System considerations with proposed baseline Linear physical interface

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IEEE P802.3db 100 Gb/s, 200 Gb/s, and 400 Gb/s Short Reach Fiber Task Force
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➢Overview

- Consider proposed host budget from Baseline_linear physical interface proposal(latchman_3db_adhoc_01_101520)
- Consider simple applications proposed Host options for Linear I/O(palkert_3db_adhoc_01_101520)
- Review port coverage that can use linear physical interfaces
- Scope of this analysis:

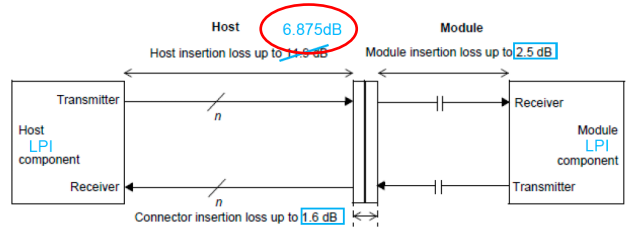
  - Limited to port coverage in a system with an assertion that Linear physical interface proposed baseline works

  - Do not cover some of the challenges we face to support linear interfaces like ref. equalizer suitable for low power applications, TIA noise, the discontinues and noise along the channel path.
- Summary

- Proposed base line host budget is 6.875 dB
- The suitable front panel applications within this loss limit

Channel Insertion Loss Budget & Host LPI

> Align host loss with 100GBASE-CRx



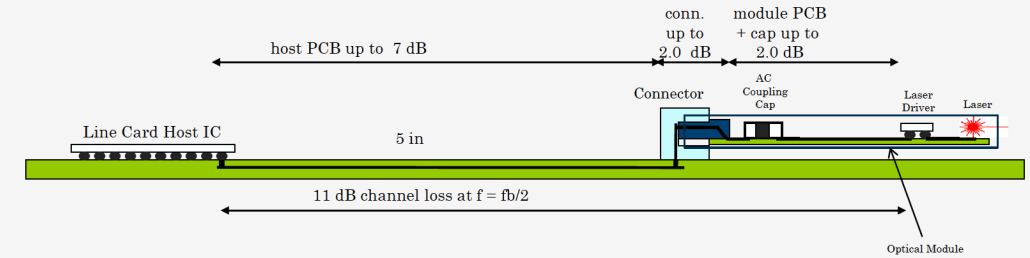
Note—The number of lanes *n* is equal to 1 for 100GAUI-1, 2 for 200GAUI-2, and 4 for 400GAUI-4.

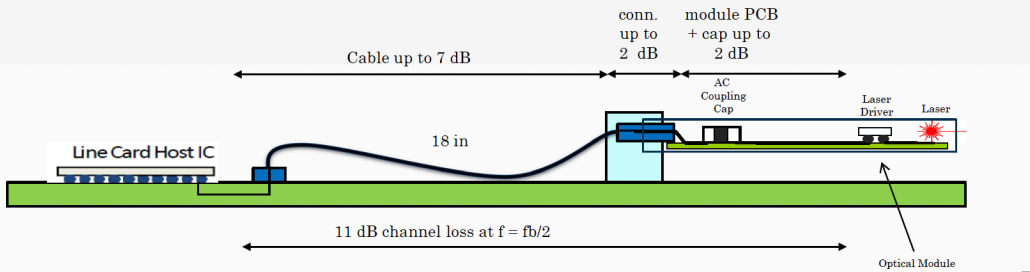
Modified **Figure 120G–2—~~100GAUI-1~~, ~~200GAUI-2~~, and ~~400GAUI-4~~ C2M insertion loss budget at 26.56 GHz**

100GLPI-1 400GLPI-4

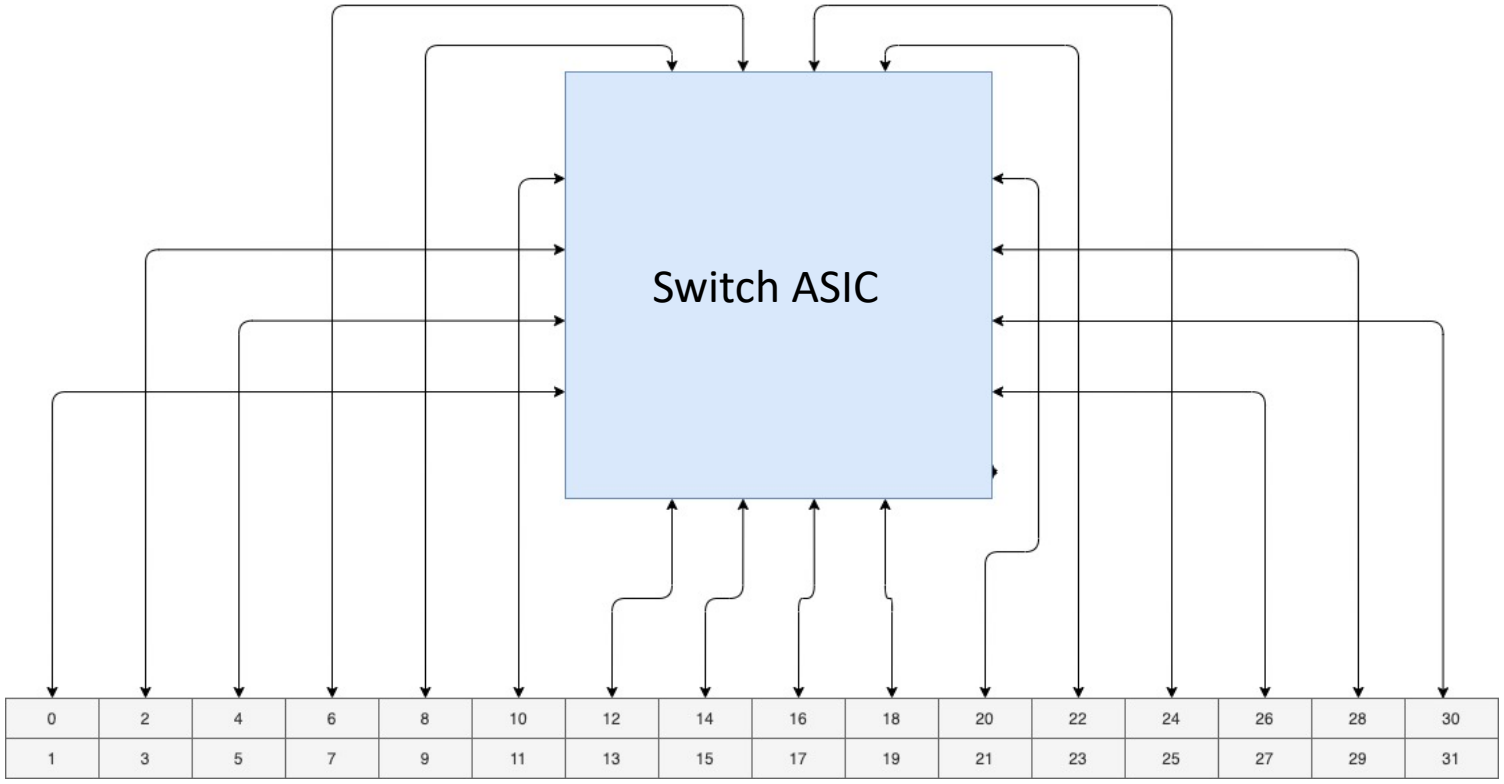
200GLPI-2

11 dB ASIC to front panel socket as specified in 802.3ck Clause 162





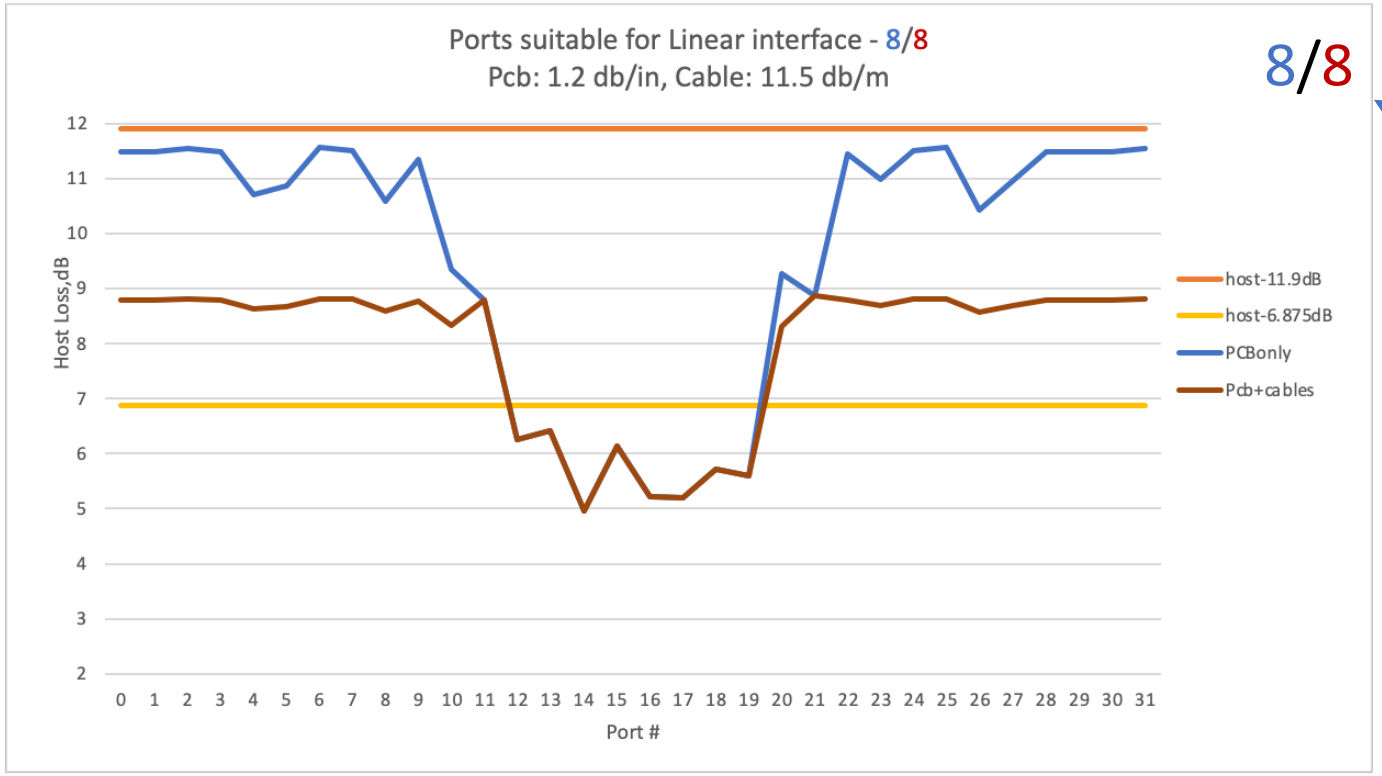
- Consider a simple 1 RU switch box with
  - 256 lane switch
  - 32 front panel ports
- optimize switch to front port connections to minimize host losses and maximize ports for Linear I/O
- Channels can be
  i. PCB only
  ii. Or PCB + cables



Parameters that influence port coverage for Linear Interface

- PCB material 1.2 dB/in @ Nyquist 26.5625 GHz

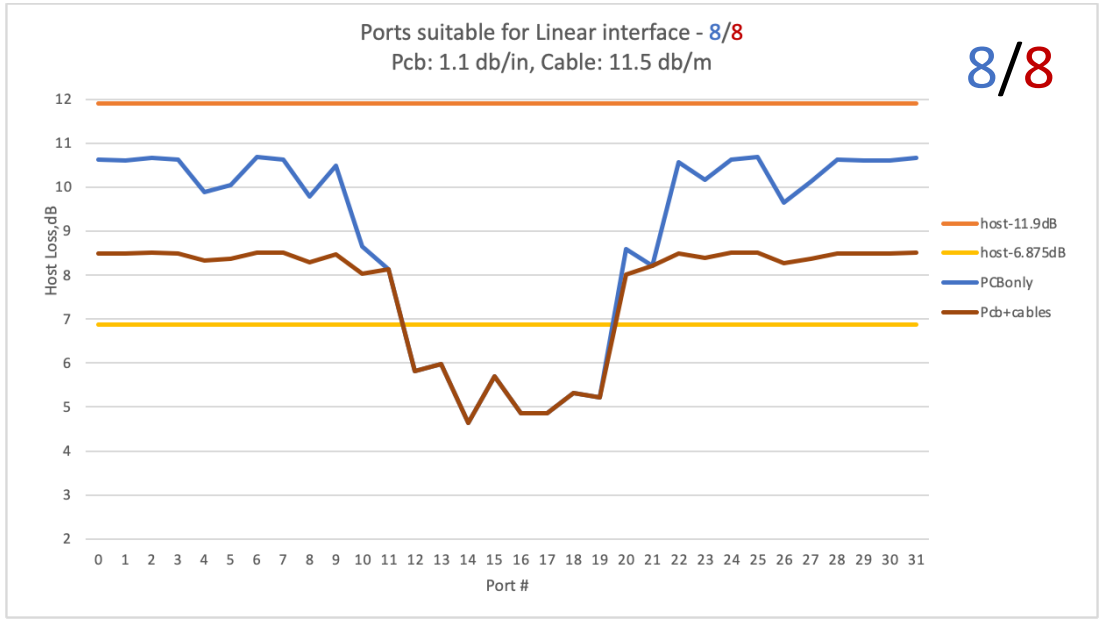
- Cables 32 AWG twin-ax -11.5 dB/m @Nyquist 26.5625 GHz

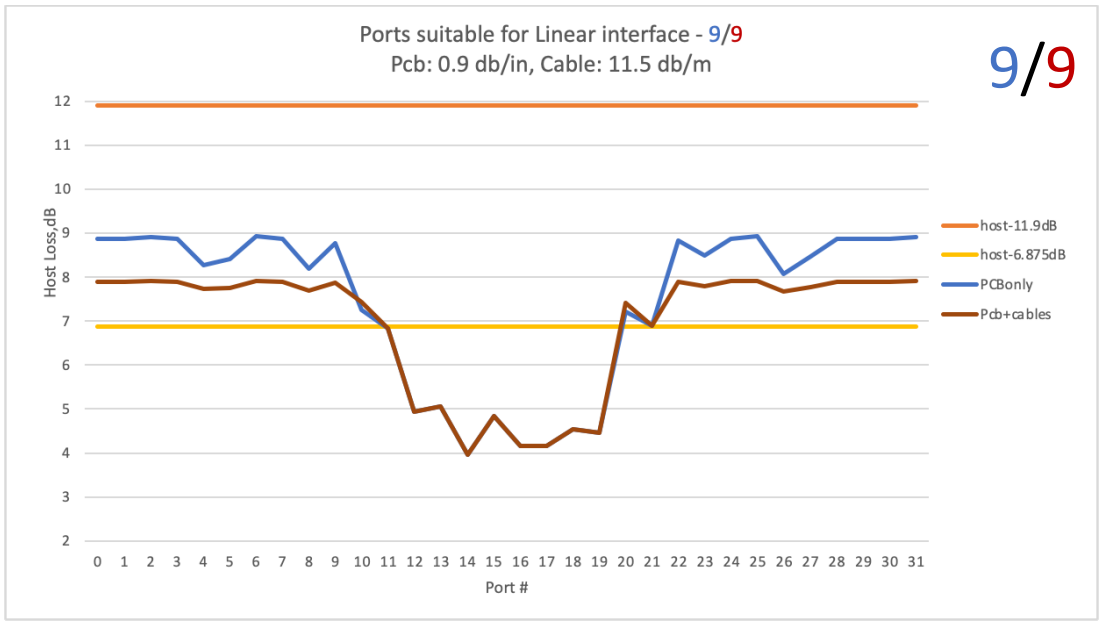


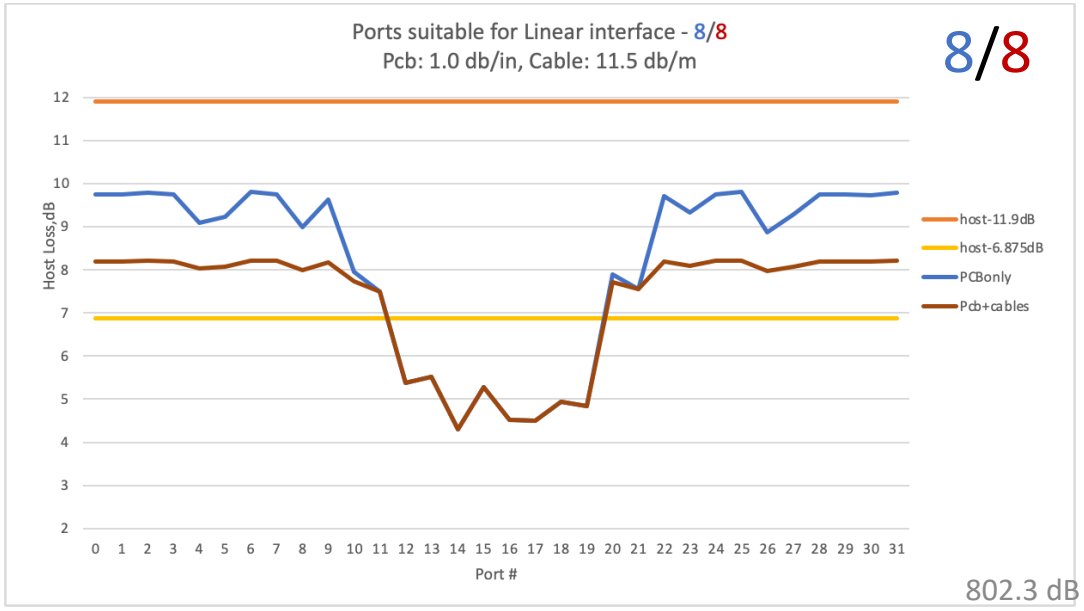
Number of ports that can support linear interface by PCB only/ PCB + Cables out of max 32 ports

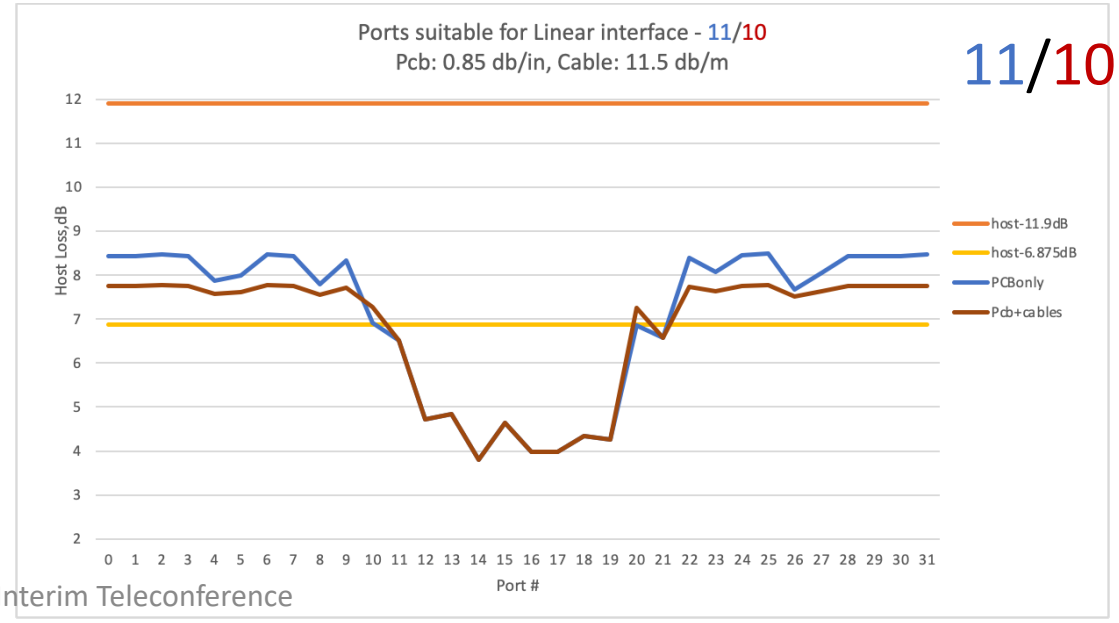
Constant loss contributors:
BGA via; pin filed fan-out; near ASIC connector and its vias; cable terminating structures; pcb transition vias (if any); IO conn via (PCB only cases).

PCB loss Impact

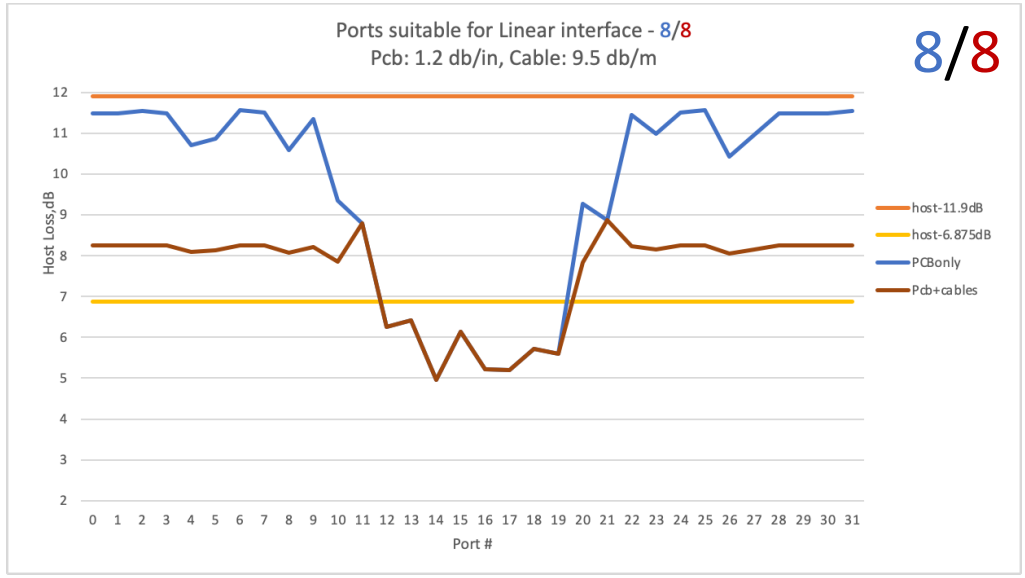


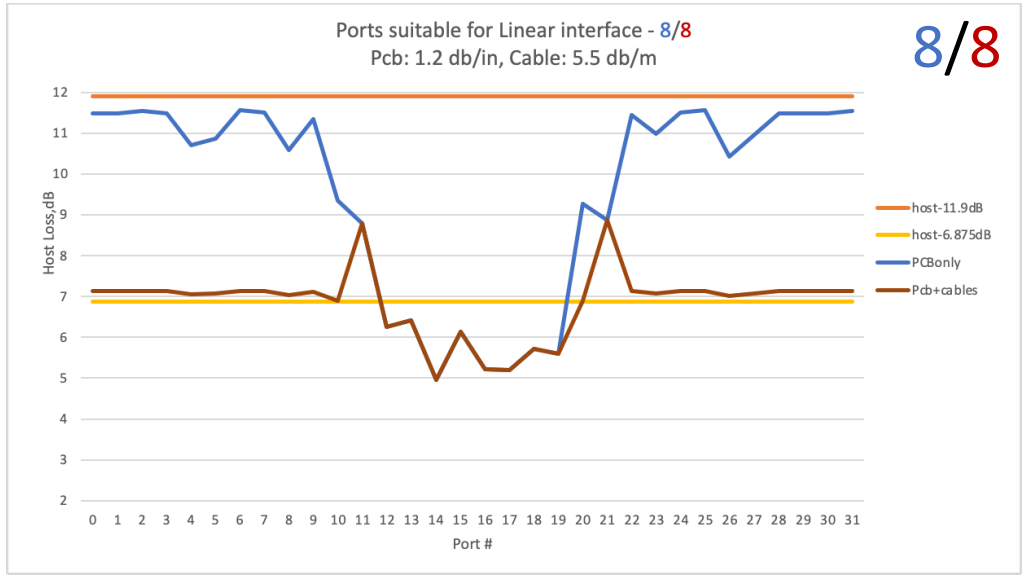




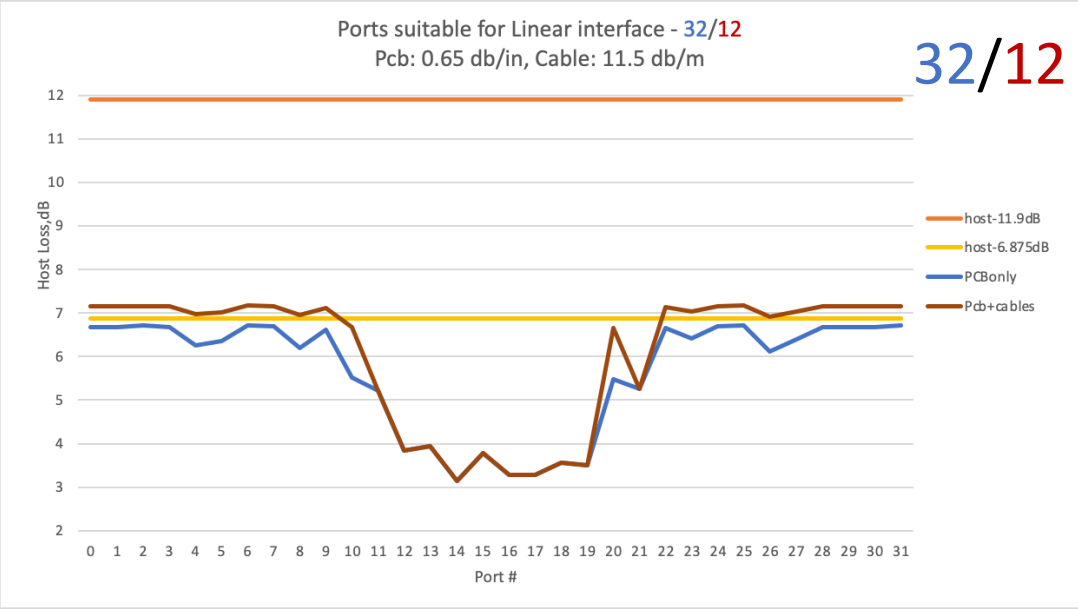


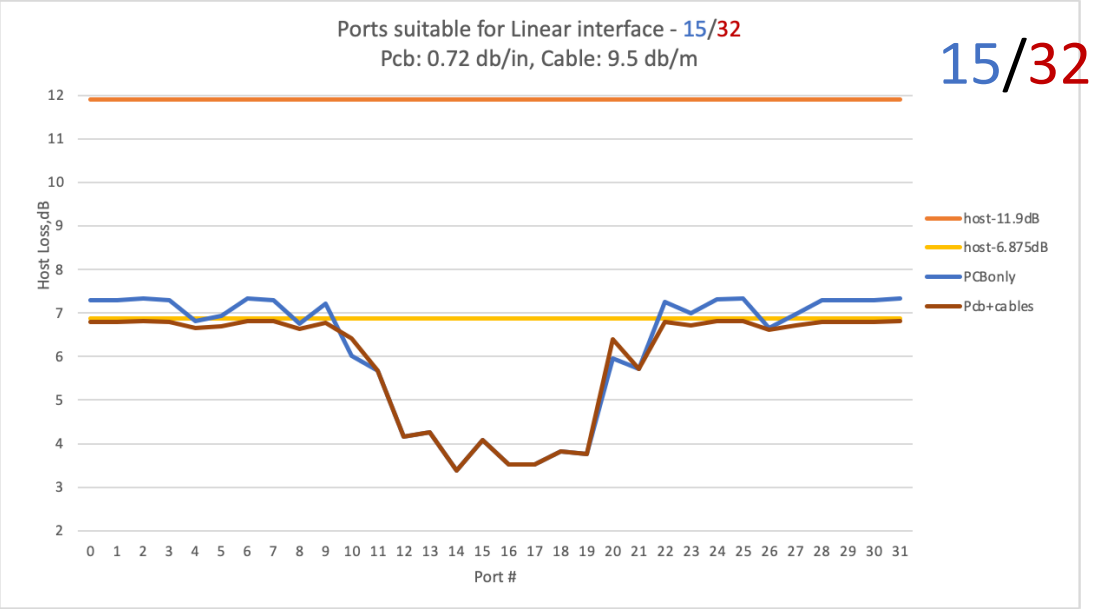
Cable loss Impact





What it takes to All ports meet Linear Interface Host loss limit





Summary

- There is no practical way(s) for all ports to support a linear physical interface using the proposed host budget
- Only way to get all ports to support this interface is by adding phy or re-timers in the path.