

Update on PHY Baseline Strawman

Contribution to IEEE 802.3: 40GBASE-T Task Force

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Supporters

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- Kamal Dalmia, Aquantia
- Paul Langner, Aquantia
- Wayne Larsen, Commscope
- William Lo, Marvell
- Valerie Maguire, Siemon
- Richard Mei, Commscope
- Ron Nordin, Panduit
- Paul Vanderlaan, Berk-Tek
- Robert Wagner, Panduit
- Peter Wu, Marvell

Strawman Progress

- zimmerman_3bqah_02_1213.pdf:
 - Strawman based on 10GBASE-T @ 3.2Gbd
 - In 'sweet spot' of Grimwood power curve
 - Easy to standardize, well known technology
 - Several improvements to consider
- Power analysis contributed to January Task Force
- Two new contributions discussed refinements, one discussed time-to-link
- No proposals for alternative modulations
 - Convergence

PHY Baseline Strawman

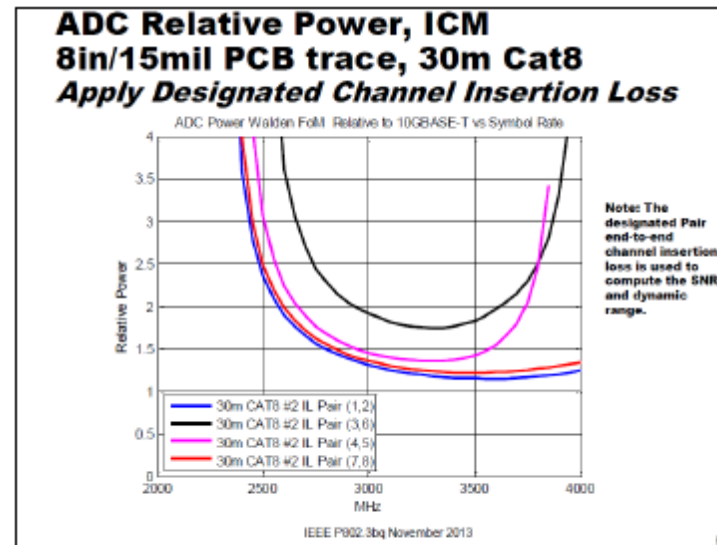
- Slide 6 of zimmerman_3bqah_1213.pdf

Baseline Proposal

- **Baseline PHY proposal:**
 - Use PCS, Framing and Line Coding from Clause 55
 - Increase symbol rate 4X to 3200 Mbaud
 - Drop transmit power to ~ 0 dBm at MDI
- **Areas for improvement/consideration:**
 - Backchannel for THP dynamic update?
 - Revised FEC to cover uncoded bits?
 - Multiple ways of doing this
 - Faster startup?
 - Negotiated patch-cord operational mode?
 - Remove PBO?

Power & Performance

- AFE power estimates use having sufficient SNR margin as a requirement & >6dB margin
- Langner_01_0114.pdf analyzed 30meter power 1.6-2.1X 10GBASE-T without further simplifications
 - Further simplifications likely by implementers (> 6dB budget for implementation margin)
- 3200 Mbaud in sweet spot for AFE power
 - Channel improvements shift analog tail to high frequencies, but increase digital power, analog power climbs steeply if symbol rate is reduced



grimwood_3bq_01_1113.pdf

Refinements - PBO

- Potential simplification of Power Back Off (Peter Wu, Marvell)
 - Wu_01a_0214_802.3bq_adhoc.pdf
 - Agree that 6dB PBO can save ~15-30% total AFE power (7.5-15% PHY power)
 - Agree:
 - 2 or 3 power steps would simplify training & interoperability
 - 6dB PBO is safe, levels used by 10GBASE-T, within margin seen in models
 - 12 dB PBO is likely but requires further study of noise

Refinements - General

- See: zimmerman_3bqah_01_0214.pdf
- ‘Direct attach’ mode
 - May be desirable for management, but doesn’t appear to need standardization
- Additional FEC for uncoded bits may be desirable
 - Specific changes require proposals, possibilities within existing structure
- THP update: Not at this time
 - Not in series with basic transmission agreement
- Time-to-Link improvement – needs further study
 - Not in series with basic transmission agreement

Proposal to Move Forward

- At least 2 PHY vendors have contributed analysis of strawman
 - 3 have confirmed symbol rate is in sweet spot for AFE power
- 2 meeting cycles, 4 ad hoc calls, general consensus, no contributed alternatives
- Consider adopting skeleton of PHY baseline and move forward with refinements at this meeting or setting it up for decision at the May meeting, and consider refinements
- Proposed Motion:
 - Move to adopt the proposal on page 6 of zimmerman_3bqah_1213.pdf, based on a 4X rate scaling of Clause 55 signaling, as a baseline PHY specification with future consideration of the proposed modifications listed on the same slide.