10GBASE-LRM INTERIM MEETING
Ottawa, Canada
P802.3aq Task Force Minutes

MONDAY 27 SEPTEMBER 2004

Referenced to: http://www.ieee802.org/3/aq/public/sep04/index.html

Opening Session
Welcome and Introductions
-   Request to task force attendees to review the minutes from the July 2004 meeting for approval at the closing session.
Appoint Recording Secretary
Ground Rules
Reflector and Web Information
Review IEEE Patent Policy
Review of the IEEE Standards Process
Review of Task Force Objectives
Review of Project Timeline
Goals for the Meeting

Review of the Agenda
•   Minor modification to the presentation order suggested & agreed; no objections
•   Insert a late presentation (TP2/TP3) from L. Aronson into Day 2 agenda; no objections

Motion#	1			
Accept the Agenda as presented & modified by D. Cunningham.				
Moved	D. Cunningham			
Seconded	J. Jaeger			
Procedural (50%)	**Yes**	**No**	**Abstain**	**Result**
	by acclamation			**Passes**

Presentations

IEEE 802.3aq Channel Modeling Ad-Hoc: Recent Progress, Future Goals & Plans
Ian White

Key Points:
•   Activities to date overview
•   Task leaders have progressed the ad-hoc activities
    o   FDDI-grade / OM2 / OM3 model – Richard Penty
    o   Time-varying study & modal noise – Jonathan King
    o   Input and output parameters – Lars Thon
    o   Launch and filter modeling – Yu Sun
    o   Validation – Nick Weiner
•   FDDI-grade / OM2 / OM3 model – Goals & Activity Overview
•   Time variation & modal noise – Goals & Activity Overview
•   Inputs & outputs – Goals & Activity Overview
•   Launch & mode filtering – Goals & Activity Overview
•   Validation – Goals & Activity Overview
Questions & Discussion
•   Q: P. Kolesar: Envision rolling TP2 & TP3 into the ad-hoc?
    o   There is a need to coordinate & ensure minimal overlap of the efforts

Channel Modeling Ad Hoc Task 1 – Static Channel Model
Ian White (for Richard Penty) & John Abbott

Key Points:
- Ian:
    - Required activities & approach
    - Rationale to Methodology
    - 81 fiber model overview
    - Review of possible perturbation sets to the model
- John:
    - Purpose of the Monte Carlo set
    - Criteria for generating the set
    - Gen54YY Test Data Set Introduction
    - Discussion Summary

Questions & Discussion
- C: P. Hallemeier: Clarification of Modified 81 model coverage – does not include any EDC; inappropriate for the ad-hoc to take this stand
- C: J. Abbott: yield # is an appropriate value for comparison & subject to interpretation
- Q/C: A. Ghiasi: Surprise at the large variation of OFL bandwidth
    - Discussion took place of scaled data sets; and how one works with the data set (mode groups, spot size, …) can provide significantly large relative deltas
    - C: J. Abbott: 5X sounds larger than expected, will follow-up with people at this meeting

Task2 Update: Time Variation & Modal Noise Study
Jonathan King

Key Points:
- Review of goals
- Overview of task activities & progress
- Worst case off-set review
- Summary Comments

FDDI Channel Modeling: Comparison of Data Sets
John Abbott et al

Key Points:
- Detailed review of the Monte Carlo data set
- Comparison to a number of additional data sets (from fiber manufacturers & Corning MBI data)
- Kinks – DMD vs. Radial Position; review of manufacturer data
- Recommendation review

Questions & Discussion
- Q: S. Bhoja: can you explain what the MBI310 data sets means and is it available?
    - MBI310 data set represents profile data that John received from Corning during the period of the MBI work effort; pre-form index data, which he ran through a mode solver and created a set of delays; appears in a published paper; specifics have not been shared to date; and John will investigate approval to do so [post meeting note: John provided an Excel spreadsheet containing 25 mode delay sets from the MBI310 data to accompany his presentation. Refer to the 802.3aq public area for this file.]
- Q: B. Zona: question on the 81/108 and the Monte Carlo approaches and how do these come together; and gauge the statistical relevance of the data sets to the work at hand
    - D. Cunningham, this is part of the agenda topic at hand for tomorrow when adopting the fiber models
- Q: I. White: Clarification of DMD Slope vs. Offset BW (slide 17) assumptions
    - 65 fibers with many steps out, some steps in, - requires further investigation as well as looking at the 108 set
- Q: S. Bhoja: Possible to provide some of the data that went into the Monte Carlo set
    - J. Abbott, yes although exact specifics TBD.

Break

Straw polls on Interim meetings taken:
- – Vancouver week 1/24 - 1/28; conflicts with TIA meeting (35)
- – Sacramento week 1/17 – 1/21; would need to arrange for vice-chair (8)
- – May '05 Edinburgh Scotland possible location polled

DMD Simulations Based on Scaled/Non-Scaled Index Profiles and Comparison with Cambridge Model Results
Yu Sun (for Gary Shaulov)

Key Points:
- Comparison of Optium & RSoft simulation results reviewed
- Comparison of pulse shapes; Optium vs. Cambridge
  - o Iterations for specific fibers presented
- Preliminary conclusions outlined
- 2nd iteration results presented

Questions & Discussion
- C: J. Abbott: clarification of work attributed to John in the material; he was working with the Cambridge 81
- C: J. Abbott: comment on the number of mode groups maintained & the implications should be discussed
  - o D. Cunningham: we need to agree the approach, amount of difference in the end may not be material
  - o Q: P. Hallemeier: any history on where 18 mode groups was picked
    - ▪ Deferred to Ian
    - ▪ Discussion on mode groups, how the perturbations were added, re-scaling methodology, … ensued for clarification. Ian also indicated that specifics are in the release information – and the methodology was very similar to what was presented in Long Beach with an exception of the edge perturbation case.

Preliminary Results of PIE Metrics Calculations
Yu Sun

Key Points:
- Simulation set-up and PIE calculation presented
- PIE metric comparison, JDSU & Optium, aligns well
- Effect of input pulse width on PIE metrics
- Summary of PIE metrics for different launches presented
- Preliminary PIE metrics for links with connectors – new data
  - o NB: all high order modes considered; comparative results vs. distance can be drawn
- Conclusion & next steps reviewed with requested feedback from the group
-

Questions & Discussion
- Q: S. Swanson: question on the Tx specs used; suggesting to change the rise time spec?
  - o In some applications, may need benefit of a higher quality Tx
- Q: S. Swanson: 80% coverage clarification
  - o Used to pick up a reference point for comparison; graphs provided for other coverage points of interest
- C: J. Abbott: request to display results for 30 & 47 ps Tr and 80% coverage & a higher coverage percentage
- Q: J. George: How did you calculate the Vortex & center launch cases
  - o Mode groups from Cambridge, & power coupling coefficients from J. Morris for Vortex and from Optium for center launch. Optium would be happy to provide their material.
- Q: M. Traverso: Is 30ps Tr 10/90 or 20/80? A: 10/90.

Channel Metric Results for OM3 Fibers at 1300nm
John Ewen et al

Key Points:
- OM3 simulation model presented; 3117 fibers maintained in the analysis per the criteria outlined
- PIE metric results presented (PIE-L & PIE-D)
- Discussion of the results
  - o Delays as a function of mode group presented, 850nm optimized fiber results in systematic delay trend at 1310nm
  - o Results in relatively broad pulses with a monotonic high-frequency roll-off
- Results for 300m with +/-3um off sets
- Linear & DFE Equalizer data presented for different launches
- Summary results presented

Questions & Discussion
- C: J. Abbott: Very good & interesting work. However, the OM3 data set includes an awfully lot of fiber with impossibly high bandwidths; need to be discussed & considered
- Q: J. George: when you state 300m on OM3 is difficult but maybe not impossible, what is required to do so?
  - o Need link model with connectors, off-sets et al and then could start to address what would be required
- Q: S. Swanson: Common launch clarification for OM2 & OM3 – expect this to be different?
  - o Don't know without having an OM2 model, can not be sure to this point
- Q: J. George: Responses filtered to one of 6 DMD masks, does the filtering also include the new specification addressing kinks?
  - o Not sure, need to address this question to Petar Pepeljugoski
- C: P. Kolesar: DFE center launch data looks to be best behaved, possible to create a launch that mimics the center launch without an off-set and contains the standard OSL for OM2 fiber.

Break for Lunch

TP2 Ad Hoc Overview and Status for LRM
Tom Lindsay

Key Points:
- Agreed objectives – proposal for TP2 signalling parameters & testing for September meeting
- Progress from the conference calls reviewed
- Future work direction reviewed

EDC Performance versus Relaxed Transmitter Specifications and its Implications for TP2 Testing
Martin Lobel

Key Points:
- Objective to establish an understanding of Tx characteristics on link penalty & EDC performance
- Results for a range of lasers & packages, with & without EDC presented
- A significant amount of detailed data was presented, examining a number of different cases, with corresponding conclusions drawn from the results outlined

Questions & Discussion
- Q: N. Weiner: Any comments on how your conclusions differ if you were not looking at using 4G technology, but instead was looking at reduced specification 10G technology?
- Q: Tap spacing of the FFE filters? A: T/2 space.

Comparison of EDC-Enabled Link Performance Using Measured Waveforms from 2.5G and 10G Lasers
Norm Swenson

Key Points:
- Motivation for the work, and data capture & simulation methodology presented
- Eye diagrams & penalty calculations per the methodology outlined given

- Penalty vs. Fiber Length and the resulting decreasing delta's with increasing distance approaching 300m discussed
- Summary results outlined
  - Single fiber results showing a relatively small (0.2dB) penalty for the 2.5G TOSA
  - Penalties of the laser & fiber are not additive

Questions & Discussion
- Q: A. Shanbhag: results look encouraging. Do you have the spectral characteristics for the 2.5G laser.
  - Yes, he will talk to the person who supplied who supplied the data for the Tx source (L. Aronson) and see if he can provide this data
- Q: P. Kolesar: trying to understand the differences between Yu Sun's presentation today and the Cambridge 81 results from this presentation
  - Norm could not comment to this as he was not present for Y. Sun's presentation, but it was noted to not assume the Tr/Tf performance of the laser under test
- C: T. Lindsay: Commented that one needs to consider that the rise time is not necessarily the best way to think about the transmitter.

Break

PIE Metrics & Mask Testing
John Ewen

Key Points:
- NB: the metric presented are <u>normalized</u> PIE metrics for the simulation methodology presented
- Simulated eye diagrams and corresponding relative PIE metrics at 220m & 300m shown
- Added in a 'moderate' & 'high' noise case (RIN & scope noises) and the resulting delta to the PIE metrics

Questions & Discussion
- Q: P. Kolesar: asked if any of the presented effects are included in the implementation penalty – is there a description of the included effects in implementation penalty?
  - Quite a bit of discussion on implementation penalty has transpired over the past several meetings;
- Q. P. Dawe: Earlier heard from Martin that combined effect can be greater than the sum, and from Norm that combined effect can be less than. From your results, what similar conclusion to your draw?
  - A noted difference that the material presented here is for a linear system, so this needs to be taken in consideration

TP2 Test and Specification Framework Proposal for LRM
Tom Lindsay et al

Key Points:
- Tom indicated that he may skip over a bit of material in order to fit it in under the 60 minutes requested!
- The objectives & general framework for the work outlined
- Categorization of TP2 impairments into correctable & uncorrectable provides insight into the rational for the following material – and is a unique need arising with the use of an EDC-based system
- The "Correlated test - concept diagram" depicts the fundamental basis for the approach

Questions & Discussion
- C/Q: L. Aronson: problem is not so much with the proposed test, but that it might lead the elimination of the eye mask test. J. Ewen's method from his presentation could account for some of the unallocated penalty. How much would such an approach claw-back?
  - Would refer the question to P. Dawe or J. Ewen for the work that they have done in this area.
- Q: L. Aronson: How do you see this being included in the specification?
  - Defer to an EDC expert in what the best approach may be. S. Bhoja referred to the 1000BASE-T clause & P. Dawe indicated that there is some pseudo-code in this clause as well.

- C: P. Dawe: would believe that a mask test would still be useful.
- C: A. Shanbhag: if the Tx is compliant with the 10GBASE-T LR specification (mask & TDP) is that sufficient?
  - o Need to consider and incorporate the TDP with appropriate/specified MMF, which has its own set of implications
- Q: J. Peeters Weem: when doing 802.3ae, believe that the TDP test was to get at the low probability error events. For LRM how do we cover this?
  - o Slight aside - could look at incorporating histograms; secondly, TDP does give you both a BER/low probability aspect as well as a discrete number to reference & test against.

Report from Conference Calls on TP3 Specification
Mike Lawton

Key Points:
- Summary material from the weekly TP2 calls
- Mike indicated that with the forthcoming detailed presentations from the TP2 activities later in the agenda, he would summarize the work efforts to date within the group quickly here.

Task 2: TP3 - ISI Generator Block for Stressed Sensitivity Test
Petre Popescu et al

Key Points:
- Review of the TP3 ISI Generator work which has been in discussion and under modification within the TP3 activities for the past 4+ weeks
- Goals & evaluation methodology outlined
- Details on the ISI Generator Block using Three Peak Impulse Response Approximation reviewed
- Conclusions of the applicability of the ISI generator and future work direction outlined

Questions & Discussion
- Q: Unknown Questioner: clarification of the 'fibers' labelled post-cursor/pre-cursor/quasi-symmetrical – are they actual fibers or where were they derived from?
  - o All taken from the Cambridge 81 set – refer to the fiber label for identification.
- Q: J. George: how well does the quasi-symmetrical matches the Gaussian pulse response of the fiber
  - o 18.3dB - therefore match the pulse of the fiber within ~2%
- Q: J. Abbott: if the Gaussian pulse is wider, do you need more than 3 taps?
  - o Based upon work to date, Petre believes that you do not need more than 3
- Q: M. Lobel: How sensitive do you think the approach is to the actual T-spacing?
  - o A very detailed answer provided – minute taker could not summarize it here…
  - o Follow-on discussion that many of the implementation specific items which would go into such a TP3 test is work for further study
- Q: A. Shanbhag: Justification for 3 impulse responses – do you really see a scenario that an EDC which can compensate for pre-cursor & post-cursor would have a problem with quasi-symmetric
  - o Yes, Petre does feel that this the case and all 3 are needed
- Q: P. Kolesar: Error peak – clarification on this
  - o Different points where matching of the area – relative maximum of the height of the impulse over time (see slide titled #10 for specifics)
- Q: P. Kolesar: are there one or two tests under consideration?
  - o As defined here today, static stressed test & dynamic test – two tests. However, took into consideration both in the work here, and it is likely too early to make any definitive decision

Task 2: TP3 Temperature Impact on Channel Model
Petre Popescu

Key Points:
- Review of the temperature impact on the channel conducted for the sub-task 2 work within the channel ad-hoc

Questions & Discussion
- Q: P. Kolesar: Fabry Perot RIN comment on the slide; do the effects get worse, better, … over temperature?

TP3 "3 Impulse " Test Proposal
Nick Weiner (for Ben Willcocks)

Key Points:
- Motivation & methodology for the work outlined

Questions & Discussion
- C: P. Kolesar: comment as to the comparison to Petre's work and this
  - This work was directed at PIE metrics as challenging as what one gets with the Cambridge fiber, but does not try and emulate the fibers themselves.
- Q: N. Swenson: why not go up to A=1?
  - Looked at values of A to get as challenging as Cambridge metrics – and up to the 80% percentile coverage point
- Q: A. Shanbhag: concern & question of pre-post-pre at the 1kHz rate that justifies the channel variation reviewed here?
  - No have not seen this, this was motivated as how to test and stress an equalizer and was not tied to any specific channel data

10GBASE-LRM over 300m of FDDI-grade Fiber - Experimental & Simulation Results
Jonathan King

Key Points:
- Motivation was to provide both simulation & experimental data for performance of 300m of FDDI-grade fiber
- Simulation data of the Cambridge 81 v1.1 with PIE metrics for 300m
- Measured PIE metrics for center launch & off-set launch for the TIA 12/96 fibers presented
- Experimental BER results for the 12/96 TIA round robin (300m) fibers reviewed
- Summary & next steps when the modified Cambridge and/or FDDI-grade Monte Carlo are adopted and the addition of connectors when an agreed link model is adopted

Questions & Discussion
- Q: J. George: Since there is generally a 10% variation in measured OFL bandwidth, we may have to include fibers such as 2green. Can you comment on the OFL numbers?
  - The OFL numbers were provided by NIST
  - D. Cunningham commented that the OFL BW of one fiber did not agree with the TIA agreed numbers. J. King would review the data and update the slides if a transcription error occurred (post-meeting note: 2 blue was indeed incorrectly listed).
- Q: N. Swenson: Can you comment on the number of taps that were used?
  - That is considered proprietary information
- Q: S. Swanson: Why does CL & OSL on 2 blue & 3 blue have similar PIE-D metric when OFL bandwidth is very different?
  - As has been discussed in earlier presentations, OFL bandwidth is not necessarily an accurate predictor of PIE metrics
- C: P. Dawe: CL & OSL are both valid launches that need to be considered based on these results.
  - Agreed.

Closing Comments

A discussion on the agenda and topics for presentation on Day 2 was directed by D. Cunningham.

Adjourn for the day.

10GBASE-LRM PLENARY MEETING
OTTAWA, CANADA
P802.3aq Task Force Minutes

TUESDAY 28 SEPTEMBER 2004

Opening Comments

The chair reviewed the agenda for the day.

Feasibility Demonstration Towards 300m and Beyond Over FDDI Grade Fiber for 10GBASE-LRM
A. Shanbhag (for Venu Balasubramonian)

Key Points:
- EDC technical feasibility and experiments with electronic emulation of a few of Cambridge fibre set, using 8 tap, 50ps FIR filter + 3-4 GHz filter to emulate fibres f18o17 (post-cursor), f48o17 (pre-cursor), f42o20 (quasi symmetric)
- Conclusion: significant link margin at 220m; 300m even worst channels have penalty <6-7dB optical

Questions & Discussion
- Q: N. Swenson: asked for clarification of eye diagrams shown in presentation
  - Input to slicer after unspecified EDC
- Q: L. Thon: Is line 2 minus line 3 equal to the implementation loss?
  - Yes (relative to a PIE-D ideal implementation) Because PIE-D metric is current metric for link budget development
- Q: M. Lobel: These are electrical emulations - has conversion into optical domain been tried?
  - No, but no fundamental issues - more of practicality of matching electronic signals out of emulator into laser drive circuit

Proposed Functional Additions to Support Receiver Eye Characterisation
Tom Waschura

Key Points:
- Overview of capabilities & limitations on current test equipment
- Decision threshold adjustment & programmable delay to enhance current test & measurement functions for optical transceivers put forward
- Proposed potential additions to the MDIO functional interface to support this proposal for R&D & production testing environments

Questions & Discussion
- Several questions and discussion items were ruled as improper and not allowed, as they were too close to company product or licensing related – both items which are covered in the IEEE meeting rules.

TP2/TP3 Progress: Comments and Suggested Areas for Consensus
Lew Aronson

Key Points:
- TP2 compliance test – discussion of issues, rationale for retaining eye mask & conditioned launch material review
- TP3 compliance test – informative sensitivity test, stressed sensitivity test, dynamic adaptation test and discussion of OMA measurement of compliant signals
- Potential areas for consensus – motivation for preliminary motions for consideration; for a draft 1.0 document and to focus future work
- See slide material for the summary areas & recommendations for discussion

Questions & Discussion
- Q: R. Lingle: question on statement of the large impulse responses and ability to track across pre-cursor to post-cursor case and ability to adapt the coefficients – has this been demonstrated as not being an issue?

- o Lew claimed to not be an expert on this and that we should put this to the EDC experts to address
- Discussion on how to emulate the broad range of impulse responses from the fiber models and have the tests be indicative of the coverage which the group puts forward.
- C: S. Bhoja: stated that the 2.3GHz filter in the informative stress test is a bit premature and should be a TBD value
    - o Lew discussed that for the test, the defined sensitivity is still an open value
    - o Sudeep stated that we need to correlate the PIE metric back to the new baseline models under consideration
- C: L. Thor: Statement that dropping all together the dynamic test may be a dangerous thing to do – an 'unscrupulous' manufacturer would build a LRM device that could not track temporal changes since they were unspecified
- C: A. Shanbhag: Has a general concern that many of the numbers in the proposal are set up for 300m distances and not 220m
    - o Agreed that we have two distances which we are evaluating – and being a bit schizophrenic on our behaviour – we can scale the specifics to the final agreed distance specification if/when they change
    - o Discussion on how to handle the discrepancy that the current objective is 220m and many of the proposed numbers are for 300m ensued
- C: J. Abbott: statement that until the fiber models are adopted, uncomfortable with the portions of the TP3 tests reviewed. Specifically the structure of the impulse tends to "be blurred" and broadened out.
- C: P. Kolesar: supports the general objective to improve the test compliance, but concerned on some of the statements with respect to the dynamic tests and given some of the work of the ad-hoc, frequencies up to 100Hz may need to be accommodated and is this considered low-speed or high-speed?
    - o Agreed, but with the magnitude of change for the responses at these frequencies, put forward that we do not need a dynamic penalty test. More discussion ensued between Paul & Lew on the subject…
    - o Petre Popescu added additional commentary to the changing nature of the channel and the need to test for this change. Speed of the change is not necessarily the issue
- C: P. Dawe: statement supporting the body of work within the presentation.
- C: N. Weiner: statement on how much we spend on the test and the cost/benefit trade-off needs to be understood, but given to speed of channel variation currently being discussed, his current leaning is towards leaving the dynamic test out
- C: J. King: personal opinion is that it is too early to make a decision either way on the dynamic test, and that he feels that Task 2 should be allowed to finish their work
- C: N. Swenson: regarding your recommendation for retention of the eye mask – are you suggesting that there may be two ways to qualify the Tx signal?
    - o Too early to resolve that now, but feels that there are sufficient rational to retain a test that is similar to what we have today
    - o Discussion regarding the trade-off of making it too loose vs. too restrictive needs to be understood

Break

Adopt Fiber Models Agenda Topic:

Ian White:
- Thanks to the Task team & particular thanks to Paul Kolesar & John George for working on the proposal below; as well as the small task team meeting attendees from this morning.
- Two Models for OM1 have been worked on in the task 1 group
    - o Within the task 1 group, wish to put forward in this meeting, motions to approve both the 108 fiber set model and the Monte Carlo model be adopted to be used to generate the standard
    - o The 108 contain a set of challenging fibers for carrying out a number of studies of interest to the group
    - o In parallel, the Monte Carlo model has had a lot of work into it to compare it to the installed base, and is beneficial in this regard
    - o The models are useful, are rigorous and beneficial for ongoing work with the LRM task force

- o The task group has not assigned yields and related metrics or is trying to imply how the standard might interpret the results

*Questions & Discussion on the **background** of the motion*
- C: S. Swanson: stated that this motion is a good step forward for the committee to be able to move forward with the task group
- P. Kolesar: point of clarification – the term 'baseline' is a foundational point from which to progress. The models will evolve as the group sees the need to have them reflect future views.
- C: J. Abbott: stated that motion represents a well worded consensus for moving forward and represents an area of agreement within the task 1 group.
    - o Discussed the 108 fiber distribution compared to the Corning MBI310 data set, which Ian discussed ('V shape' DMD vs. Bandwidth curves), and presented graphs for both for 17um & 23um
- R. Ingle: the reason to put forward the modified 81/108 model is to represent the perturbations that have been shown to be in the installed base and this 108 model needs to be put forward as an improvement.

Motion#	1			
Adopt 108-fiber set with 9 kink positions as presented in penty_1_0904 as a base-line collection of challenging FDDI-grade cases to support efficient studies of potential 10GBASE-LRM specifications prior to determination of launch conditions, as it contains fibers that are challenging for a variety of launch conditions. Adopt Monte Carlo fiber model in abbott_1_0904 as the base-line model that shall be evolved to best represent the installed base of FDDI-grade fibers by alignment with manufacturing data. These models will be used to validate the compliance of specifications for meeting P802.3aq objectives.				
Moved	Ian White			
Seconded	Paul Kolesar			
Technical (75%)	**Yes**	**No**	**Abstain**	**Result**
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Discussion on the motion
- Is the 108 fiber set meant to model the FDDI-grade fiber? Was not clear from the working of the motion
    - o Yes, we believe so. All the supporting and foundation data is meant to reflect the FDDI-grade fiber. However, it is not put forward as a "worst case" set. This was meant to represent a distributed set of fibers that are indicative and challenging for this fiber type.
    - o Clarification of the question – this is meant for OM1, not OM2 or OM3.
    - o "FDDI-grade" friendly amendment accepted
- How do these models relate to some of the center launch comments which have been discussed earlier in the meeting?
    - o The V-shape plots were chosen for the off-set launch for comparison purposes. There is no real time data available to provide center launch data for the models, one of the areas for future work
    - o Clarification – is the model relevant to center launch? Yes, center launch was one of the areas of focus for the model. Additional clarification provided – the models are not attempting to favor one launch condition over another if that is the concern.
- P. Hallemeier: one thing not clear, how many fibers in the Monte Carlo model
    - o 5000 fibers in the initial set available on the IEEE web site
- P. Hallemeier: noticed that the wording may imply the Cambridge 108 model can be used for work, and that the Monte Carlo would be used for coverage #'s. Monte Carlo is also new to the group. How do we work towards coverage #'s?
    - o Ian: Not a valid interpretation – both can be used for work forward. More than just the channel model will be used to get to a final coverage # for the standard. However coverage was not an objective of the task 1 effort. Correlation of the models is very good and they bring unique attributes to the effort.
    - o We are stating the models should be used, but how the resulting yields are interpreted is up to the task force. Not being overly prescriptive at this time.

- o Clarification that the models do not go into the standard, only specifications (parameter values) which may be derived from use of the models
- B. Zona: sounds like the 108 model represents challenging fibers and that Monte Carlo model should contain these challenging fibers. Does the Monte Carlo include the challenging cases? If not, we should consider splitting the motion.
    - o The 108 is not used to validate the Monte Carlo set. It is important that the two agree but one does not have more validity than other and that would be an erroneous assumption.
    - o But we don't know how to use it was Bob's retort.
    - o Guidance on the use of the models from the Chair
        - ▪ The committee can decide how to use the models in the absence of guidance from the Task 1 group
        - ▪ Or we can ask for task group to provide additional data
        - ▪ Ian: there is not yet consensus within task 1 on yield #'s. Using the 108 as an example, it leaves the standard with a lot of flexibility on making decisions as he work progresses. Personal opinion to let the parallel activities move forward.
    - o D. Cunningham –personally wouldn't vote for this as currently worded. "Challenging" needs to be more clearly specified is a minimal change. Secondly, in terms of the Monte Carlo set, it states that it is work in progress, but the tail in the distribution will inevitably lead to 5-10% of the distribution being difficult, possibly even so for LX4 or Gigabit Ethernet. We should have some line that we will not go into specifications of worst case that would break other PMD's
        - ▪ Suggestions for change was requested: "(2ns/km centroid DMD)" given
        - ▪ Clarification – J. George, the statement in the motion "that shall be evolved to best represent the installed base of FDDI-grade fibers" meant to imply and address the stated concern regarding the Monte Carlo model. Follow-on from John Abbott that truncation is certainly possible as the set evolves.
        - ▪
- S. Bhoja: stated support of the models. Provided information on how he plans to use it going forward.
- P. Dawe: huge motion, parts controversial, some not, some parts not sure what they mean. Question regarding the "shall" statement, who is going to do this work wrt evolving the model?
    - o P Kolesar provided his interpretation – the group is responsible and that to date John Abbott has been the endless loop on iterating on the Monte Carlo set.
- Piers: Made a motion to divide:
    - o 3 separate motions as noted below:

Motion#	2 (Motion to divide Motion #1)			
Motion to divide: **Adopt 108-fiber set with 9 kink positions as presented in penty_1_0904 as a baseline collection of challenging FDDI-grade cases to support efficient studies of potential 10GBASE-LRM specifications prior to determination of launch conditions, as it contains fibers that are challenging for a variety of launch conditions.** **Adopt Monte Carlo fiber model in abbott_1_0904 as the base-line model that shall be evolved to best represent the installed base of FDDI-grade fibers by alignment with manufacturing data.** **These models will be used to validate the compliance of specifications for meeting P802.3aq objectives.**				
Moved	Piers Dawe			
Seconded	Pete Hallemeier			
Procedural (50%)	**Yes**	**No**	**Abstain**	**Result**
	31	13	9	**Passes**

The three distinct motions created from this motion to divide became motions 3, 4 & 5

Motion#	3				
Adopt 108-fiber set with 9 kink positions as presented in penty_1_0904 as a base-line collection of challenging FDDI-grade (centroid DMD 2 ns/km and/or 500 MHz-km) cases to support efficient studies of potential 10GBASE-LRM specifications prior to determination of launch conditions, as it contains fibers that are challenging for a variety of launch conditions.					
Moved	Piers Dawe				
Seconded	Pete Hallemeier				
Technical (75%)	**Yes**	**No**	**Abstain**	**Result**	
	46	0	5	**Passes**	

Discussion on the motion
- Ian – spoke in favor of the capability of the 108 model and what it can provide for the task force; and concluded with his support of the motion.
- Discussion on the use and the value of the model within the gigabit Ethernet development; what's changed since then, and that the fibers are a good challenging set and it not intended to be normalized distribution nor is it intended to be the worst 100 fibers that might exist.
- Suggested friendly amendment to add text specifying the percentage of fiber represented was rejected as unfriendly
- Another friendly amendment – insert "(centroid DMD 2ns/km and/or 500MHz-km) was accepted
- Call the question – no objections, question called

Motion#	4				
Adopt Monte Carlo fiber ~~model~~ set in abbott_1_0904 as the base-line model that shall be evolved to best statistically represent the overall installed base of FDDI-grade fibers by alignment with manufacturing data.					
Moved	Piers Dawe				
Seconded	Pete Hallemeier				
Technical (75%)	**Yes**	**No**	**Abstain**	**Result**	
	41	0	10	**Passes**	

Discussion on the motion
- Interpret that it will be worked going forward, and if so what is the purpose of the motion
  - Stated that in 802.3, having a baseline is common procedure and used to advance the work
  - John Abbott: it is currently available on the web and will be improved going forward, and it certainly is of sufficient quality to get the process going
- Friendly amendment John Abbott – change 'model' to 'set'
  - Accepted
- Friendly amendment – add 'statistically'; modified with addition of 'overall'
- Question called with no objection.

Motion#	5				
The fiber sets adopted in motions 3 & 4 ~~These models~~ will be used to develop ~~to validate the compliance of~~ specifications for ~~meeting~~ P802.3aq ~~objectives~~.					
Moved	Piers Dawe				
Seconded	Pete Hallemeier				
Technical (75%)	**Yes**	**No**	**Abstain**	**Result**	
	39	4	5	**Passes**	

Discussion on the motion
- Comments from a number of people on the floor if this motion is required
- P. Kolesar – spoke in favor of the motion
- N. Swenson – felt that the previous motions were used to study & guide the work and that it seems a bit premature to now say that they are used to set the baseline
- J. George – spoke in favor of the motion and called the question

- o Vote on calling the question failed 13-25-11
- Friendly amendment – "The fiber sets adopted in motions 3 & 4 will be used to develop specifications for P802.3aq." be the revised wording for the motion
  - o Accepted as friendly
  - o Discussion – S. Swanson, spoke against the amendment; N. Swenson stated he had no issue with the new motion, but asked if it was really required; S. Swanson supported Norm's assertion that it is already covered; J. George stated that we need to bear in mind the wording of motions 3 & 4 & that those fiber sets will evolve, may make them out of order from the wording here; response from the Chair that the committee can vote to amend the models and that these changes would not be out of order from the wording of this motion.
- Vote on the amended motion was called.

Break for Lunch

Continuation of the Adopt Fiber Models Agenda Topic

Ian White summarized the significant activities of the Task 1 group – and that in particular noted the efforts of Jonathan Ingham, John Abbott & Paul Kolesar should be recognized for their contribution in this regard.

Motion#	6			
Motion that 802.3aq recognize the contributions that John Abbott, Paul Kolesar & Jonathan Ingham made to developing the models which were adopted by the task force which are instrumental to guide the future work efforts.				
Moved	Ian White			
Seconded	David Cunningham			
Procedural (50%)	**Yes**	**No**	**Abstain**	**Result**
	by acclamation			**Passes**

Comment Review Agenda Topic

Editors Report 802.3aq Task Force Meeting September 28, 2004
Nick Weiner
- Nick Weiner led the review & discussion of the editors report 802.3aq Task Force Meeting
- Refer to document weiner_1_0904 for specifics on comments, their resolution and the overall editors report
- Proposed next steps for the creation of draft 0.2 and comment timeline in preparation for the November meeting presented & discussed

Comment Resolution
Nick Weiner
- General discussion on how the task force would work through the comments in today's session and consensus was reached after a semi-spirited debate (after lunch you know...).
  - o Note: it was clear that this was the first appreciation for the aq task force regarding the time & effort required for proper comment discussion & resolution process. The group is now calibrated.
- Refer to the comment resolution log for specifics on the handling & responses of each individual comment discussed.

Break

Comment Resolution (continued)

Motion#	7			
Motion to accept comments 26, 47, 25, 28, 34, 35, 36, 40, 42, 41, 43, 8, 9, 10, 20 & 21 and direct the editor to incorporate into the next revision of the draft.				
Moved	Nick Weiner			
Seconded	John Jaeger			
Technical (75%)	**Yes**	**No**	**Abstain**	**Result**
	by acclamation			**Passes**

Continued discussion on Draft 0.1 comments – refer to the comment log for specifics.

- Comment #1 was the first one into the controversial hopper. A thanks to Pete Hallemeier for kicking off the comment process, even though he was sent packing with a rejection to the comment. Pete did proclaim "I'll be back".
- Comment #4 was 2nd onto the table for discussion, courtesy of Tom Lindsay. A simple OMA definition & measurement discussion ensued. No decision could be reached and the group ran out of time to continue with comment resolution process.

Closing Session & Motions

- The chair discussed the need to focus presentations and task force material for future meetings aimed at making changes to the draft document.
- Objectives of the task force reviewed
- Task force timeline reviewed
- Goals for the meeting reviewed

Polarization Effect in 10GbE Transmission over Multimode GI-Fiber
Jen Fiedler

Key Points:
- Described the measurement set-up & results the effect of polarization has on a number of fibers with different conditions (off-set launch, center launch)
    - Effects are worse with patch cords and with connectors in the link
    - Proposed that the investigation of this effect be included in the channel ad-hoc activity
Questions & Discussion
- Discussion on which task group should best take this – Task 2 or Task 4
- Commitment to the task force that one of them will take it on within the subtask and work for closure in the November meeting – with the suggestion that within two weeks agreement to be made and proposed first steps put forward.
- Discussion on the need for a motion or not took place.
    - Jonathan King described what he felt was the logical split of this activity and he would coordinate with Yu Sun on seeing that participants of the tasks will focus their on this item.

Motions:

- Call for motions made:

Motion#	8			
- **Develop a Transmit Penalty Test ~~From~~ using lindsay_2_0904 as a starting point** - **Add an editors note to reflect the possible inclusion of a transmit penalty test in D0.2 based upon lindsay_2_0904 and instruct the editor to make all eye mask references in the draft an editors note** - **Pursue Practical Improvements of Eye Mask to Mitigate Known Limitations Including Eye Closure and Measurement Weaknesses, specifically the need to account for correctable and uncorrectable impairments** - ~~Not Use PIE-L Metrics in Evaluating the Quality of the Transmitted TP2 Signal~~				
Moved	Lew Aronson			
Seconded	Piers Dawe			
Technical (75%)	**Yes**	**No**	**Abstain**	**Result**
	28	0	10	**Passes**

Discussion of the motion:
- Piers Dawe: first two related to each other and has been discussed in this meeting. The 3rd is orthogonal and need not be considered at this time
- S. Bhoja: stated that based upon multiple contributions to meeting, PIE-L is not sufficient for either a 220m or 300m distance
- A. Shanbhag: for this application, believes that it is reasonable to use PIE-L and PIE-D
- Lew entertained a friendly amendment to delete the 3rd bullet – and this bullet was withdrawn from the motion
- Two other friendly amendments accepted via a series of comments
- N. Swenson brought up the item of getting to 'equal footing' for the two TP2 tests (eye mask and Transmit Penalty test)
    - Discussion as to the exact status of the eye mask test within the draft
        - Clarified the test is in the draft and the values are editors notes /TBD
        - More amendments made…
- Question called without objection

Motion#	9			

- **Do Not Include Dynamic Adaptation Penalty Test in ~~D1.0~~ D0.2.**
- **Specifically:**
    - **Remove References to Dynamic Penalty Test Presently in Tables 68-4 and 68-5 of D0.1.**
    - **Remove (or do not include) Present Section 68.6.4.3 on Dynamic Penalty Test in Draft 0.1.**				

Moved	Lew Aronson			
Seconded	Tom Lindsay			
Technical (75%)	**Yes**	**No**	**Abstain**	**Result**
	12	20	6	**Fails**

Discussion of the motion:
- P. Kolesar spoke against the motion providing a number of points including that removing this from the draft at this time is a bit premature until the temporal task group has completed their work
    - Lew provided his counter points
- J. King spoke against the motion
- M. Lobel also spoke against the motion
- N. Swenson spoke in favor of the motion
- N. Weiner spoke in favor of the motion
- A. Phanse spoke in favor of the motion
- J. George spoke against the motion
- A. Shanbhag spoke in favor of the motion

- P. Dawe spoke in favor of the motion
- Repeats began in the queue and the minute taker stopped the reference count...
- Friendly amendment made to the motion to get the correct draft referenced

Motion#	10			

- **Adopt Informative Simple Sensitivity Test in ~~D1.0~~ D0.2 As Described in aronson_1_0904**
 - **Specifically:**
     - **Include −7.5 dBm OMA as Required Sensitivity**
     - **Include ~~ISI as~~ a 4th order BT Filter with Bandwidth TBD for the sensitivity stress generator**
     - **Base Test Definition on Clause 52.9.9 Receiver Sensitivity Description, Modified to Require The Inclusion of a 4th order BT Filter ~~ISI~~ stress signal Generator and Reference to a Figure as in aronson_1_0904**
     - **Reference OMA Measurement Method Used For Static Stressed Sensitivity Test**				

Moved	Lew Aronson			
Seconded	Jens Fiedler			
Technical (75%)	**Yes**	**No**	**Abstain**	**Result**
	26	2	10	**Passes**

Discussion on the motion:
- A number of modifications made to motion – all considered friendly and resulted in the motion above
- Vote was called on the motion

Discussion on continuing the work on the motions was directed by the Chair
- Guidance from the two commenters whose comments were deferred was sought (P. Dawe & T. Lindsay)
- A comment to task force participants was made by the chair – in the future, expect that preference will be given to making changes to the draft via the comment process
- The last 4 possible motions from L. Aronson were reviewed for the task force and the group waded into the discussion of the next motion in the hopper

Motion#	11			

- **Modify the ~~Adopt a~~ Static Stressed Sensitivity Test in D0.1 for ~~D1.0~~ D0.2 As follows ~~Described in aronson_1_0904~~**
     - **Alter Test Description to Describe and Show a Gaussian Noise Impairment Added Before the ISI Generator. Note That Other Implementations Which Effectively Shape the Noise Impairment to the ISI Response are Acceptable.**
     - **Remove sinusoidal interferer**
     - **The Gaussian noise impairment to be added to generate a total noise in the compliance test signal equivalent to the noise penalties in the link budget**
     - **Define Gaussian Noise Impairment in Description as Having a Flat Frequency Spectrum Out to A Minimum of 10 GHz**
     - **Write Test Description to Require Operation with BER < 1e-12 At Specified OMA, Noise and Jitter Impairments And At <u>Each</u> of the ISI Impairments Specified**				

Moved	Lew Aronson			
Seconded	Tom Lindsay			
Technical (75%)	**Yes**	**No**	**Abstain**	**Result**
	26	0	5	**Passes**

Discussion on the motion:
- Point of clarification on the motion asked by J. King
- Friendly amendment suggested by A. Shanbhag and then withdrawn
- Friendly amendment by A. Phanse – wrt changing the frequency of the bandwidth from 10GHz to 5GHz
  - Comment that having bandwidth beyond the nyquist bandwidth would be desired, however going to 10GHz may not be required though
- J. King requested a friendly amendment after reviewing the current D0.1 draft – accepted
- Additional discussion, mainly for clarification
- Many more modifications/friendly amendments made to the motion which stressed the minute taker more than any sinusoidal interferer ever would…
- Vote called on the motion

Straw poll taken to move onto the last remaining motions as discussed by the chair at the start of the closing session

Motion#	12			
10GBASE-LRM adopts draft D0.1 with the comment resolutions and motions passed at this meeting directing additions and changes to the document Therefore, 10GBASE-LRM directs the editor to: - **Create draft D0.2** - **Distribute draft D0.2 for review well in advance of the November meeting** - **Collect comments and prepare proposed resolutions for the November meeting**				
Moved	Piers Dawe			
Seconded	John Jaeger			
Technical (75%)	**Yes**	**No**	**Abstain**	**Result**
	By acclamation			**Passes**

Discussion on the motion:
- Nick Weiner noted the following proposed dates
  - D0.2 available October 15th
  - Deadline for submitting comments November 3rd

Motion#	13			
To Approve the draft minutes from the July meeting				
Moved	David Cunningham			
Seconded	John Jaeger			
Technical (75%)	**Yes**	**No**	**Abstain**	**Result**
	By acclamation			**Passes**

Motion#	14			
Motion to adjourn				
Moved	David Cunningham			
Seconded	John Jaeger			
Technical (75%)	**Yes**	**No**	**Abstain**	**Result**
	by acclamation			**Passes**

Adjourn 802.3aq Interim Meeting