



100G Host-to-Module Short Channels

Jane Lim, Arturo Pachon, Pirooz Tooyserkani

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Contributors

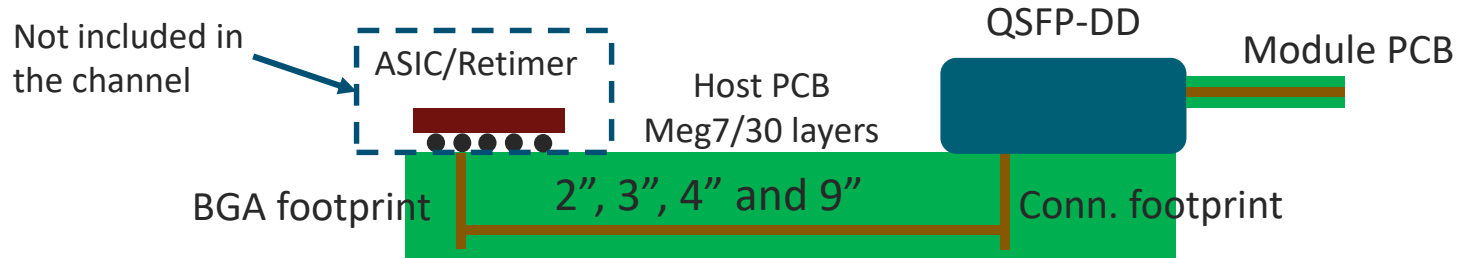
- Vivek Shah, Molex
- CheeKit Chew, Molex
- Alex Haser, Molex
- Xiang Fang, Cisco
- Rockwell Hsu, Cisco
- Wei Yao, Cisco

Channels Overview

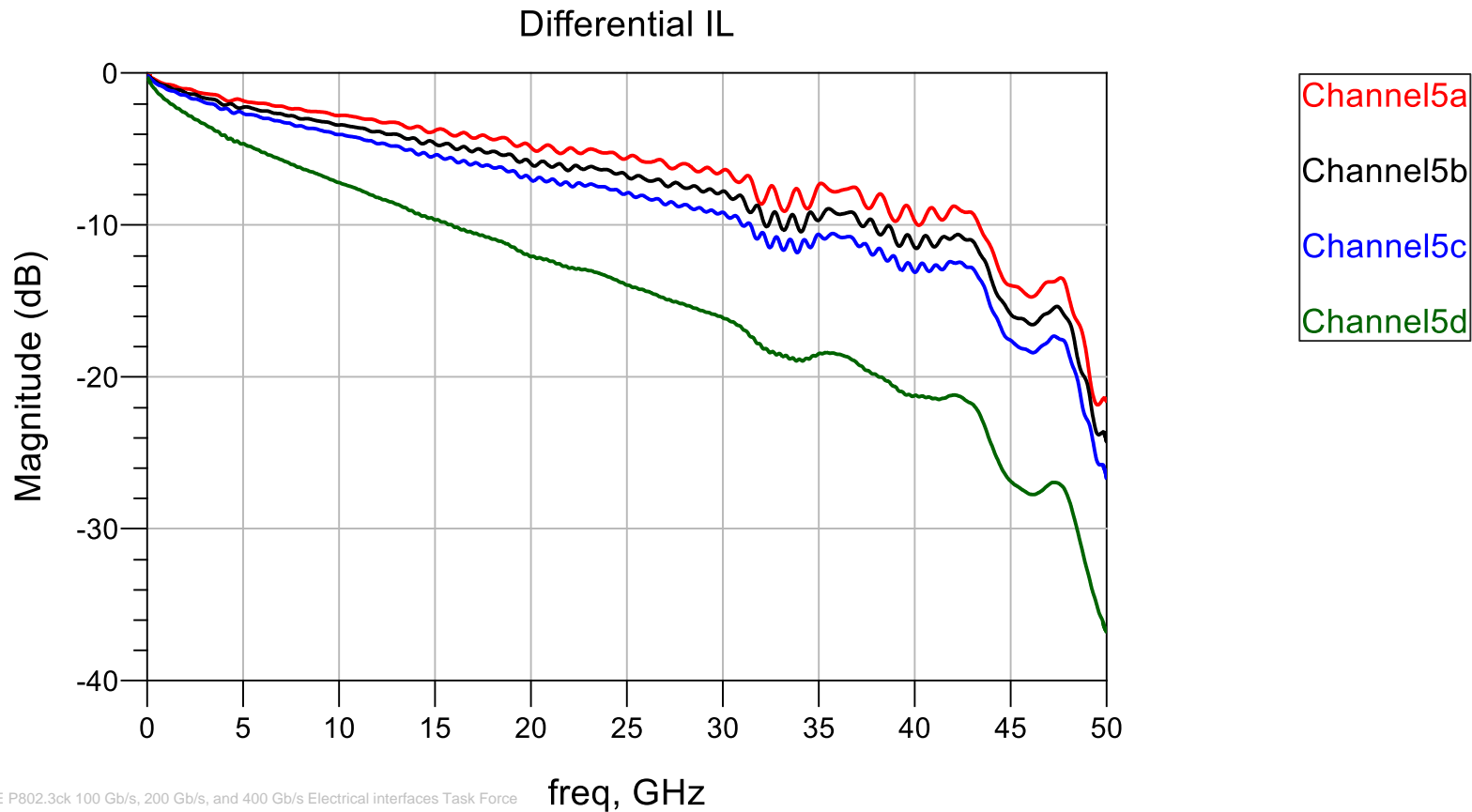
- A set of 6 channels (host to module, channel 1/2/3/4/5/6) were shared in March 2019 (lim_3ck_01a_0319), and this is meant for long channel analysis with 9" of host trace length
- At Vienna meeting, there is a request to provide shorter channels with realistic BGA & connector footprint to analyze the reflective short trace length issue (see dudek_3ck_01_0719)
- This presentation provides additional channels built with ASIC footprint and new pair in QSFPDD connector, namely channels 5a/5b/5c/5d. All were built with latest updated QSFPDD model provided by Molex:
 - Channel 5a: ASIC BGA footprint (mid length via) + host PCB trace 2" + UPDATED QSFP-DD footprint & connector (new pair) + module PCB; including 5 FEXT & 3 NEXT
 - Channel 5b: ASIC BGA footprint (mid length via) + host PCB trace 3" + UPDATED QSFP-DD footprint & connector (new pair) + module PCB; including 5 FEXT & 3 NEXT
 - Channel 5c: ASIC BGA footprint (mid length via) + host PCB trace 4" + UPDATED QSFP-DD footprint & connector (new pair) + module PCB; including 5 FEXT & 3 NEXT
 - Channel 5d: ASIC BGA footprint (mid length via) + host PCB trace 9" + UPDATED QSFP-DD footprint & connector (new pair) + module PCB; including 5 FEXT & 3 NEXT

Model Overview

- 16 pairs (8 Tx, 8 Rx) QSFP-DD SMT Connector and host PCB footprint are solved as one piece in HFSS
 - QSFP-DD is the latest updated 112G simulation model
- PCB stackup is 30 layers, 150mil thick, with Meg7 material
- PCB via stub length is modelled as 10mil
- Diff pair trace width/spacing is 4.5mil/8.5mil
- ASIC and retimer footprint are simulated with actual BGA ball-out using the same PCB stackup



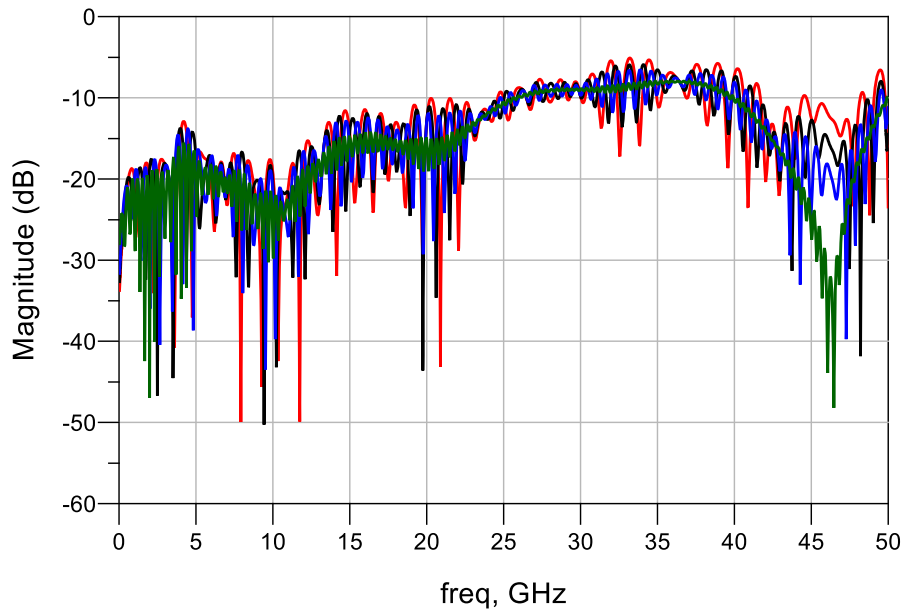
Differential Insertion Loss



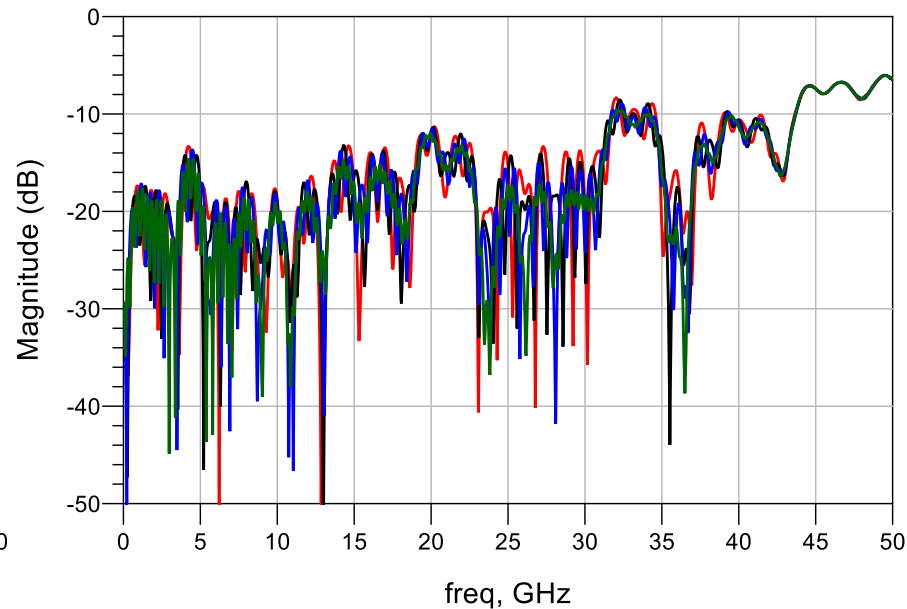
Differential Return Loss

- Channel5a
- Channel5b
- Channel5c
- Channel5d

Differential RL- BGA



Differential RL- Connector



Far-end and Near-end Crosstalk

- NEXT aggressor
- FEXT aggressor

