Parameters for PHY analyses*

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* Items with strikeout and/or yellow highlight were striken, added, or modified during discussion on 10 Aug ad hoc

Purpose

- To start discussion to see where we have consensus and set some parameters for PHY discussion

Not the Purpose

- To push any particular phy proposal or metric for phy choice

Easy stuff we may have agreement on

- Baseband PAM transmission
- Zero-order transmit hold
  - ~~Possibly plus a simple 1st or 2nd order lowpass filter at Nyquist?~~
- DFE-based reception
  - Using Salz analysis as a starting pt for margin in noise
- Containing error propagation
- Use of FEC to correct impulsive error events
- Primary EMI protection is cabling/shielding
  - Next (secondary) is separation of PAM levels at Rx

Some stuff we may assume but haven't necessary talked about in a while

- We may have agreement on the following, but if we don't, now is a good time to identify:
  - Continuous transmission at full rate
    - e.g., echo cancelled or unidirectional
  - Simple clock rates
    - In .3ch this drove 12.5% overhead for FEC + framing
  - Use of precoder similar to .3ch
  - Impulse environment similar to .3ch
    - Means managing impulses of lengths to 60ns is a 'must' (see, e.g., Pandey_3ch_02_1118.pdf
      - Based on 50 ns external noise + 10ns random noise & error propagation
        - » Impulse length could become 50ns + 4ns…
      - 60ns means correction of 1500 BT at 25 Gbps, or interleave depth of 10 on the 802.3ch RS code
    - Use of programmable interleaving to cover both low latency and long impulse cases
  - Definition of the transmit level at the MDI or at TP0? (for evaluation purposes)

Some things unspoken or that have been different

- We may be able to get consensus on these, and it would simplify comparison, but to date we either haven't said or haven't been consistent
- Transmit levels:
  - Similar to 802.3ch, e.g., -1 to 2dBm, 1.3Vpp, but WHICH is the limit? Vpp or dBm? (suggest Vpp)
- Line coding:
  - Simple mapping between modulation and FEC-encoded bits
- FEC-strategy:
  - RS, or similar multi-bit symbol-based block codes (802.3ch uses 10bit RS)
    - Do we go to larger or smaller GF, changing complexity?
    - Do we go with a different coding strategy altogether?
  - FEC symbols contain an integer number of baud intervals
  - FEC overhead? (same as CH?)
- Evaluate echo cancellation assuming micro-reflection (sparse EC) architecture
  - May need to be generalized, and not assume specific implementation

Implementation-related stuff folks will differ on

- These I don’t expect us to get consensus on, because they vary with architecture, baud, and PAM levels
  - Finite-length MMSE-DFE based analysis
  - Finite-wordlength complexity analysis of DSP
  - Proprietary receiver-based EMI protection
  - Gate count complexity tradeoffs

Discussion

- What did I miss?
- What can we generally agree on?

THANK YOU!