Set B1: Channel Performance for 400GPL PAM6- C2M

Hansel D'Silva, David Stauffer and Samuel Kocsis, Amphenol
Mike Peng Li and Frank Lambrecht, AMD

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IEEE 802.3dv 400 Gb/s/Lane Signaling Task Force

History

Revision	Date	Comment
02	03-Nov-2026	▪ Initial Draft. ▪ Revised the slide titled ‘Summary’ and ‘Touchstone Files being shared’. ▪ Minor typographical edits.
02a	05-Nov-2026	▪ Minor editorial edits.
02b	11-Nov-2026	▪ Revised the slide titled ‘History’ in aligning with that uploaded to the IEEE 802.3dv Public Area. ▪ Added a backup slide on the IO Connector wipe.

Purpose of this presentation

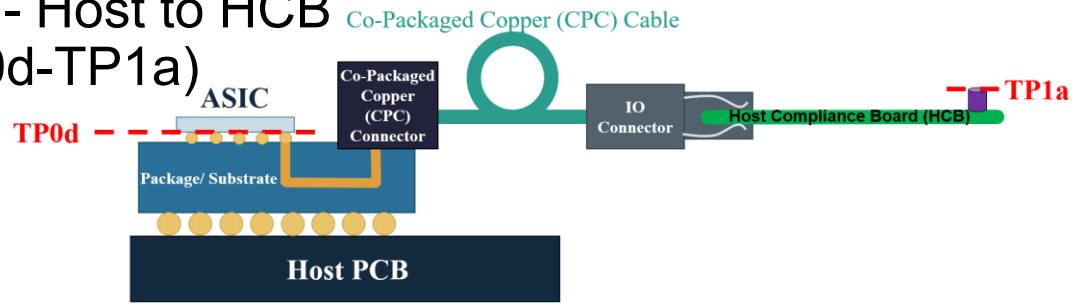
- The purpose of this presentation is to share channels of C2M- from Host to HCB for IEEE 802.3dv- 400GPL electrical interfaces.

Summary

- Shared a THRU.s4p, FEXT_1.s4p and NEXT_1.s4p with 10MHz:10MHz:130GHz and a reference impedance of 42.5 Ohm.
- At 425 Gbps PAM6 for a loss of ~-20 dB from TP0d to TP1a, the CPC cable length is 0.4 m.
- 425 Gbps PAM8 is off the consideration with PAM4 & PAM6 being dominant considerations.
- 425 Gbps PAM6 with existing technologies is possible with HVM around 2027-2028 while further enhancement in technology is needed for 425 Gbps PAM4.

1. Touchstone Files being shared

C2M- Host to HCB (TP0d-TP1a)



1] IO Connector with nominal wipe
- dsilva_set_b1_v1_c2m_425gbit_pam6_tp0d_tp1a_nomwipe_thru.s4p
- dsilva_set_b1_v1_c2m_425gbit_pam6_tp0d_tp1a_nomwipe_fext_1.s4p
- dsilva_set_b1_v1_c2m_425gbit_pam6_tp0d_tp1a_nomwipe_next_1.s4p

2] IO Connector with minimum wipe
- dsilva_set_b1_v1_c2m_425gbit_pam6_tp0d_tp1a_minwipe_thru.s4p
- dsilva_set_b1_v1_c2m_425gbit_pam6_tp0d_tp1a_minwipe_fext_1.s4p
- dsilva_set_b1_v1_c2m_425gbit_pam6_tp0d_tp1a_minwipe_next_1.s4p

3] IO Connector with maximum wipe
- dsilva_set_b1_v1_c2m_425gbit_pam6_tp0d_tp1a_maxwipe_thru.s4p
- dsilva_set_b1_v1_c2m_425gbit_pam6_tp0d_tp1a_maxwipe_fext_1.s4p
- dsilva_set_b1_v1_c2m_425gbit_pam6_tp0d_tp1a_maxwipe_next_1.s4p

THRU	NEXT_1	FEXT_1
!Port1= TP0d (TX)	!Port1= TP1a (AGG)	!Port1= TP0d (AGG)
!Port2= TP1a (RX)	!Port2= TP1a (VIC)	!Port2= TP1a (VIC)
!Port3= TP0d (TX)	!Port3= TP1a (AGG)	!Port3= TP0d (AGG)
!Port4= TP1a (RX)	!Port4= TP1a (VIC)	!Port4= TP1a (VIC)

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!
!Shared with IEEE 802.3dv 400 Gb/s/Lane Signaling Task Force- November 2026
!
!Port1= TP0d (TX)
!Port2= TP1a (RX)
!Port3= TP0d (TX)
!Port4= TP1a (RX)
!
!S-parameter Quality Metrics as per IEEE P370,
!   - Casuality Quality Metric (CQM)= 99.2590%
!   - Reciprocity Quality Metric (RQM)= 100.0000%
!   - Passivity Quality Metric (PQM)= 100.0000%
!
# GHz S RI R 42.5
0.01 0.04057989277204666 0.03831040001318881 0.9492511016686519 -0.1958114780360483
```

- The touchstone file have port names along with S-parameter quality as per IEEE P370.
  - Start : Step : Stop= 10 MHz: 10 MHz: 130 GHz.
  - Reference impedance: 42.5 Ohm.
  - TX port: [1 3] (in case of crosstalk, aggressor).
  - RX port: [2 4] (in case of crosstalk, victim).
  - Files: 1 Thru, 1 FEXT and 1 NEXT.

2. Modulation Options

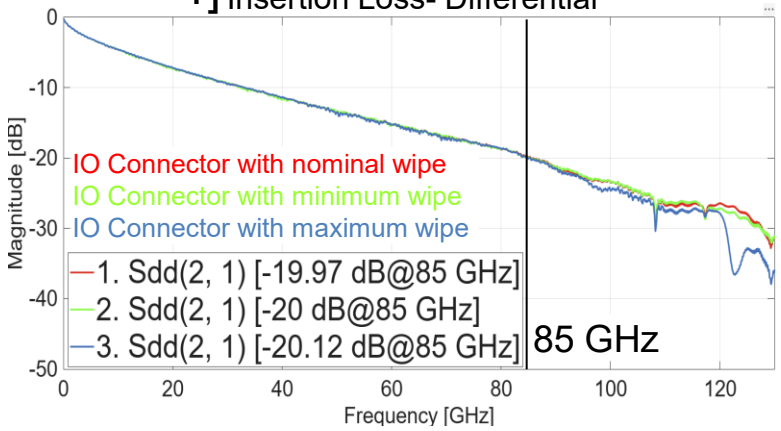
Data Rate	425 Gbps		
Modulation (PAM-N)	~~8~~	6	4
Bits per Symbol	~~3~~	2.5	2
Signaling Rate [Gsym/s]	~~141.67~~	170.00	212.50
Nyquist Frequency [GHz]	~~70.83~~	85.00	106.25

- Only PAM4 and PAM6 are dominant candidates.
  - PAM8 is off the consideration.
- 2027-2028 product needs to be based on existing technologies.
- 2028-2029 product will be based on next generation technologies.

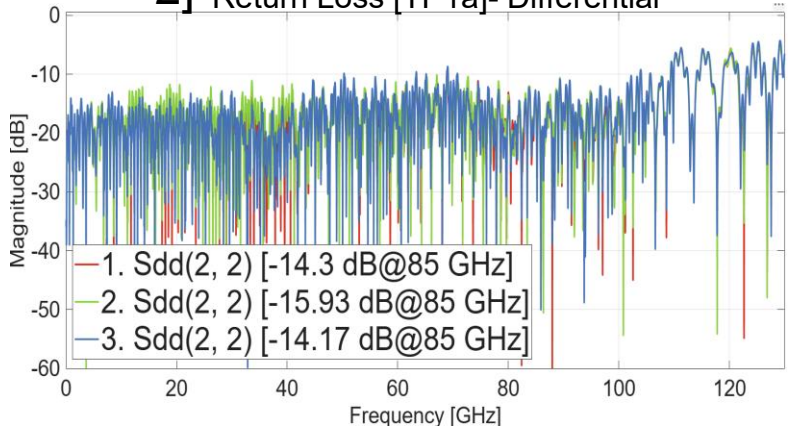
- 425 Gbps PAM8 is off the consideration.
- 425 Gbps PAM6 with existing technologies is possible with HVM around 2027-2028 while further enhancement in technology is needed for 425 Gbps PAM4.

3. Results of C2M: Host to HCB (TP0d-TP1a)

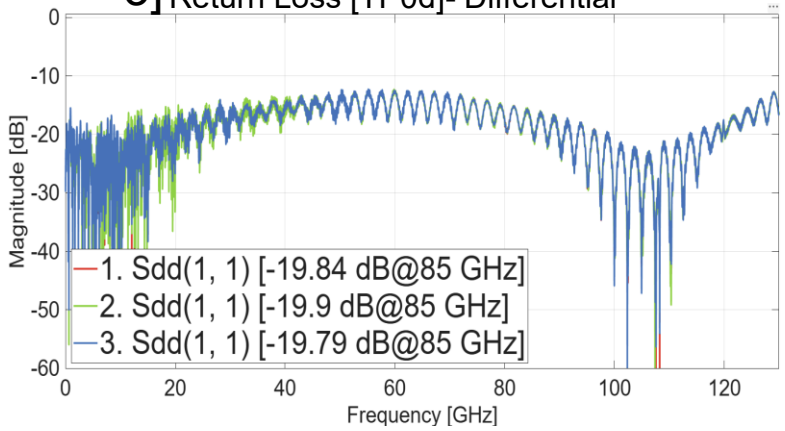
1] Insertion Loss- Differential



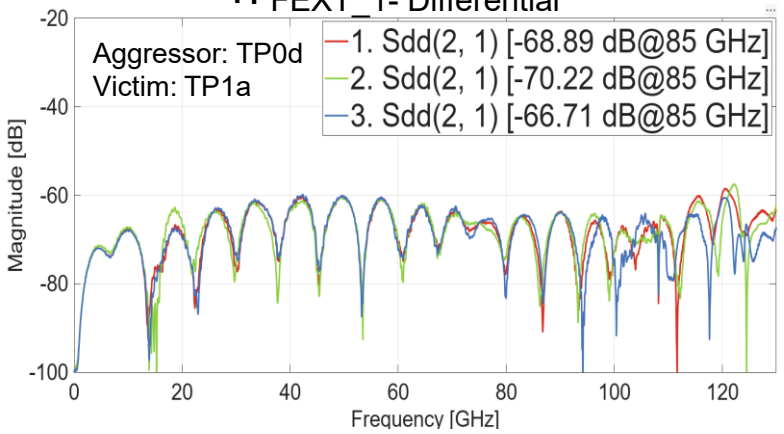
2] Return Loss [TP1a]- Differential



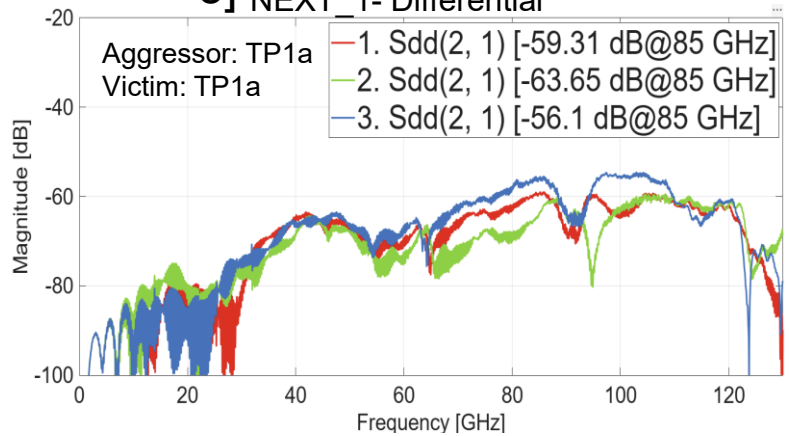
3] Return Loss [TP0d]- Differential

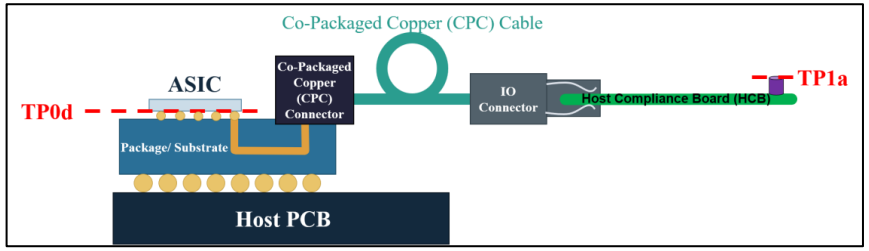


4] FEXT_1- Differential



5] NEXT_1- Differential





- At 425 Gbps PAM6 for a loss of ~-20 dB from TP0d to TP1a, the CPC length is 0.4 m.

Thank You

IO Connector Wipe

