

MDI for 4x25G Copper and Fiber Optic IO Quadra (CFP4 proposal) Connector System

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4x25Gb/s MDI Potential Requirements

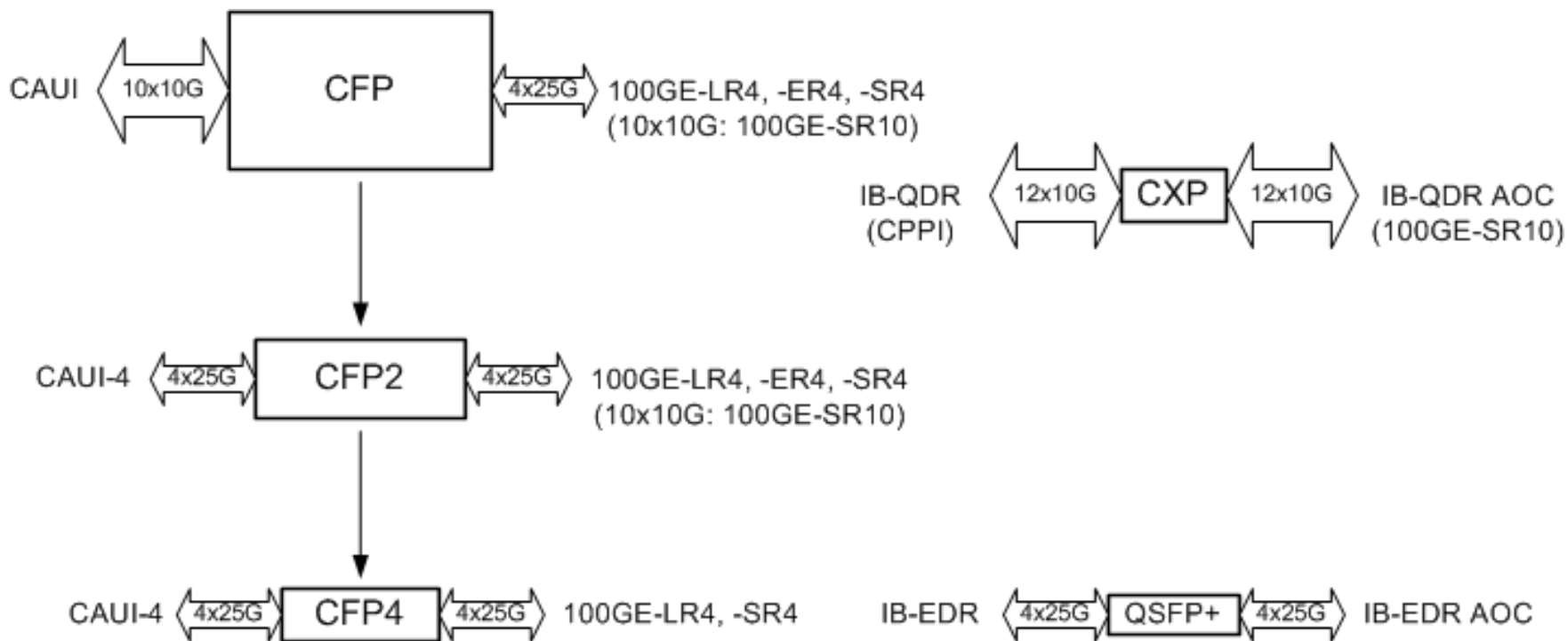
Critical Needs:

- Excellent electrical performance for both copper and fiber applications
 - Low insertion loss, low crosstalk, and good return loss
- Optimized for ability to manage thermal dissipation
- Supports direct attach copper cable assemblies, passive and active
- Supports SR, LR transceivers and active optical cables
- Integrated EMI management
- Achieves high density

MDI Options

- QSFP25 as presented in palkert_01a_0911.pdf provides backwards compatibility
- CFP MSA is developing CFP2 and CFP4 Optics for 4x25G applications
 - Offers a multi-generational approach to allow for technology cycles
 - Provides for increased range of power dissipation
 - Designed to support lower density long reach and higher density short reach
 - Uses a common electrical interface for CFP2 and CFP4
 - Cage design incorporates comprehensive EMI containment features

CFP MSA Roadmap



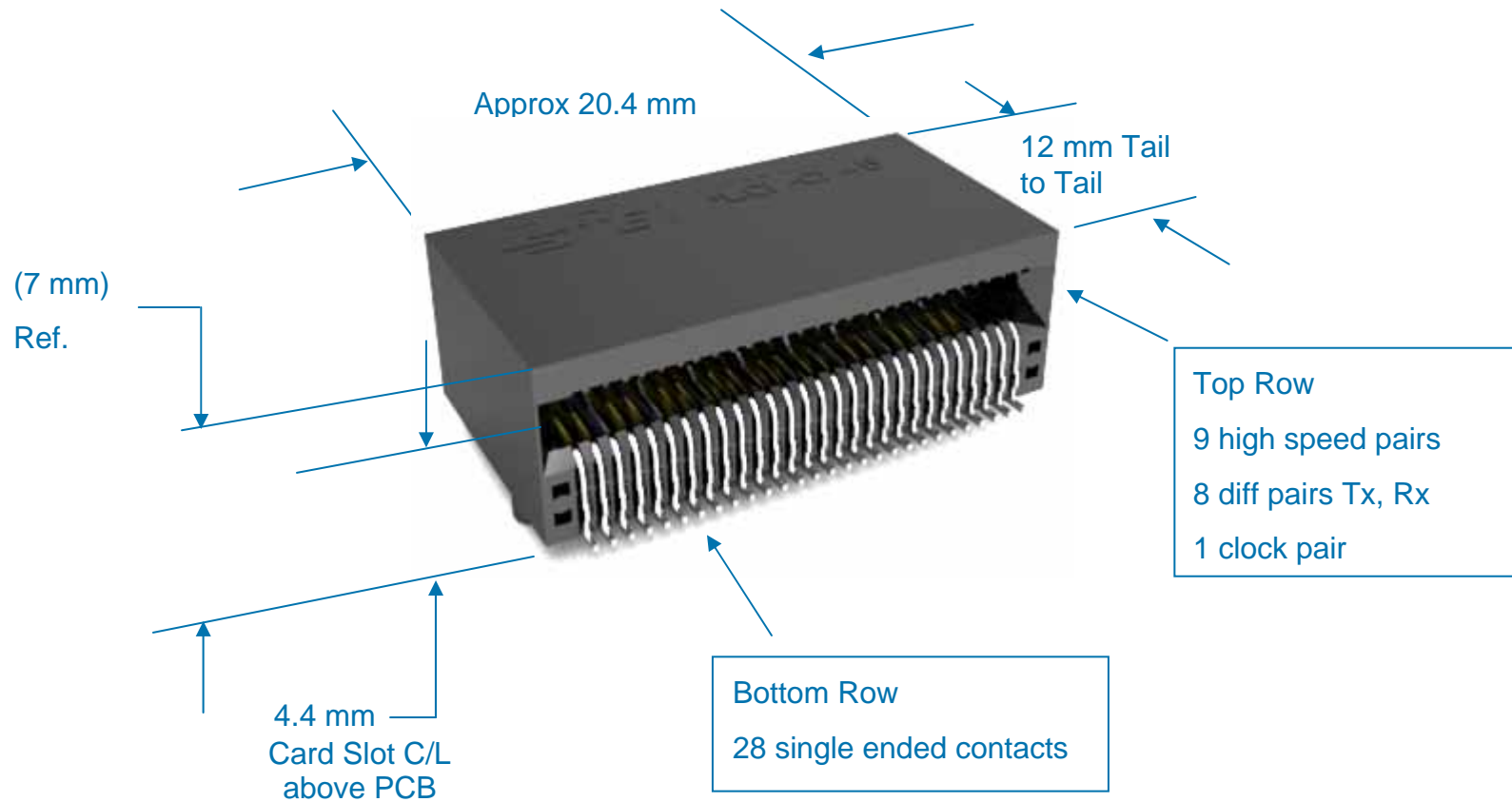
Module shapes all drawn approximately to same scale

Roadmap supplied courtesy of the CFP MSA

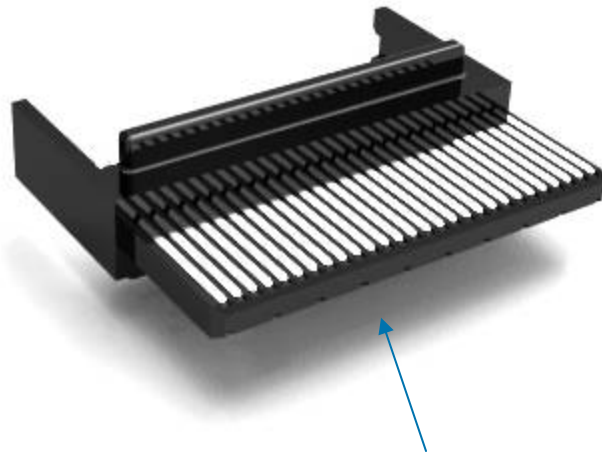
Quadra Connector Overview

- Designed specifically for optimized performance up to 28Gb/s
- Two piece plug and receptacle system allows tighter mating tolerance to be held which optimizes electrical performance
- All high speed pairs are located on the top row of the connector, eliminating vias on the transceiver PCB
- Optimized layout and routing of host and module PCB to enhance channel performance
- Same electrical performance for CFP2 and CFP4, just different pin count
- Surface mount design accommodates belly to belly high density applications

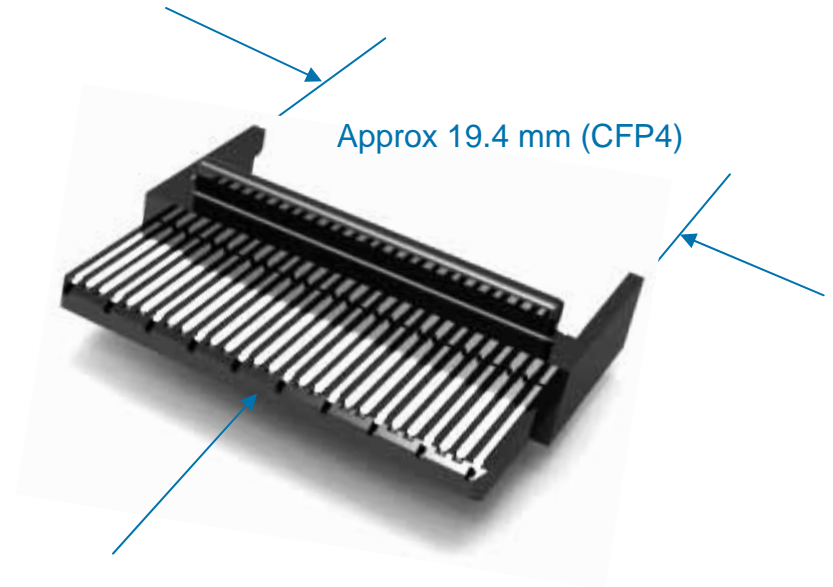
Quadra Connector (CFP4 Proposal), Receptacle



Quadra Connector (CFP4 Proposal), Plug



Singed Ended Contacts
Bottom side



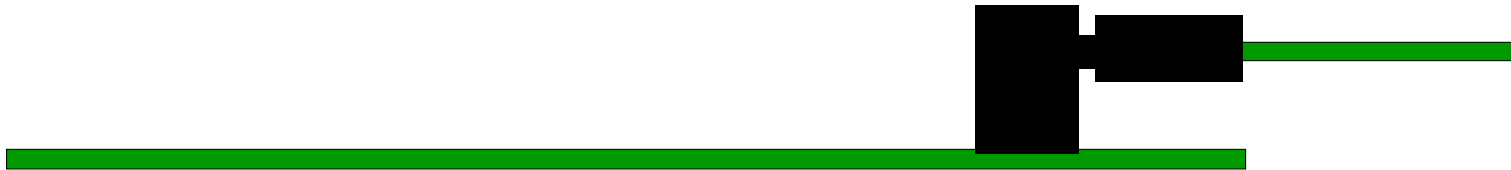
High Speed Contacts
Top side

Approx 19.4 mm (CFP4)

Quadra Channel Simulation Set-Up

CONNECTOR

- QUADRA
- 2 piece connector design
- All 8 high speed pairs on top of the module board
- No vias required on module PCB



HOST BOARD

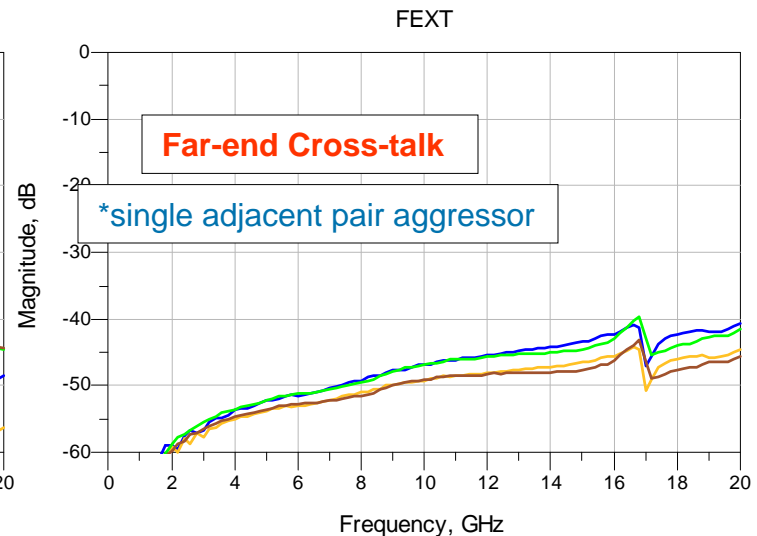
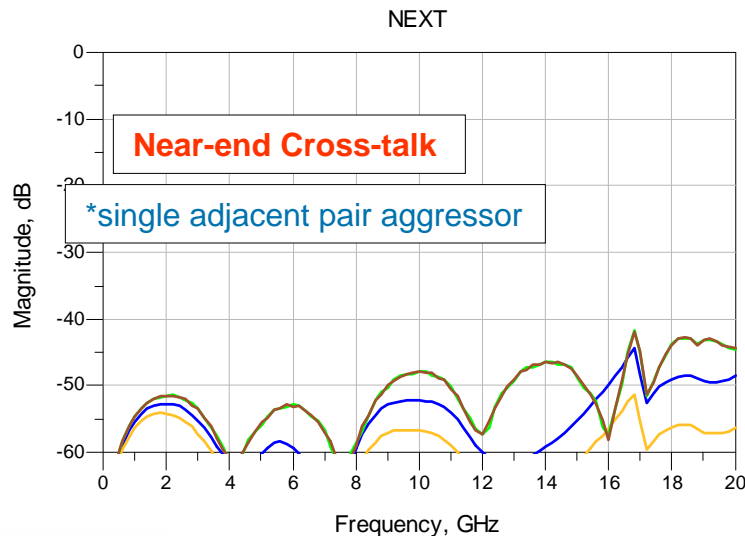
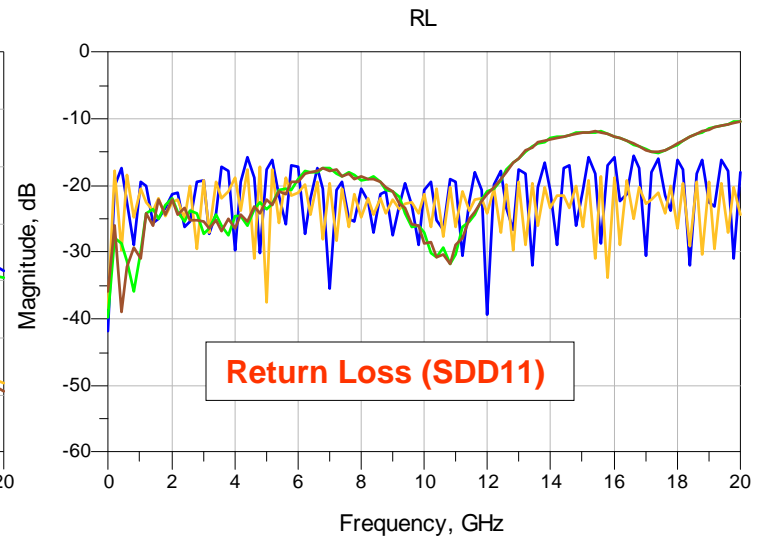
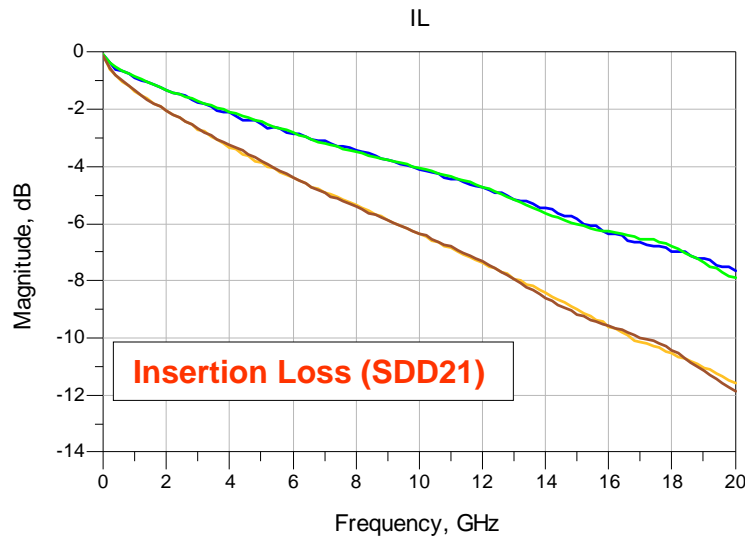
- Board material = N4000-13si
- Trace length = **4" and 7"**
- Trace geometry = stripline
- Trace width = 5 mils
- Differential trace spacing = 6 mils
- PCB thickness = 0.093"
- 2 signal layers
- 6 ground planes
- Layer connection = layer 2 (near top)
- Counterbored [18mil stub]

PLUG BOARD

- Board Material = N4000-13si
- Trace length = 1.25"
- Trace geometry = mStrip
- Trace width = 7 mils
- Differential trace spacing = 5 mils

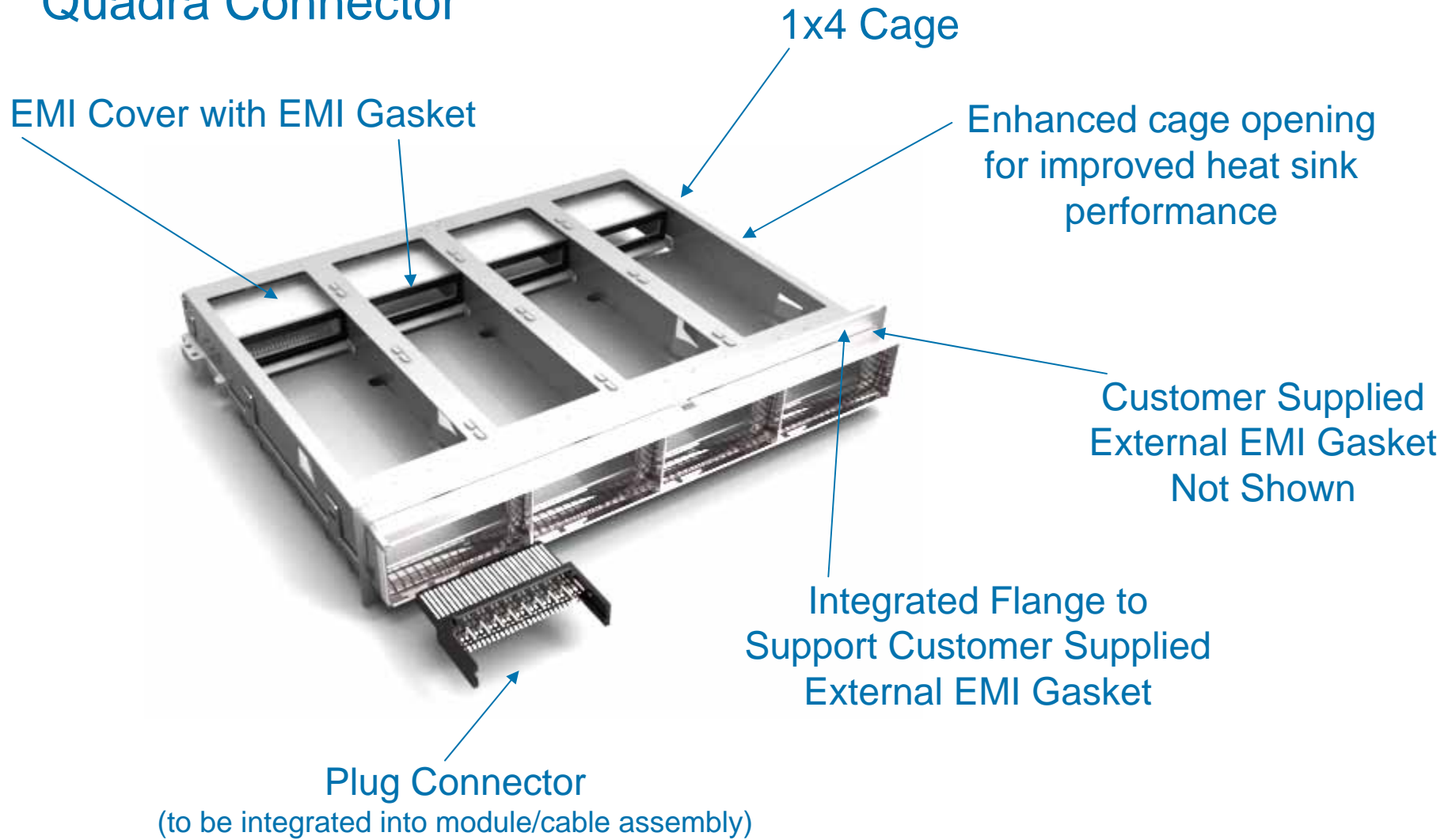
Quadra Channel (CFP2, CFP4), SI Modeling Results

Insertion/Return Loss/NEXT/FEXT



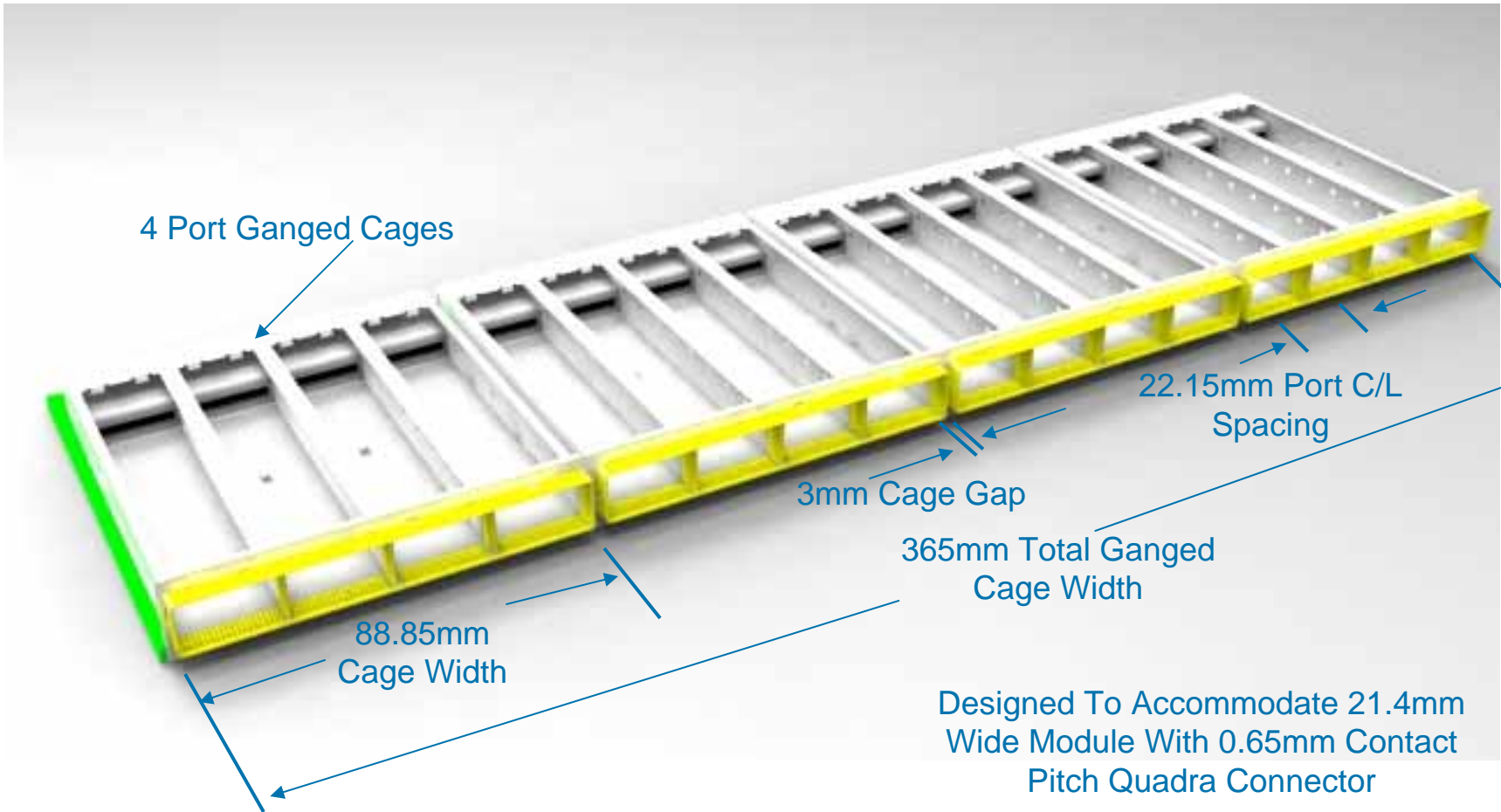
CFP4 Proposal Port Overview

Quadra Connector



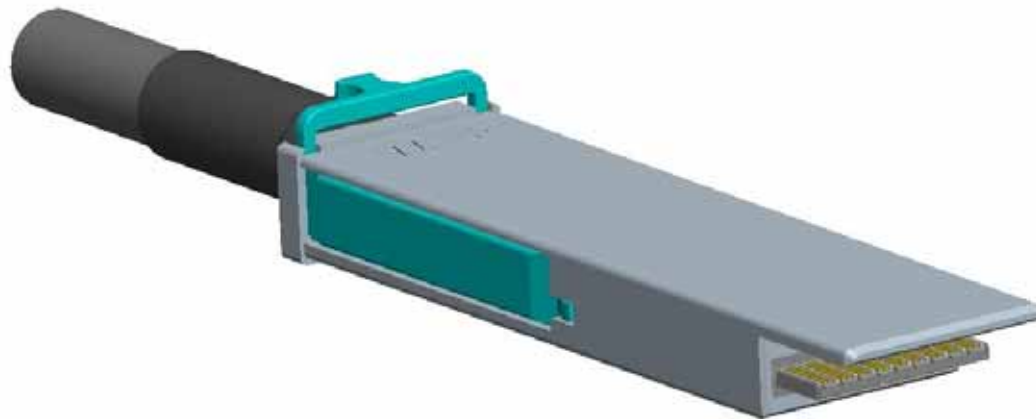
Quadra (CFP4 Proposal) Connector Mechanical Density

16 Port Line Card



CFP4 Proposal Copper Cable Assembly

- CFP4 port supports 100G CR4 copper direct attach cable assemblies
- Module form factor supports direct attach copper and modular solutions
- Optimized connector gives improved channel performance



Recommendation

- Similar to what was done with 802.3ba, we should support the demands of backwards compatibility and newer generations
 - CFP MSA supports implementations of existing standards
- 802.3bj should recognize two MDIs that will be consistent with future implementations of 100G standards
 - QSFP28
 - CFP4