

## **IEEE 802.3aq 10GBASE-LRM Task Force Minutes May 17-19, 2005**

Recorder: Vivek Telang

### **Tuesday, May 17, 2005**

**9:00 AM: Introductions and General Information:** Jim McVey, who will be chairing the meeting in David Cunningham's absence

- Review of IEEE Standards Process & Requirements for WG Ballot
- Review of Objectives & Timeline

Objectives

The LRM Timeline shows that the May meeting and the June meeting will be used for comment resolution, and out of the June meeting will come the recirculation ballot draft. The recirculation period is 6/24-7/11. This will be followed by the July plenary, and hopefully out of that we will go to Sponsor Ballot.

Reminder of June interim meeting in London.

- Review of Meeting Goals & Agenda

Process of comment review

- discussion about comment resolution (with clarification from Geoff Thompson and David Law).
- Question by Steve Swanson re: early sign-off. No early sign-off. All comment resolutions (including rejects and deadlocks) go to re-circ ballot.
- Comment resolution votes do not need to be recorded in the minutes.

Agenda

- Meeting will continue past noon on Thursday to 3PM (change from what was posted on the reflector)

**9:27 AM:** Motion made to approve the agenda (Nick Weiner), seconded by Steve Swanson. Agenda approved by acclamation

**9:33 AM:** Motion made to approve the minutes by Jim McVey, seconded by Piers Dawe. Approved by acclamation.

**9:33AM:** Editor's Report by Nick Weiner (document on the web)

Question by Steve Swanson.: What does it mean to have an approved draft at this stage.

Answered by Bob Grow: The LMS chair gets to decide what to do to the draft if approved. He \*could\* forward it to Sponsor Ballot, but that's not the practice. There is an obligation to the majority, to publish quickly.

Also, if there is a disapprove vote without required comment, it is counted in the return rate, but not in the approval rate, should be classified as "disapprove without comment"

7 comments classified as uncontroversial: 34, 91, 145, 149, 229, 326, 378.

The more controversial/difficult comments have been pushed to the back. May be delegated to ad-hocs.

Motion to accept the proposed order of Comment Resolution:

M: Sudeep Bhoja, S: Petre Popescu

Approved by acclamation

**9:48AM:** [TP2 Conference Call Summary](#) (presented by Norm Swenson for Tom Lindsay who could not attend) (slides on the web)

No questions, no discussion.

The group sends its condolences to Tom and his family.

## **BREAK**

**10:13 AM:** [Report from TP3 Conference Calls](#) presented by Jim McVey (slides on the web)

No questions or discussion

**10:22 AM: Presentation:** [The need for a robust 10GBASE-LRM Standard](#) (Steve Swanson)

Discussion/Questions:

Ali Ghiasi: Robustness has always come down to Laser failure. LX4 may be robust from the link model, but it fails because of poor lasers.

John Jaeger: Which part of Draft2.0 do you think doesn't meet the objectives.

Steve: The current stressors are at 5.0dB PIE-D, and EDC vendors have stated that this is not cost-effective.

Piers Dawe: LX4 is overengineered, expensive, but is solid. SR needs a brand new premium cable. LRM is unique because it works on legacy cable. The cost benefit analysis is different because the cost is low. LRM is useful to have in the arsenal of PMDs, even though the coverage maybe questionable. The network operator should be given the choice.

Steve: Could not disagree more. Market data suggests that people who want 10GE do not have a problem installing new fiber. All the things that apply to LRM also applied to LX4 but were not considered.

John Abbot disagrees that the cost analysis is flawed. The cost to put in a new system is not cheap.

Steve says that the network operator who has the 300m which all fail will be disappointed

John George: Supports Steve. If the network operator expects that LRM is reliable on 300m, he needs to understand the risks.

**10:53 AM: Presentation:** [Installed Base Coverage Deficiencies and Remedies for 10GBASE-LRM](#) (John George)

Presented 2 motion, but the motions will be taken later.

No discussion or questions

**11:00 AM: Presentation:** [Scaling LRM Length to Match PIE-D Capability & Failure Rate Using FDDI Gen67 Fiber Set](#) (John Abbott)

Discussion and Comments:

Norm Swenson: We need to agree on the method of dual launch. May make a few 1/10 dB difference, but that is important.

Mike Dudek: Why does the dual launch show up worse than the center launch. Ans. Because the center launch was not statistically varied. Also there were connectors.

Ali Ghiasi: How much dip do you see in the fiber for center launch? Ans. John does not know off the top of his head, but will post to the reflector.

Mike Dudek: Why do the dual launch curves look so flat? Ans. The center launch has split pulses, which if you can equalize, it doesn't matter what the spread is.

Paul Kolesar: To answer Ali's question, the pulses are split, and it doesn't matter whether it's a peak or a dip. This only affects whether the fundamental mode leads or lags the other mode.

**11:21 AM: Presentation:** [Effect of 1355nm Source on LRM Length/PIE-D/% failure tradeoffs](#) (John Abbot)

Piers Dawe: On slide 3, which dots are which? Ans. The red is 1300, and the others are shifted.

**11:29 AM: Presentation:** [A New Approach to Measure TX Signal Strength and Penalty](#) (Norm Swenson)

John Abbott: Is this something new? Ans. No, nothing new, just new application.

Sudeep: What is the justification behind the assertion that the gamma correlates with a practical equalizer penalty? Ans. Can't prove. But most reasonable approach as far as I know.

Scott: nervous about TX and RX getting tied together.

John Abbott: On slide 6, what do you mean by "this gap should shrink?" Ans. Can't say that this is true in all cases. "This gap will shrink for a well-designed receiver", but not for all pathological channels.

Andre: question about linearity

Jim McVey: Agree that looking at the signal in a more sophisticated way, not just OMA is the way to go. Also, agree that we should use finite equalizer effects. But what about phase response? The high frequency needs to be bounded. Also agree that the previous overestimation of pre-emphasis is correct. But we need to put some constraints on the preemphasis energy, and how it fits with eye safety and receiver distortion. Ans. Agree that peak power needs to be limited.

Nick Weiner: What are you proposing wrt the document? Ans. Propose that we place limits on Gamma, the SNR effective for the transmitter for the TP2 compliance test Q. Are you advocating the use of pre-distortion. A. The standard should neither require nor preclude pre-distortion.

Lars Thon: Q You treat ISI as Gaussian. What you really want to use is the peak ISI. A. The current TWDP code does exactly that.

Sudeep: On slide 10, can you comment on specific values of these numbers? Ans. No, it's a work in progress. But I'm thinking gamma=1dB.

Petre: If predistortion is not required and not disallowed, how can you guarantee interop? Ans. You have to do it in a way that allows interop. Q. Then why should we use PD?

Ans. To improve margin

**12:22 PM: Presentation:** [Dynamic RX Test Justification](#) (Paul Kolesar):

Scott: We should separate the PIE-D numbers from the dynamic test justification. Ans. Agree

Mike Dudek: These fibers were purposely chosen because they were interesting, not randomly picked. So not surprising that the numbers are worse. Ans. The fibers were chosen for their behavior at 850 not 1300. John Jaeger disagrees.

Jonathan King: Slide 7, disagrees that the static model underestimates the PIE-D. Monte Carlo takes into account the worst case, presented by Yu Sun in January. Also, on slide 6, when choosing between two launch conditions, you would not have chosen the worse one. Also the actual adaptation rate of EDC is about 100Hz-1 kHz, about an order of magnitude faster than the variation. So the static test covers the variation. Ans. The one that is chosen may be the one that works, not the one that is best. Agree with everything else. But we need to cover it with a test

Abhijit Shanbhag: Why should EDC be able to compensate for worse of the two launches? Ans. Same answer as above. We should cover worse of the two cases.

Q. If we did in fact pick the better launch, would the bad data points go away? Ans. Yes, but how will the customer know? Q. Are you suggesting that Gen67YY be amended.

Ans. That is one way to solve the problem. Q. Do you think the channel could vary fast enough that the commercial EDCs could not track it, and static test does not cover the variation? Ans. Yes. But that is the lowest on my list? Q. What is the justification of your worries. A. Lab results. Q. But not specific impairments. A. Not specifically. Q. Request additional data. Otherwise the red flags are hypothetical.

Lew Aronson: We started out considering a dynamic test, but the complexity of implementing was not justified by the low risk. So we removed it. Ans. There is no requirement that the receiver should track from one stressor to another in any reasonable time constraint.

John Abbott: Slide 6: Agree with Lew that the dynamic test may be complex. But I'm worried the static measurement does not reflect this either. To answer Abhijit's question, the modal power dist. changes, not the delays.

Piers Dawe: Slide 4, The really problematic case is 4 orange, where the range spans the red line. You can probably make this happen by manipulating the fiber in a fraction of a second. So this can be tested informally. Ans. You can't be sure that the patch cord is shaken, but we could instruct the customer to do this, to jiggle both ends. This has no precedent.

Jonathan: The MC simulation predicts the upper no. of the range, not the center. So this is already comprehended in the Gen67YY models. Also, this is impractical.

John Dallesasse: There was no consensus that we get rid of the dynamic test. I haven't heard anyone say that there is no dynamic component. Also, we expect the link to perform when the dynamic condition is occurring. We need to explicitly say this, and have a test that explicitly tests this. Even though this is a big burden, we would need to do this only when the design changes.

Petre: Will take too long to implement in real life. Ans. The test duration does not need to be longer for the sweep.

### **1:21 PM Break for lunch**

**2:39 PM Presentation:** [Modification of Comprehensive Stressed Receiver Sensitivity and Overload Test for Verification of Equalizer Adaptation Times](#) (John Dallesasse):

Piers Dawe: Jonathan King's group has studied this, and their conclusion was that the variation was slow enough to be tracked by EDC. Also, if the issue was in the environment of the transmitter, then it's not the receiver's problem. If it's the cable environment, then it's a different thing, but the IEEE has stayed out of cable environment specification. Ans. Agree that in the past the IEEE has not specified. But now it is important. Also 63GR-core is not accounting for all the types of conditions that are present.

Paul Kolesar: Could the triangular waveform be sinusoidal. Ans. Any wf that could work with the power constraint is acceptable

Petre Popescu.: Why not symmetric. Ans. Going from precursor to postcursor should cover it

**3:00 PM: Presentation:** [Noise Load for Comprehensive Receiver Test](#) (Albrecht Rommell)

**3:30 PM: Presentation:** [Stressors Selection, Coverage and Reach Requirements](#) (Albrecht Rommell)

**3:45 PM: Start of Comment Resolution**

*< Minutes recorded in the Comments Database >*

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**Wednesday 5/18/05**

**1:53PM: Assignment of leaders for comment studies:**

**Motion #1 (Procedural):**

**Further study is required to resolve Comments 115, 159, 160, 387 (Operating range for 50  $\mu$ m 500/500 and 400/400), and the TF nominates John Abbott to lead the study group**

M: Paul Kolesar

S: John George

**Passed by acclamation**

**Motion #2 (Procedural):**

**Direct TP2 and TP3 groups to recommend any required changes in the draft to account for longest wavelength operation as specified in Table 68-3**

M: John George

S: Paul Kolesar

**Passed by acclamation**

**Motion #3 (Procedural):**

**Accept the response to Comment 396 (Launch for 50um 400/400 fiber)**

M: Steve Swanson

S: Robert Lingle, Jr.

**Passed by acclamation**

**Motion #4 (Procedural):**

**Further study is required to resolve Comment 346 (TWDP for calibration of Comprehensive RX test), and the TF nominates Jonathan King to lead the study group**

M: Norm Swenson

S: Scott Schube (sp?)

**Passed by acclamation**

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**Thursday 5/19/2005**

**8:30 AM**

**Motion #5 (Procedural):**

**Give editor discretion in how to respond to E comments;**

**Give editor discretion to accept ER comments;**

M: Nick Weiner

S: Steve Swanson

**Passed by acclamation**

**Assignment of study groups:**

- 115, 159, 160, 387: Operating range for 50  $\mu$ m 500/500 and 400/400 (**John Abbott**)
- 166: Effect of 1355 nm TX wavelength on link length for OM1 and OM3 (**TP2/TP3**)
- 173, 273, 276: TP2 eye mask coordinates/hit ratio (**Piers Dawe**)
- 174: Usefulness of dropping stressor from TWDP to create TWP (**Tom Lindsay**)
- 187: Connector loss w/ controlled launch vs OFL (**Jonathan King**)
- 251, 278: Changes to TWDP algorithm to normalize power correctly (**Tom Lindsay**)
- 279: Look for other TX impairments and deal with them (**Tom Lindsay**)
- 284: Need for TWDP? (**David Cunningham**)
- 290: Copyright release for Matlab code in TWDP (**Tom Lindsay**)
- 337: Peak noise power in TP3 comprehensive test (**Jim McVey**)
- 346 (TWDP for calibration of Comprehensive RX test (**Jonathan King**))
- 361: Comp cal figure and surrounding refs. (**Jim McVey**)
- 392: Pre-compensation (**Tom Lindsay**)
- 393: Finite equalizers in TWDP (**Tom Lindsay**)

**11:30AM**

Closing announcements

Reminder of next meeting in London June 14-16

Reminder of re-circulation ballot

Reminder of plenary meeting in San Francisco meeting in July

**11:35 AM: Motion Madness**

**Motion #6 (Technical)**

**For all 802.3aq calculations and analysis of installed MMF, the percentage of duplex links capable of supporting compliant 10GBASE-LRM PMDs shall be used as the basis of representing coverage for each optical fiber type specified. Such duplex link coverage shall be calculated as follows: (fiber coverage)<sup>2</sup> = duplex link coverage.**

**M:** John George

**S:** John Abbott

**Y:** 16    **N:** 11    **A:** 7

**Motion FAILS**

**12 Noon**

Meeting Adjourned