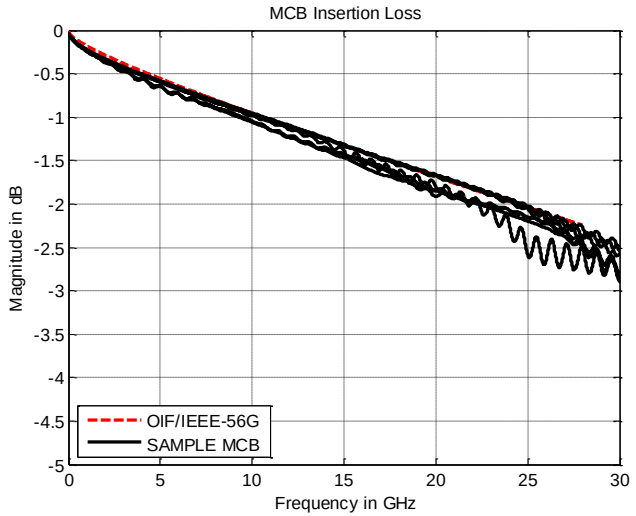
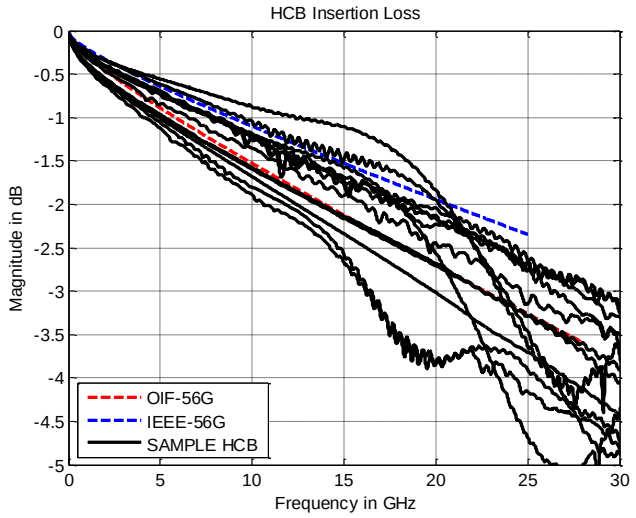
100GEL Compliance Test Fixtures – MCB,HCB Design

Sam Kocsis

Test Fixture Insertion Loss

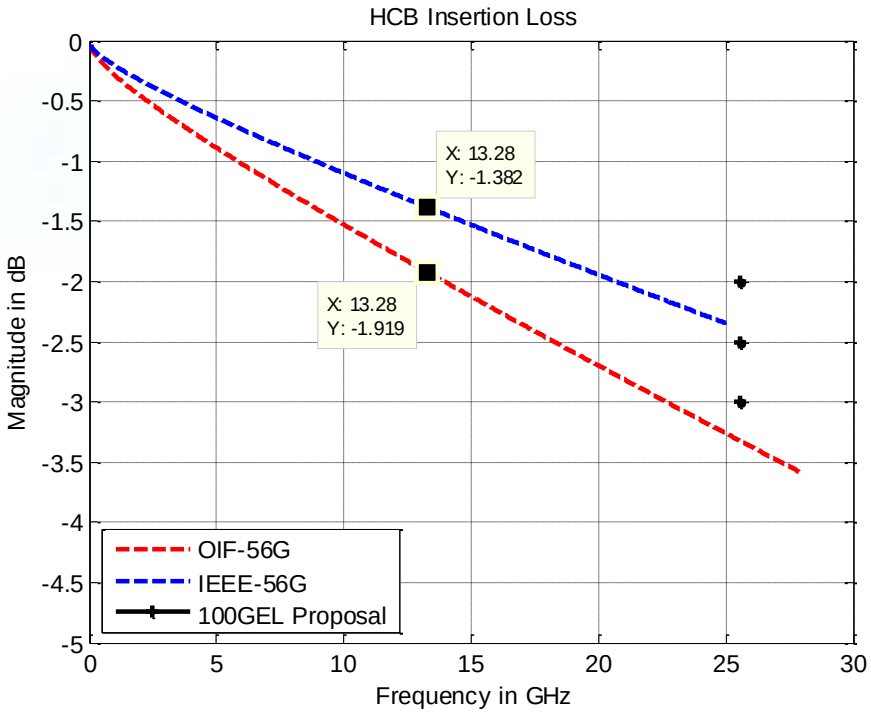
- Plots to the right show IL performance of sample MCBs and HCBs for multiple MDIs against the 56G specs
  - Sample data collected from multiple fixtures from multiple vendors (not just Amphenol)
- MCB performance is very consistent and generally compliant to the spec
- HCB performance is inconsistent and compliance is subjective
  - Sample data shows the IL requirement for the HCB is difficult to achieve





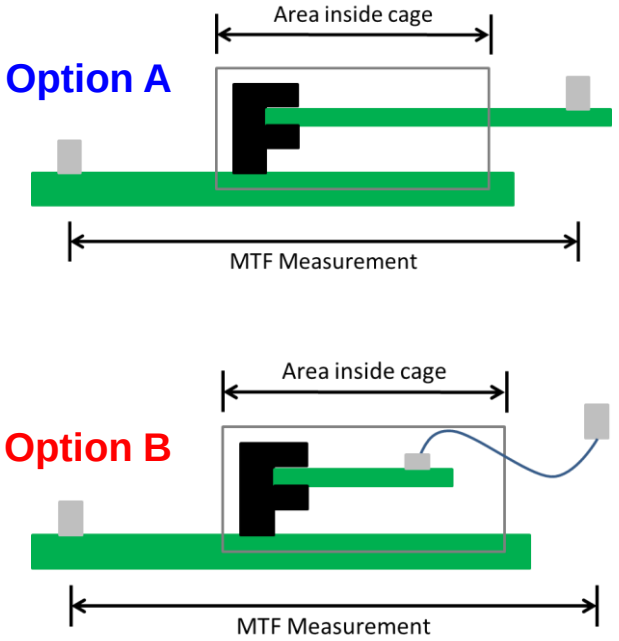
HCB Performance Request

- Requirements for both IEEE and OIF shown at right
- **-2.0dB**
  - -2dB target would be very aggressive given the increased density of the 112G MDI base and the inconsistency of the current 56G HCBs
- **-2.5dB**
  - -2.5dB target is a natural extension of the current IEEE 56G requirement
  - Given the inconsistency of the current 56G HCBs, there is low confidence for this target
- **-3.0dB**
  - -3.0dB target is improvement over OIF 56G
  - Given advancements in PCB materials and new fixture design concepts, there is high confidence to consistently meet this target



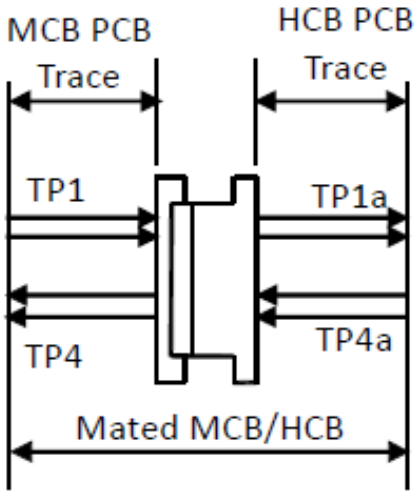
HCB Test Fixture

- Both HCB and MCB have traditionally been made with PCB structures (Option A)
- In order to meet the performance for 112G, the optimum test fixtures will be constructed as PCB + Cable (Option B)
- More dense MDIs (e.g. QSFP-DD, OSFP) currently require multiple fixtures to characterize the solution
  - PCB + Cable construction would eliminate additional test fixtures
- Stacked MCBs could also benefit from the PCB+Cable concept to keep same masks



MTF Target Performance

- IEEE/OIF MCB shared the same IL profile for 56G
  - Same expectation for 112G (2.3dB)
- From last meeting, consensus was connector required reference IL budget of 2.0dB
  - All single-port MDIs included
  - Stacked connectors included
- Using HCB IL from this presentation the total MTF IL reference would be 7.3dB
  - A uniform MTF IL reference would provide a comparison between MDIs



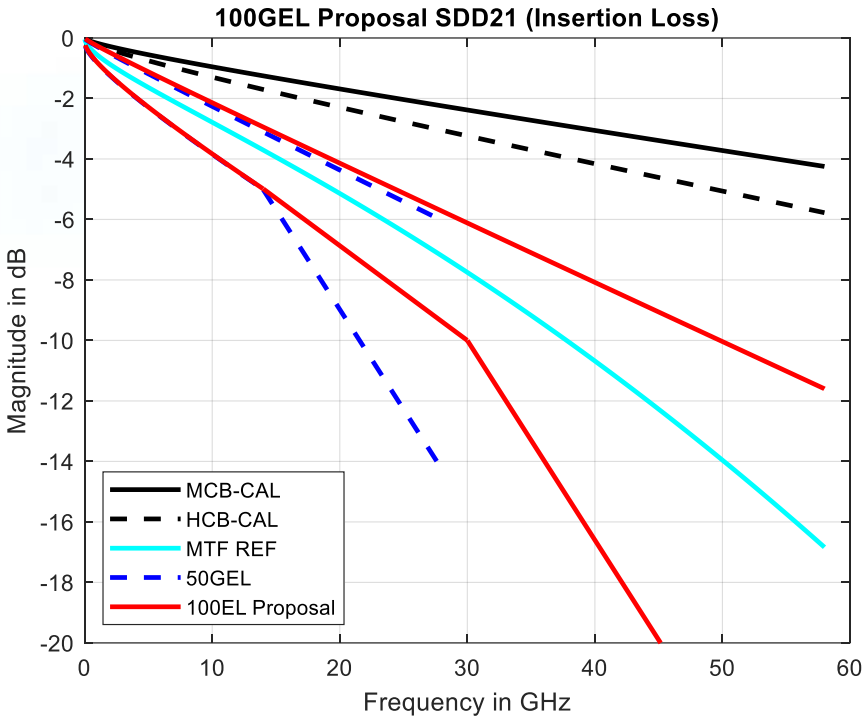
2.3dB **2.0dB** **3.0dB**

112G Reference (@28GHz) = 7.3dB

56G Reference (@14GHz) = 3.6dB

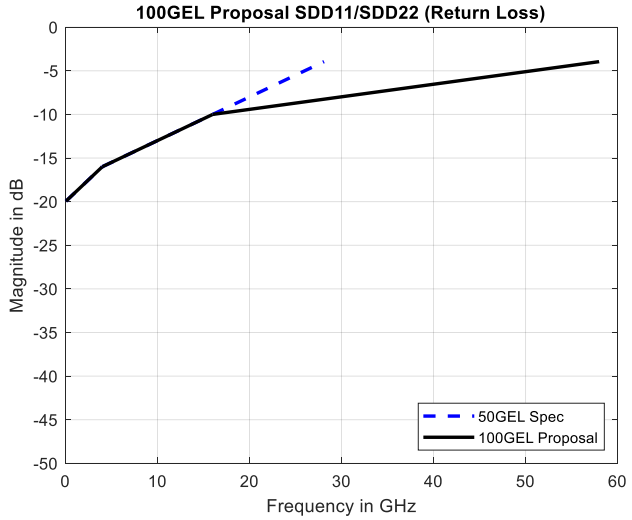
Mated Test Fixture Insertion Loss

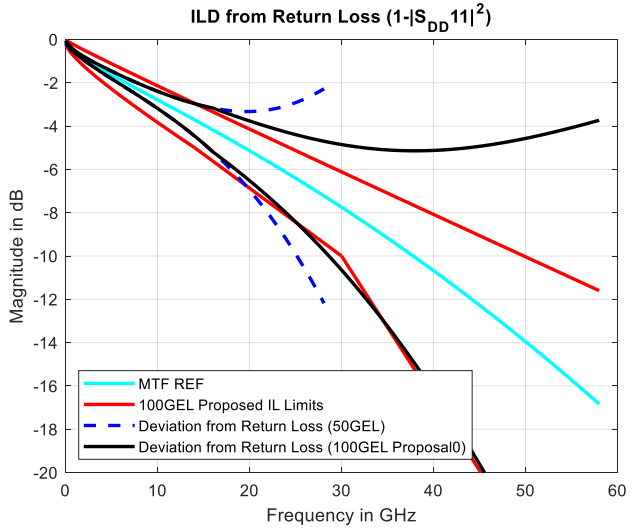
- MCB Reference Loss (50MHz-58GHz)
  - SDD21 = 0.00125-0.1200*√f-0.0575*f
- HCB Reference Loss (50MHz-58GHz)
  - SDD21 = 0.00170-0.1632*√f-0.0782*f
- MCB-HCB Reference Loss
  - SDD21 = -0.4655*√f-0.1179*f-0.00196*f^2
- 100GEL Proposed Mask
  - SDD21< 0.076*√f+0.19*f
    - For f < 58GHz
  - SDD21> 0.12+0.475*√f+0.221*f
    - For 50MHz < f < 14GHz
  - SDD21> 0.6025+0.31325*f
    - For 14GHz < f < 30GHz
  - SDD21> -9.8+0.66*f
    - For 30GHz < f < 58GHz



Mated Test Fixture Return Loss

- Return Loss dominates the Insertion Loss mask budget
- Proposed Mask
  - SDD11/22 > -20+f
    - For 50MHz < f < 4GHz
  - SDD11/22 > -18+0.5*f
    - For 4GHz < f < 16GHz
  - SDD11/22 > -12.302+0.144*f
    - For 16GHz < f < 58GHz
- Deviation due to Return Loss is approximated using $1-|S_{DD}11|^2$





Amphenol

Summary

- Practical reference target provided to help guide the development of the other normative parameters
- Test fixture samples expected to be ready by Q1 ‘19 Meeting
- Request for others to collect measurements for all applicable connector interfaces to validate reference model or propose changes