Equalization and Jitter Transfer Function (JTF) Proposals for nAUI of IEEE 40G/100G Specification

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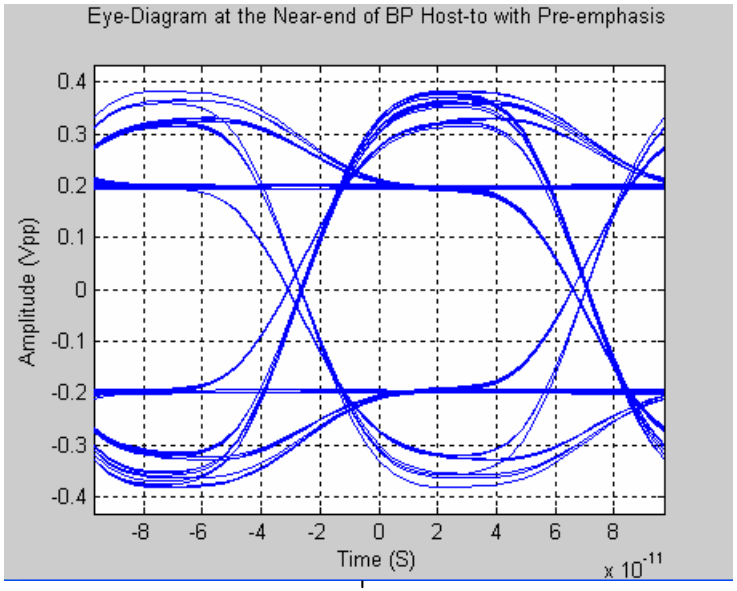
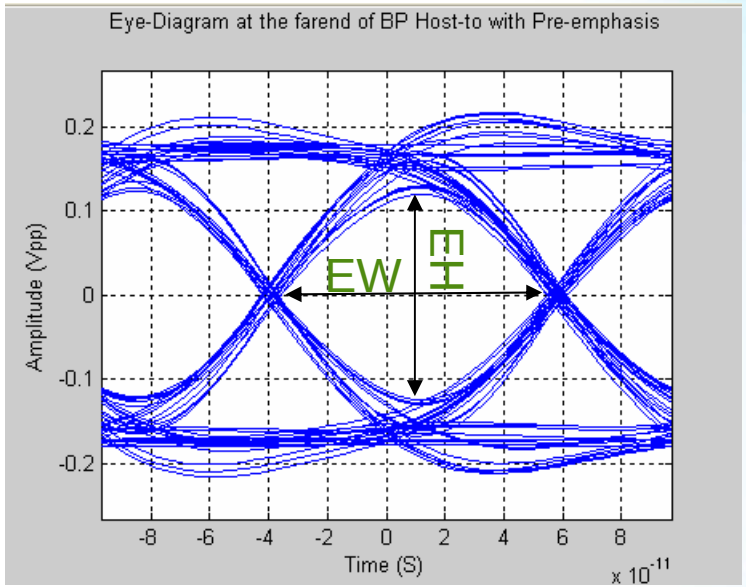
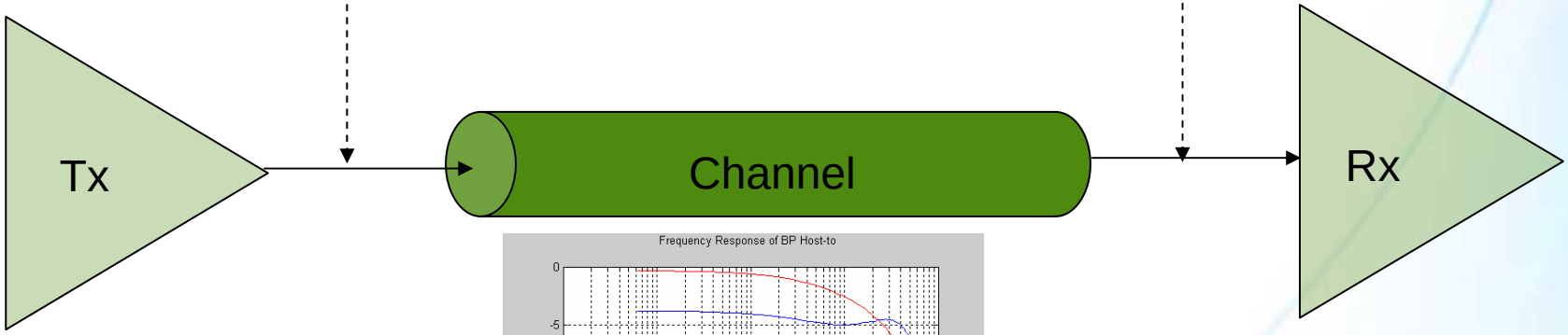
Hole #1 With the D1.0 nAUI: Equalization Not Specified

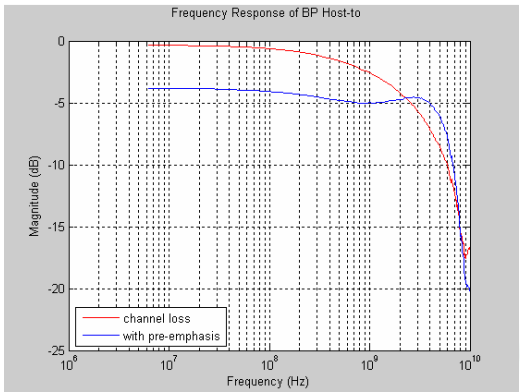
- In D1.0, Annex 83A, section 83A.3.3, P283, transmitter and/or receiver equalization is not defined or assumed. As such the assumption that channel jitter is not compensated is used in the specification. This will eat the DJ margin of Tx and Rx while most of them today have the equalization capabilities, or will leave channel jitter margin unused, making nAUI specification unnecessary expensive.

Channel Simulation With Tx EQ: 1-Post Tap, 5.64 dB



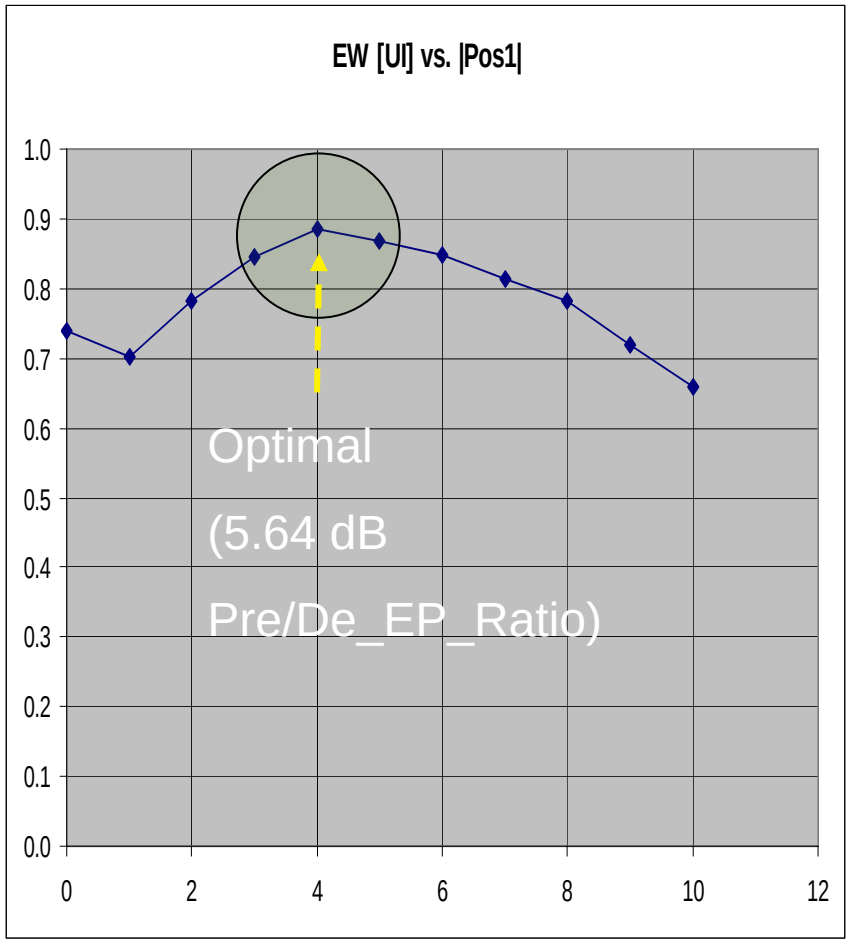


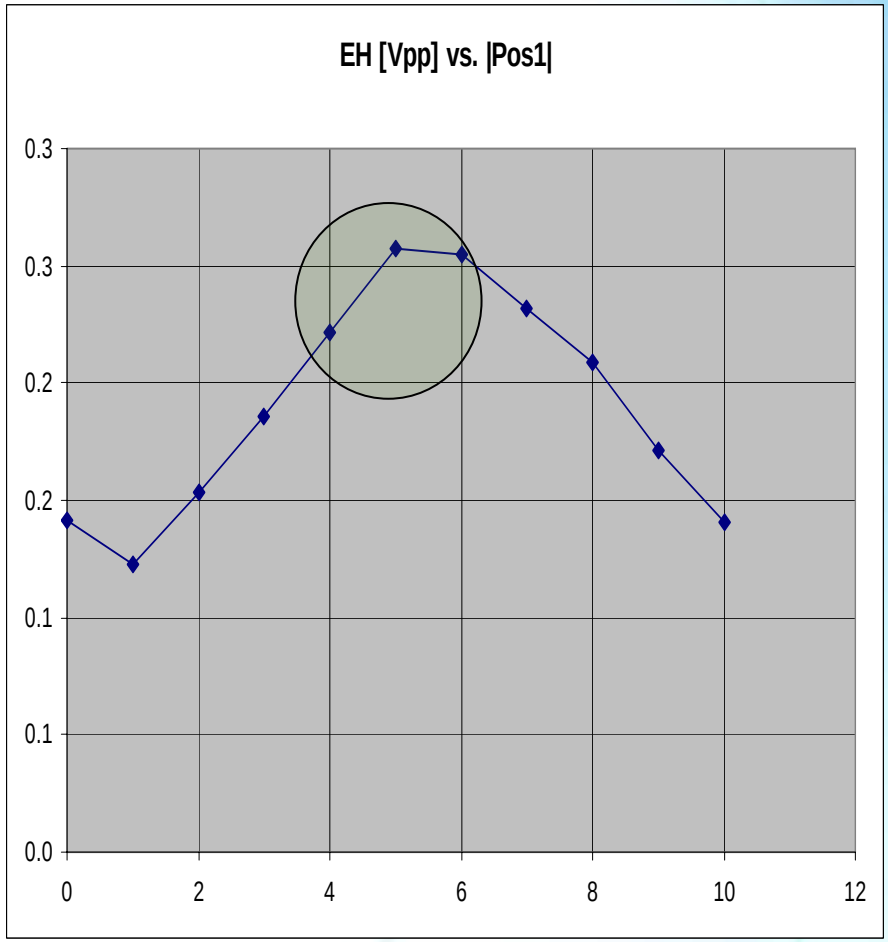




nAUI channel magnitude

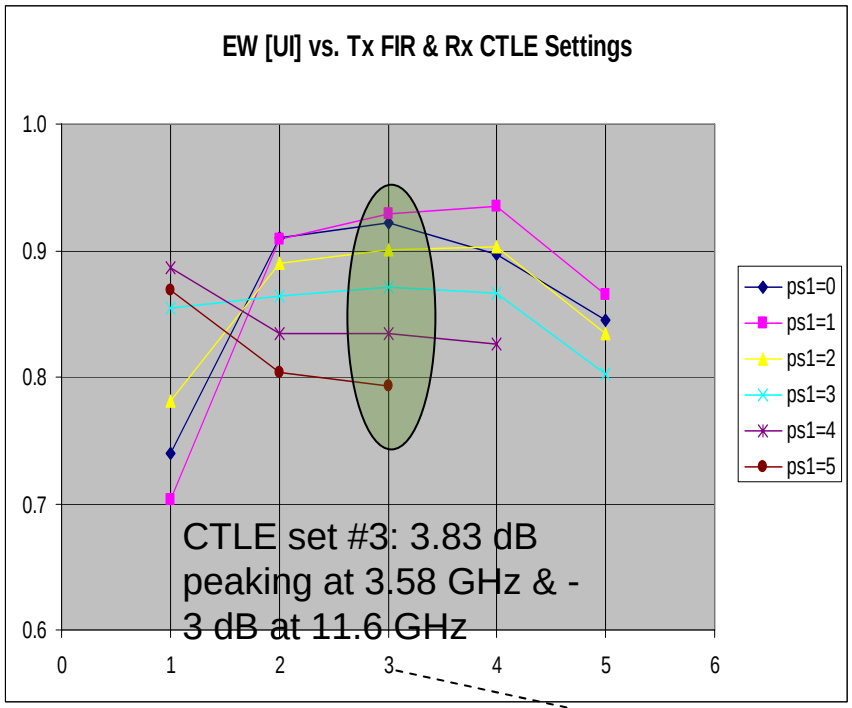
Sweeping Tx EQ 1st Post-Tap Coefficients



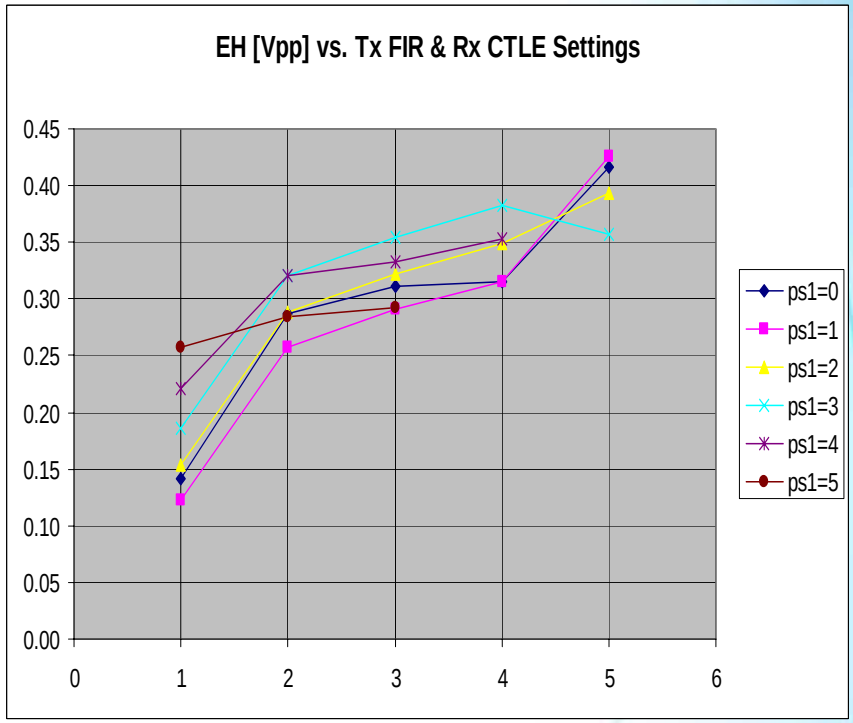


- Add 1 pre-tap or 2nd post-tap does not improve EW/EH much

Tx EQ + Rx EQ Simulation Results

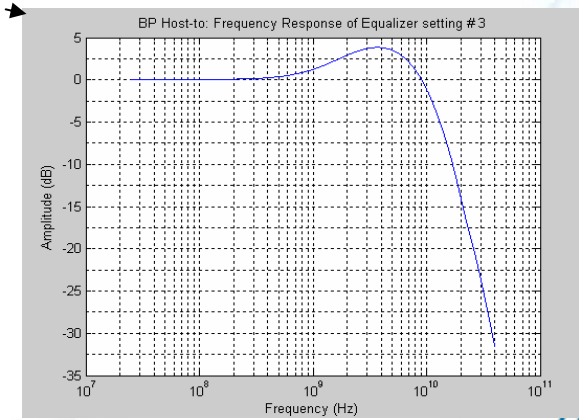


CTLE Level



CTLE Level

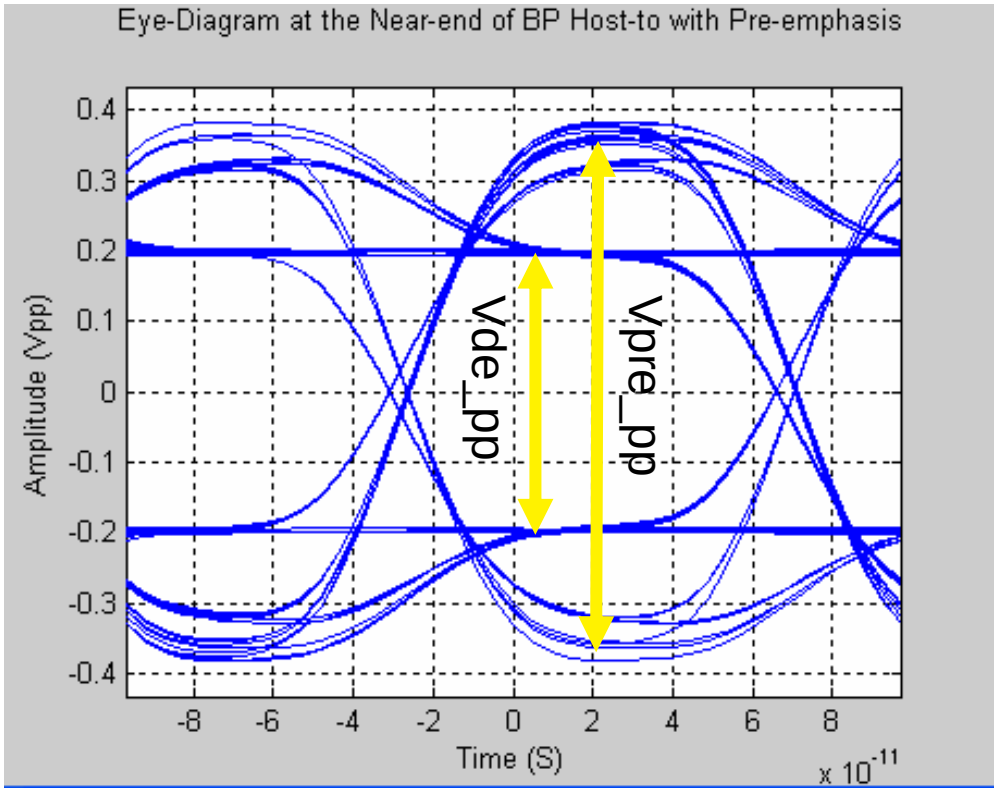
- Add CTLE significantly improves the eye-height



CTLE frequency response

Equalization Proposal for nAUI

- Tx equalization:
  - Pre-emphasis/de-emphasis with 5.5 dB ratio
- Rx equalization:
  - CTLE, frequency response mask TBD



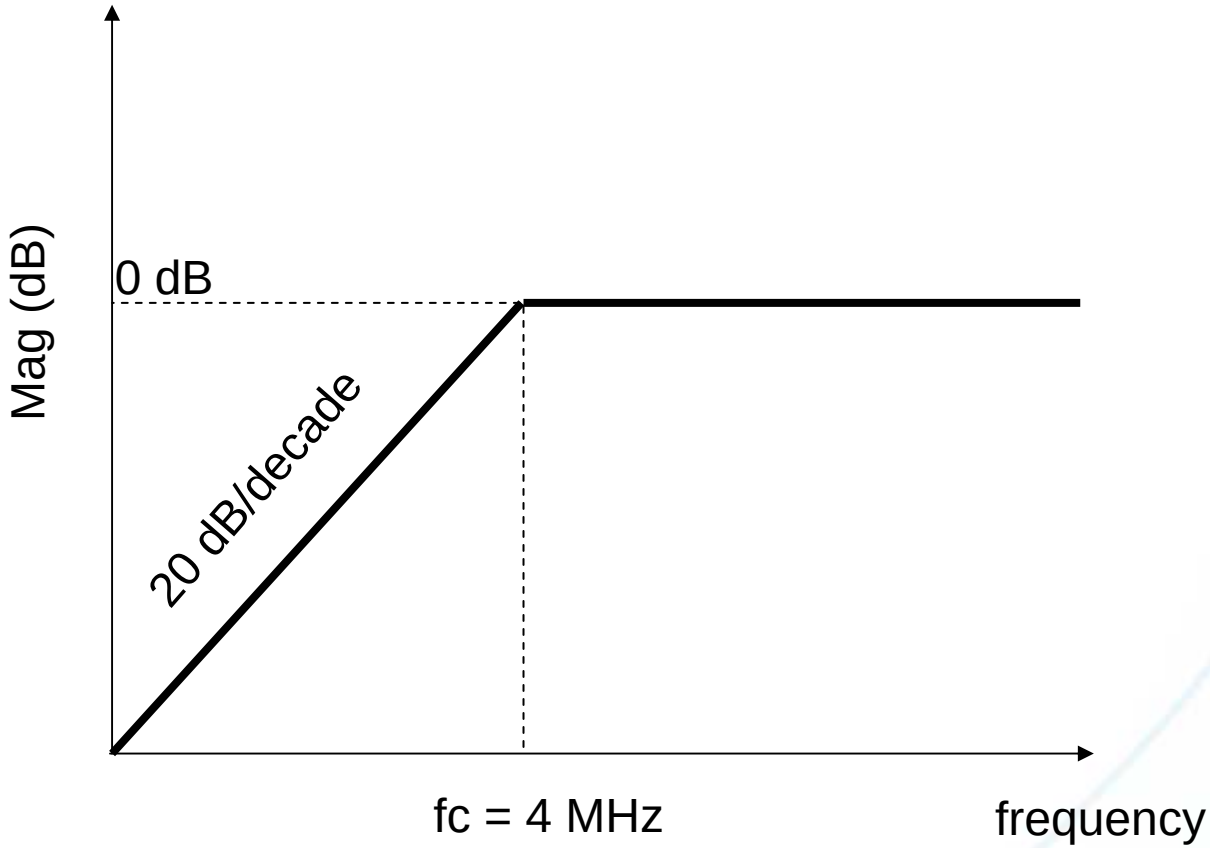
$$\Pr e\_de\_ratio = 20 * \log 10\left(\frac{V_{pre\_pp}}{V_{de\_pp}}\right)$$

Hole #2 With the D1.0 nAUI: Clock Recovery Jitter Transfer Function (JTF) Not Specified

- In D1.0, Annex 83A, section 83A.3.3, P283, jitter transfer function (JTF) is not defined for Tx jitter definition/testing. This will grossly overestimate the Tx jitter, leaving the jitter margin available by clock and data recovery (CDR) unused, resulting in expensive nAUI specification.

Jitter Transfer Function (JTF) Proposal for nAUI

- "Golden PLL" similar to Fibre Channel-MJSQ
- Should be used for Tx jitter testing



Thank you