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

Swanson, Steve

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

REJECT.

See response to comment 25.

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

Abbott, John

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

REJECT.

There is no proposed change to the draft.

Compliance to LRM specification only requires success with either the preferred or alternative launch. The March interoperation test was conducted on an OM2 fiber at 300 m and was successful.

There are OM2 fibers that will work for centre launch too.

The Task Force agrees that additional interoperability testing beyond what was done in March 05 is required to satisfy Motion 3 Nov. 04.

Move to reject:
M: J McVey
S: E. Bergmann
Y: 23 N: 0 A: 8
PASSES

Move: Hostile amendment to strike 2 & 3 paragraphs:
M: S. Swanson
S: J Gwinn
Y: 12 N: 14 A: 3
FAILS

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

Swanson, Steve

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

REJECT.

The current specification has sufficent accuracy and maintains simplicity within the document.
Passes by voice.

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

John George

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

ACCEPT IN PRINCIPLE.

This text has not been changed for D2.0 or D2.1 to require a normative test. The TF will change "recommended" to be "highly recommended" to emphasize the desire for tolerance to dynamic response.

Y: 22 N: 2 A: 3
PASSES

Historical information:

The committee has already discussed, at length, the topic of a normative dynamic receiver test.

A selection of comments on this topic, and voting results:

D2.1 comment 1067, suggesting a normative dynamic test.
Vote to reject: For: 21; Against: 6; Abstain: 3

D2.1 comment 1117, suggesting a dynamic aspect to the comp. rx test. Vote to reject: For: 24; Against: 5; Abstain: 5

D2.0 comment 215, suggesting that the statement on dynamic behavior be made normative. Vote to reject: For: 21; Against: 6;
Abstain: 3

D2.0 comment 333, suggesting dynamic aspect to the comp. rx test. Vote to reject: For: 24; Against: 5; Abstain: 5

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

Swanson, Steve

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

REJECT.

See response to comment 33.

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

Abbott, John

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

ACCEPT IN PRINCIPLE.

See response to comment 33.

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

Dawe, Piers

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

REJECT.

There is no specific change proposed to the draft.

The remedy is potentially unbounded and could set precedents that IEEE 802.3 cannot hope to live up to in all projects. More than 25% of IEEE 802.3 may not accept such commitments are reasonable.

However, agree with thrust of comment. Task force members should endeavour to present experimental results at September 05, October 05 and November 05 meetings. A reasonable (as judged by IEEE 802.3) variety of such results will aid the transition to sponsor ballot.

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

Abbott, John

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

REJECT.

There is no specific change proposed to the draft.

OM1 and OM2 models have been benchmarked against Ethernet worst case spreadsheet model. This has shown that the D2.2 220 m operating range based on ~ 4 dB PIE_D stressors is appropriate for OM1 and conservative for OM2 fibers with a dual launch.

M: L. Thon
S: J. McVey
Y: 20 N: 2 A: 7
PASSES

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

Weiner, Nick

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

REJECT.

Keep RINxOMA specification at its current value because:
1) Allows widest choice of transmitter optics.
2) Simplifies testing of transmitter components.
3) Maximizes transmitter yield.
4) Will yield lower cost solutions as requested by PAR.

The commenter is encouraged to provide data that correlates transmitter noise and jitter to TP3 stress test noise and jitter to support this change.

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

Dawe, Piers

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

REJECT.

Comment and suggested remedy do not identify a specific error in or a correction for the draft.

However, agree with thrust of comment. Task force members should endeavour to present experimental results at September 05, October 05 and November 05 meetings. A reasonable (as judged by IEEE 802.3) variety of such results will aid the transition to sponsor ballot.

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

Lindsay, Tom

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

REJECT.

Insufficient evidence is available to say that the current limit(s) must be changed. It is recommended that the commenter provide more information.

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

Ali, Ghiasi

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

REJECT.

The combination of TWDP and eye mask are sufficient protection against excessive DCD.
Move to reject as per the response.
M: M. Dudek
S: J. Gwinn
Y: 16 N: 3 A: 14
PASSES

Move to add a max DCD parameter with the value of 0.15 UI p-p.
M: A. Ghiasi
S: J. Gwinn
Y: 3 N: 17 A: 15
FAILS

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

Swanson, Steve

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

REJECT.

See response to comment 25.

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

John George

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

REJECT.

Benchmarking of the OM1 and OM2 fiber models using dual launch with the Ethernet spreadsheet model suggests that 220 m operating range based on ~4 dB PIE_D stressors is supported.

Regarding suggested change to receiver test: Committee believes that test, as specified in D2.2 is appropriate. See D2.1 comment 1036, in which the receive test stressors were adopted by a vote on an accept in principle. Voting was: Yes: 45; No: 3; Abstain: 3

See response to comment 25.

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

Abbott, John

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

REJECT.

See response to comment 25 which adds a note of clarification.

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

Kolesar, Paul

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

REJECT.

See response to comment 25.

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

Dudek, Mike

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

REJECT.

The commenter is encouraged to update the link budget methodology and the link budget.
In favor: 20
Opposed: 3
Abstain: 5
PASSES

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

Dawe, Piers

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

REJECT.

Straw poll
Accept: 3
Reject: lots

This is not one of the stressors from our methodology and hasn't been proven to be necessary to use. The split-symmetric stressor is believed to be an important test case. The commenter is encouraged to investigate further.

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

Ali, Ghiasi

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

REJECT.

Straw poll:
Accept remedy: 7, 10
Reject remedy: 6, 7

Proposed accept remedy:
Y 10 N 7 A 8
Fails

Propose reject:
It is believed that the specification is adequate. Commenter encouraged to bring more data to the committee.

Y 18 N 2 A3
Passes

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

Lindsay, Tom

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

REJECT.

No improvement to the draft is required at this time.

OMSD and OMA normalization methods have been studied. Although OMSD normalization has merit, no evidence is available that OMA normalization is not adequate for protection of practical receivers. This issue may need to be revisited if/as appropriate in response to interoperability testing and test-procedure validation.

For reference, additional technical details of the OMSD normalization methodology will be uploaded to the web.

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

Dawe, Piers

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

REJECT.

There is no evidence that there is a problem with 16. The commenter should provide more evidence to substantiate his comment.

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

Abbott, John

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

REJECT.

There is wide consensus within the committee that the dual lauch approach improves the link coverage statistics (experimental results of Meadowcroft_1_0105, for example).

The Cambridge 108 model predicted the improvement as well.

The committee believes that the effect of this correlation is small and doesn't warrant further investigation. Formal proof of statistical independence is not necessary for increased probability of a functional link with dual launch.

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

Abbott, John

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

REJECT.

There is no specific change proposed to the draft.

The extremely large lag- or precede-times are likely to fail in any case; therefore, do not need to be considered. The commenter is encouraged to investigate whether extremely large lag- or precede-times with center launch would pass.

The methodolgy used to select the rx test stressors was developed methodically by committee members (Ewen_1_0305) to represent a meaningful set of stressors resulting from daul launch. It involves the design of three stressor types to represent difficult channel conditions.

It is also the desire of the committee to use the same stressors for the comp. rx test and for the TWDP code.

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

Abbott, John

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

REJECT.

The strong concensus of the committee is that three stessors are sufficient. This would also increase the computation time for TWDP.

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

Abbott, John

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

REJECT.

There is no specific change recommended.

See response to comments 80 and 77.

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

Abbott, John

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

REJECT.

There is no specific change proposed to the draft.

The consensus of the committee is that the stressors are proxies for poor impulse responses that are close to ones fibers might produce. They are not meant to reflect all the details of fibers. The consensus was to design three canonical stressors that represent reasonably high stress values that would be generated by precursor, symmetric and post-cursor channels. The TF believes the implementation penalty for finite equalizers is similar for the stressors in the draft and real fibers.

Additional information was provided at the Sept. 05 interim, see ewen_1_0905.pdf, abbott_1_0905.pdf and lingle_1_0905.pdf.

Passes by voice.

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

Abbott, John

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

REJECT.

There is no specific change proposed for the draft.

Also, this topic was discussed at length within the ad-hoc sub-committee on launch conditions and also by the full committee. The consensus within the committee is to use single mode launch for modelling.

It is encouraged that fiber shaking be part of the interoperation testing.

Passes by voice.

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

Dawe, Piers

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

REJECT.

This is not a complete solution. The commenter is encouraged to provide a complete solution with additional commenting.

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

Dawe, Piers

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

REJECT.

There is no specific change proposed to the draft.

Verification that CSRS tester is practical has been made and the results were presented at the September 05 interim meeting. The TF encourages contributions on the testing of real receivers with CSRS testers.

Move to reject comment:
M: E. Bergmann
S: L. Thon
passes by voice

Cl **00** *SC* *P* *L* # 20002

Dallesasse, John Emcore Corporation

Comment Type **TR** *Comment Status* **R** *D2.0 COMMENT 2*

Per the vote in the November, 2004 meeting, the group needs to: ""...demonstrate a 10-12 BER over the rated distance on a specified channel (TBD) and show interoperability between PMDÆs of at least three vendors for 10GBASE-LRM to support technical feasibility prior to sponsor ballot."" This has not been done. The precedent established IEEE 802.3ae can be synopsized by an excerpt from Jonathan Thatcher's comment regarding this topic that was submitted during 802.3ae balloting: ""...Feasibility means that technology must be demonstrated with reports and working models; proven technolgy; reasonable testing and with confidence in reliability..."" The presentations made to the 802.3ae Task Force in October and November of 2001 set a reasonable bar for the 802.3aq Task Force. The work of the 802.3aq task force on this subject should also contain confirmation that equalizer adaptation times ensure link stability under conditions typical for standard office environments, such as those called out in GR-63-CORE or IEC 61300-2-1, 2nd Edition, 2003-01.

SuggestedRemedy

An adaptation of Thatcher's suggested remedy applies here as well: Demonstrate the technical feasibility of the technology specified in Clause 68 while ensuring the attainment of the other 4 criteria. Or, change the requirements/specifications such that this goal can be achieved.

Proposed Response *Response Status* **U**

REJECT.
Out of scope. Comment does not point out any deficiencies in Draft 2.0.
(TF has passed a motion that interop test is necessary prior to Sponsor Ballot)

Cl **68** *SC* **5** *P* **17** *L* **10** # 20115

Cobb, Terry Commscope

Comment Type **TR** *Comment Status* **R** *D2.0 COMMENT 115*

Table 68-2. The maximum operating range for 50 um fibers with 500/500 and 400/400 MHz-km modal bandwidths has not been substantiated.

SuggestedRemedy

Use actual range limits based on necessary analysis and experiments using worst case models.

Proposed Response *Response Status* **U**

REJECT.
Specific remedy not suggested.