Specification Considerations for CDAUI-16 Chip-to-Module (c2m) and Chip-to-Chip (c2c)

For IEEE 802.3bs

Mike Li, Altera
Peter Anslow, Ciena
Ryan Latchman, Macom

Purposes

- Discuss thoughts and considerations for CDAUI-16 specification (i.e., c2m and c2c electrical interfaces) in support the 400 GbE to fulfil its objective of:

  Support optional 400 Gb/s Attachment Unit Interfaces for chip-to-chip and chip-to-module applications

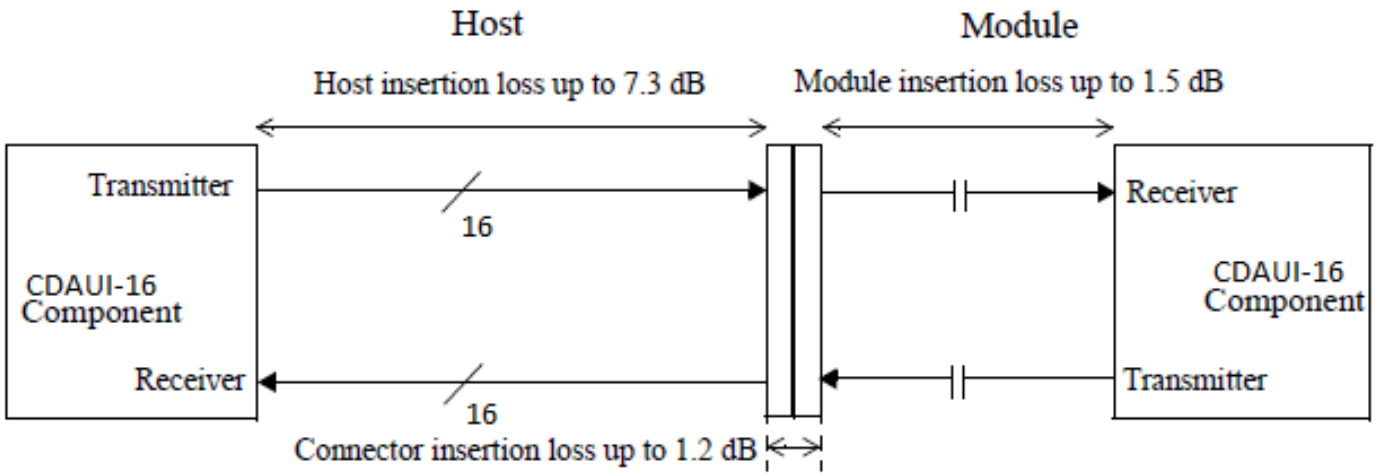
General Direction for CDAUI-16: Reuse the CAUI-4 Spec

- Rationales and justifications have been discussed in Ref [1]

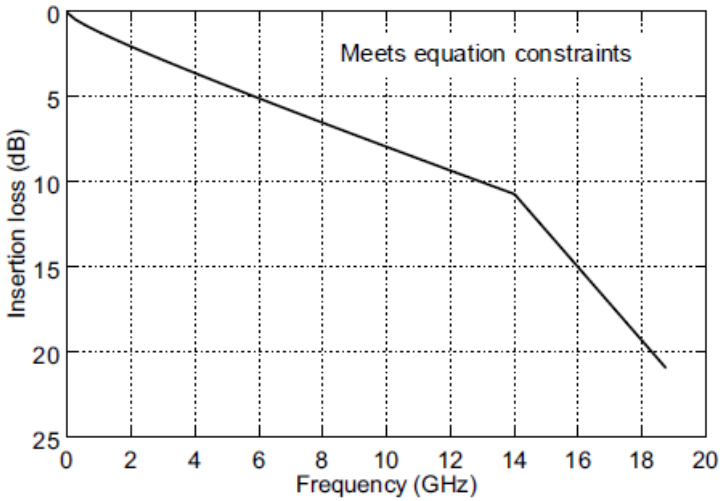
On CDAUI-16 Link

- Reuse CAUI-4
  - CDAUI-16 transceiver performance and channel characteristics could be kept the same as those of CAUI-4
  - CDAUI-16 could operate at a raw BER < 1e-15 w/o FEC
  - If FEC is used
    - Extra margin provided would be used for accommodating worse channel and/or reduced test time
    - Extra margin would not be used for relaxing the transceiver performance
      - CAUI-4 transceivers are widely available today with 28 nm CMOS process
      - CMOS power and performance only gets better moving forward (e.g., 20 nm, 16nm/14nm,…)

On CDAUI-16 Link Topology I: c2m



Max IL

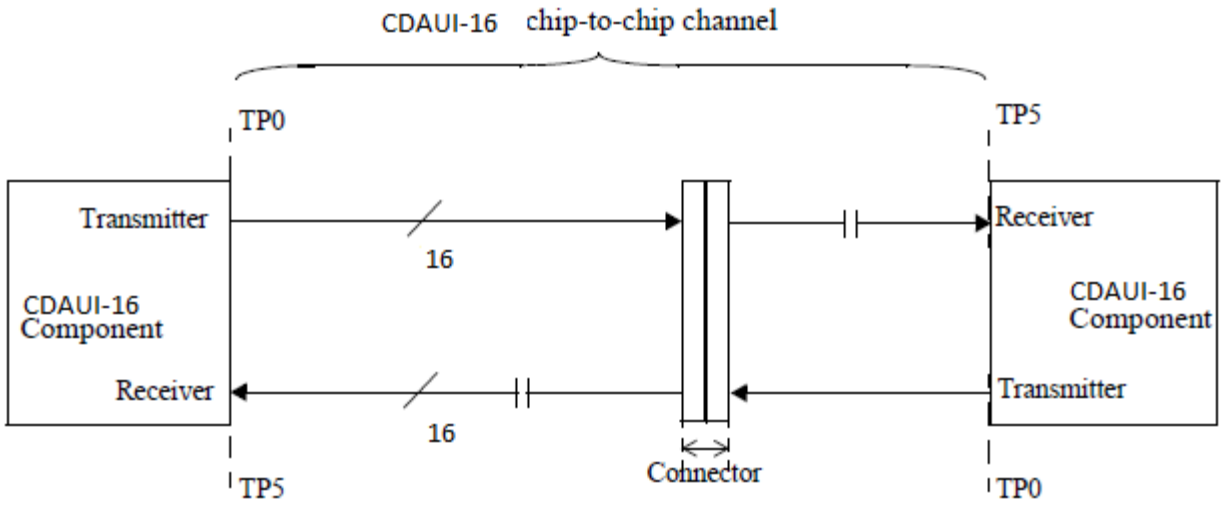


On CDAUI-16 (c2m) Specifications

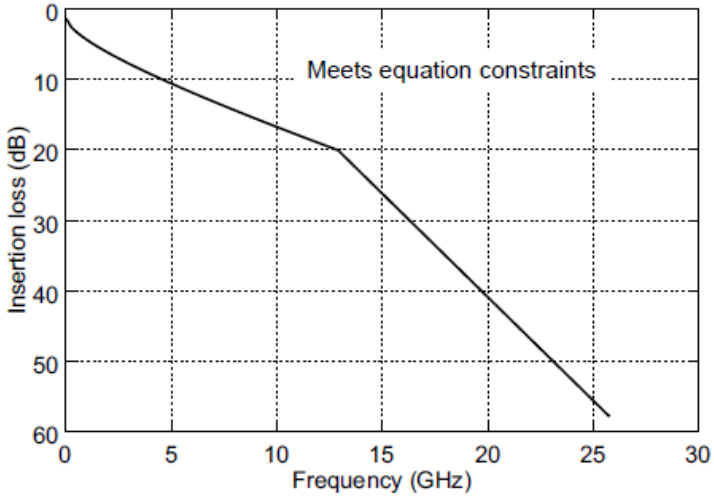
- CDAUI-16 chip-to-module compliance point definitions could reference 83E.2
- CDAUI-16 chip-to-module electrical characteristics could reference 83E.3
- CDAUI-16 measurement methodology could reference 83E.4
  - Emphasize 16 lane vs 4 lane difference

- New change considered
  - Both host and module receivers should be auto-adaptive
    - Manual adaptations for 16 lanes are not practical
    - Remove *Recommended CTLE_value*

CDAUI-16 Link Topology II: c2c



Max IL



On CDAUI-16 (c2c) Specifications

- CDAUI-16 chip-to-chip compliance point definitions could reference 83D.2
- CDAUI-16 chip-to-chip electrical characteristics could reference 83D.3
- CDAUI-16 chip-to-chip channel characteristics could reference 83D.4
  - Xtalk aggressors need to comprehend 16 lanes
- CDAUI-16 Example usage of the optional transmitter equalization feedback could reference 83D.5
  - Modification would be needed to cover 16 lanes

Summary

- CDAUI-16 specification can reuse existing CAUI-4 specification
  - Thoughts on the “reuse” specifics are provided
  - A likely modification would be auto-adaptation receiver requirement for c2m
  - If CDAUI-16 is FEC protected, extra-margin provided would be used to accommodate worse channel and/or reduced test time

References

[1]:http://www.ieee802.org/3/bs/public/14_07/li_3bs_01a_0714.pdf