Report from "Statistical Eye" ad hoc

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Introduction

- Ad hoc of P802.3ba arises from a comment in P802.3ay maintenance project
  - They saw that P802.3ba has suitable fiber optics expertise to progress the issue
- At the March meeting of P802.3ba the "Statistical Eye Ad Hoc" was set up

  Intend to recommend improvement and clarification to the (optical) transmit eye specification of IEEE Std 802.3 52.9.7, make recommendations for any similar measurements in P802.3ba.

  Remove ambiguity and improve test reproducibility in order to reduce the burden in product cost and power dissipation of the present spec, and reduce test cost (time). Interoperability and existing networks will not be affected
- Defined hit ratio masks are defined in EFM, 10GBASE-LRM and FC-PI-4, but the original 10 Gigabit Ethernet (Clause 52) does not define its hit ratio
- Charter in P802.3ba is defined by March 08 Straw Poll 1:

  "Straw Poll #1: Regarding dawe_01_0308.pdf, the following should be done:

  A. IEEE P802.3ba takes this work on as part of the project.

  B. The work should be done, but not as part of the IEEE P802.3ba project.

  C. Nothing should be done.

  D. Further evaluation is necessary.

  Results:

  A. 23

  B. 21

  C. 0

  D. 38

  Choice D wins. A "Statistical Eye Ad Hoc" will be formed and Chaired by Piers Dawe to further evaluate findings presented in dawe_01_0308.pdf, and come back with a recommendation to the Task Force on how to handle."

Background 1/2

There are several overlapping interests in different committees:

1 802.3, maintenance of original 802.3ae

Sort out definition of eye measurements in the existing 10G Ethernet (except LRM which is sorted)

2 SFP+

Provide spec points and any collateral e.g. measurement methodology

Choose suitable levels of statistical significance for eyes at transmitter and receiver

3 P802.3ba

Provide measurement methodology and suitable levels of statistical significance for any new eye specs in P802.3ba

Pay particular attention to test time for multi-lane PMDs (AUI counts as a PMD, as it connects PMAs)

Consider to what extent eye measurements could be eliminated or method improved

There are separate considerations for electrical interconnect (AUI, PMD service interface, electrical cable and backplane) and optical. However, the two communities should be able to share ideas beneficially.

In spite of its name, this ad hoc is not associated with OIF's StatEye

Background 2/2

- 802.3 maintenance activity is not driven by a project timeline
  - The opportunity in P802.3ay has passed - that project is in the closing stages of sponsor ballot - but the need remains important
  - We can create a maintenance request with the consensus of P802.3ba, which industry participants would be able to use to the extent that it clarified but did not contradict IEEE Std 802.3 in force
- P802.3ba
  - Detailed eye specifications are a level of detail beyond where P802.3ba is today
- SFP+ is expected to finalise its choices on this topic in the next few months
  - Some of the same manpower is split between SFP+ and P802.3ba
  - Problem to be solved is common for maintenance and SFP+, provides ideal case study before addressing P802.3ba PMDs
- The key thing is to get the foundations and one's thinking straight, for (any) particular scenario, then can apply what we have learnt to different situations
  - For example, optical and electrical-cable PMDs may need related but different analyses
  - Much synergy gained by having a single group addressing this

Recent activity

- Two phone conferences
  - 17 and 9 participants
  - A good number to make progress with
- At least three companies have made measurements which show the benefit of defined hit ratio mask measurements over "zero hits" method
  - Said to show expected trends
  - Results not yet fully analysed nor presented in P802.3ba

Consensus of the ad-hoc phone calls

- This ad hoc's subject is basic work that need to be done somewhere and feed into .3ba, so it might as well be in .3ba. Separate .3ba and SFP+ meetings would dilute the effort
- Be sure that any implications for faster-than-10G lanes and multiple lanes are not forgotten
- Don't attempt too much
  - We do not intend to tell the groups bringing in proposals what they should do, rather work with them when they have the basics in place. Don't become open ended or accepting all tasks, don't become a general-purpose physical lane ad hoc

- **Straw poll, 17 participants**

  Continue as an ad hoc in .3ba?

  Yes; no disagreement, no abstains

Next steps

1. Ensure the plan below is acceptable to being enacted as part of P802.3ba
2. Continue with engineering work and P802.3ba conference calls, using the SFP+ embodiment of Clause 52 PMDs (LR and SR) as case histories
3. Use above to decide how Clause 52 eye spec and measurement procedure can be improved
4. When P802.3ba PMD proposals are at that level of detail, apply same tools to define their mask specs and measurement procedure
    - This may be directed at optical or electrical scenarios depending on need and volunteer activity

Backup

It is desirable that any new mask spec take the channel into account

- For new PMDs, should work backwards from the receiver's needs through the channel to define a mask (or whatever) for the transmitter.

An eye mask could be the primary transmitter spec, or acting in concert with something else e.g. TDP or TWDP, or not used at all - depends what is chosen, PMD by PMD

For .3 maintenance, may be less channel-specific (e.g. presently have same mask for SR, LR and ER channels) as don't want to make unnecessary changes