200G AUI C2M System Application and Channel Model Contribution

Upen Reddy Kareti, Cisco
Yi Tang, Cisco
Darja Padilla, Cisco

IEEE P802.3dj Electrical Ad Hoc
Contributor

- David Nozadze, Cisco
- Mike Sapozhnikov, Cisco
Background and Introduction:

- Presented in kareti_3df_01a_2207.pdf: Large Scale Switch - high bandwidth (102.4T), high radix (e.g. 512x200G)
  - SERDES on all sides of pkg
  - Large Package (>16x the area)
  - Wider ball size & pitch (solderability reasons)
  - 64 optics on one side (“pizza box” font panel)

<table>
<thead>
<tr>
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<th>200G PAM4 w RS544 FEC</th>
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<tbody>
<tr>
<td>Cabled host</td>
<td>36.26dB</td>
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<tr>
<td>PCB host</td>
<td>43.51dB</td>
</tr>
</tbody>
</table>

![Diagram showing PCB, Cabled, and PCB + Cabled configurations]
Updated Channel Loss Estimate

• Channel optimization was conducted on a fully routed 512-radix system with both PCB host and cabled host implementations
  • Co-optimization of host package routing and PCB routing.
  • New loss target provided by PCB material suppliers – performance across temperatures needs to be investigated further.
  • New loss target provided by connector vendors.

• PCB host: worst-case bump-to-bump channel loss improved from 43dB (kareti_3df_01a_2207) to a little over 36dB, and about 2/3 of channels have an insertion loss of less than 32dB.

• Cabled host: worst-case bump-to-bump channel loss improved from 36dB (kareti_3df_01a_2207) to a little over 34dB.
• 6 PCB host channels were built and uploaded: 12dB, 15dB, 20dB, 22dB, 24dB, 26dB
• The C2M channels include host PCB via, host PCB, connector, module PCB, module PCB via.
Differential Insertion Loss – PCB Host
Differential Return Loss – PCB Host
Far-end & Near-end Crosstalk – PCB Host

PowerSUM NEXT is based on the case when IO connector is closest to the RX – i.e., at Module RX
Cabled Host AUI C2M Channel Model Overview

- 6 cabled host channels were built and uploaded: 11dB, 15dB, 20dB, 22dB, 24dB, 26dB
- The C2M channels include host PCB via, host PCB to near host connector, near host connector, cable, module connector, module PCB via.

Not included in the channel:

- ASIC
- Module DSP
- BGA footprint
- Near Host Connector
- Module Connector
- Module PCB

Differential Insertion Loss – Cabled Host
Differential Return Loss – Cabled Host
PowerSUM NEXT is based on the case when IO connector is closest to the RX – i.e., at Module RX