MMF Ad Hoc meeting minutes

29th November 2012

minutes recorded by Jonathan King

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- **Meeting started** at 8:30 am Pacific, chaired by Jonathan King.
- **Attendee list** was taken from the Webex attendee list, ~60 attendees were noted.
- **Presentations** shared in the MMF ad hoc can be found at the MMF ad hoc web page.
  - http://www.ieee802.org/3/bm/public/mmfadhoc/meetings/index.html
- **IEEE patent policy:** Attendees were reminded of the IEEE patent policy
  - http://www.ieee802.org/3/patent.html
- **Agenda slides agreed**.
- **Meeting minutes for 25th Oct**: Jonathan asked if anyone had any amendments to the unapproved minutes for the 25th October meeting. One name/affiliation error was noted and corrected before the meeting. No further comments were made, so the minutes are approved by the MMF Ad Hoc.
- **Presentations and discussion:**
- Pete Anslow: BER and FER for 100GBASE-SR4
- Pete described different methods for calculating the relationship between uncorrected BER, corrected BER and FER (Frame Error Ratio) for optical links using the RS(528,514) FEC scheme defined in Clause 91 of IEEE P802.3bj D 1.2. Pete's analysis leads to a proposal that:
  - BER at the PMA service interface should be less than 5×10^{-5} to meet the required FER
  - For a complete Physical Layer, this specification is considered to be satisfied by a FER less than 5.12×10^{-10} for 64 octet frames with minimum inter-packet gap
- During discussion, Pete recommended a statement should be added to clarify that this BER requirement assumes uncorrelated errors, several others agreed. Pete asked if anyone *disagreed* with the proposed requirement of FER less than 5.12×10^{-10}; no one spoke against it, and several voiced their support.
- Also shown was the how FEC changes the effect of optical margin on a system: For a receiver limited by Gaussian receiver noise, a margin of ~0.5 dB is required to give a BER of 10^{-15} rather than the spec limit of 10^{-12}. With the addition of RS(528,514) FEC, the same 0.5 dB margin takes the BER from 10^{-12} to $\approx 10^{-19}$.

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- **Presentations and discussion continued:**
  - John Petrilla: 100G 100m (& 20m) MMF Transceivers
- John presented further work jitter budgets for retimed and un-retimed links addressing the 100m and 20m reach on MMF objectives, which use the FEC scheme defined in Cl. 91 of IEEE P802.3bj D1.2 .
  - John presented sensitivity analyses of MMF links to margin vs BER and bit rate, reach vs BER, and reach and margin vs jitter at TP4.
  - John's work shows that the maximum reach for the retimed PMD will be 110m on OM4, and that an un-retimed 20m reach PMD could be supported, provided strong DFE is not needed in the host to recover the signal.
  - John said he will update his modeling using a Q consistent with a BER of $5x10^{-5}$ at the PMA service interface (this presentation used $6.9x10^{-5}$). This may reduce the retimed PMD's reach by up to 5m.

- **Actions and issues requiring resolution**
  - A description is needed for the error statistics required at the PMA service interface in order to meet the required FER. Pete Anslow, Adam Healey, Mike Dudek, Matt Brown were particularly active during discussion of this topic.
  - A PIC statement will be required to describe the PMA service interface BER requirement and the error statistics.
  - 802.3bm will also need to define a normative test to guarantee system operation

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- **Other items needing resolution/further work:**
  - If defined, should the 20m reach PMD be compatible with the 100m PMD ?
  - Further contributions addressing the 100m MMF reach objective
  - Further contributions addressing options for 20m MMF reach objective, showing significant cost density or power improvements

- **Next meetings:** TBC: Thursday 13th December, 2012, 8am Pacific ?
  TBC: Thursday 20th December, 2012, 8am Pacific ?
  Webex meeting details are shown on the last slide

Attendees

John Abbott, Corning
John D'Ambrosia, Force10Networks
Adrian Amezcua, Draka
Pete Anslow, Ciena
Murat Arabaci,
Luis Armenta, ANSYS
Chris Bergey, Wyle Labs
Brad Booth, Dell
Matt Brown, Applied Micro
Phil McClay, TE Connectivity
Adam Courchesne,
Piers Dawe, IPtronics
Stephen Docking, PMC-Sierra
Dan Dove, Applied Micro
Mike Dudek, QLogic
Ilango Ganga, Intel
Moa Garcia,
Ali Ghiasi, Broadcom
Hioroshi Hamano, Fujitsu
Adam Healey, LSI
Scott Irwin,
Jack Jewell, independant
Inho Kim,
Miles Kimmitt,
Jonathan King, Finisar
Beth Kochuparambi, Cisco
Paul Kolesar, Commscope
Kumar,
Gerard Kuyt,
Ryan Latchman, Mindspeed
Kevin Lefebvre, Eigenlight
Sharon Lutz, US Conec
Arthur Marris, Cadence
Marco Mazzini, Cisco
David Ofelt, Juniper
Tom Palkert, Luxtera
Peter Pepeljugoski, IBM
John Petrilla, Avago Technologies
Liang Qiu, Nexans
Rick Rabinovich, Alcatel-Lucent
Adee Ran, Intel
Song Shang, Semtech
Kapil Shrikhande, Dell
Jeff Slavik,
Greg McSorley, Amphenol
Ted Sprague ,
Peter Stasser,
Andre Szczepanek, Inphi
Tawa ,
Brian Teipen,
Nathan Tracy, TE
Ed Ulrichs,
Raman Venkataraman,
Zhongfeng Wang, Broadcom
CK Wong, FCI
Hiroki Yanagisawa,
Zengli,

Webex details

- Start: 8am Pacific, 4pm GMT, 1.5 hours duration
- Webex meeting number: **598 394 654**
- Meeting password: **IEEE**
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- To join the meeting go to
  - https://finisar.webex.com/finisar/j.php?J=592272448&PW=NYWY4OTVhYTAy
  - 2. If requested, enter your name and email address.
  - 3. Enter the meeting password: **IEEE**
  - 4. Click "Join".
  - 5. Follow the instructions that appear on your screen.
- Teleconference information
  - **Call-in toll-free number: 1-8666545792 (US)**
  - Show global numbers: https://www.tcconline.com/offSite/OffSiteController.jpf?cc=9805136069
  - **Conference Code: 980 513 6069**