do not match 802.3am. Possible trailing space in title. Rubric does not match the 802.3am that I have.

SuggestedRemedy

Reconcile

Proposed Response *Response Status* **O**

Cl **99** *SC* **99** *P* **5** *L* **40** # 101

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 5. PDF page: 5*

Greek letters are not in alphabetical order; our clause has introduced a lower case delta.

SuggestedRemedy

Please put the Greek letters in alphabetical order and include a lower case delta.

Proposed Response *Response Status* **O**

Cl **99** *SC* **99** *P* **7** *L* **26** # 102

Booth, Brad

Comment Type **E** *Comment Status* **X** *Page num: 7. PDF page: 7*

Move editor's note to proceed the referred text.

SuggestedRemedy

Move the note and change ""above"" to be ""following"" in the 1st paragraph of the note.
Remove the ""following"" in the 2nd paragraph of the note.

Proposed Response *Response Status* **O**

Cl **99** *SC* **99** *P* **7** *L* **46** # 103

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 7. PDF page: 7*

Unusual line spacing

SuggestedRemedy

Reset it. May apply to paragraph above also.

Proposed Response *Response Status* **O**

Cl **99** *SC* **99** *P* **7** *L* **51** # 104

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 7. PDF page: 7*

Title is a widow

SuggestedRemedy

Keep with next

Proposed Response *Response Status* **O**

Cl **99** *SC* **99** *P* **8** *L* **49** # 105

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 8. PDF page: 8*

Double spaces in a few people's names

SuggestedRemedy

Fix; here and line 52

Proposed Response *Response Status* **O**

Cl **99** *SC* **99** *P* **9** *L* **22** # 106

Dawe, Piers

Comment Type **E** *Comment Status* **X** *Page num: 9. PDF page: 9*

Participants' names not in alphabetical order

SuggestedRemedy

Use newspaper columns

Proposed Response *Response Status* **O**