

TYPICAL CHANNELS FOR CAUI-4 CHIP-TO-CHIP ROUTING IN SYSTEM

IEEE 802.3 bm
CAUI-4 Ad-hoc

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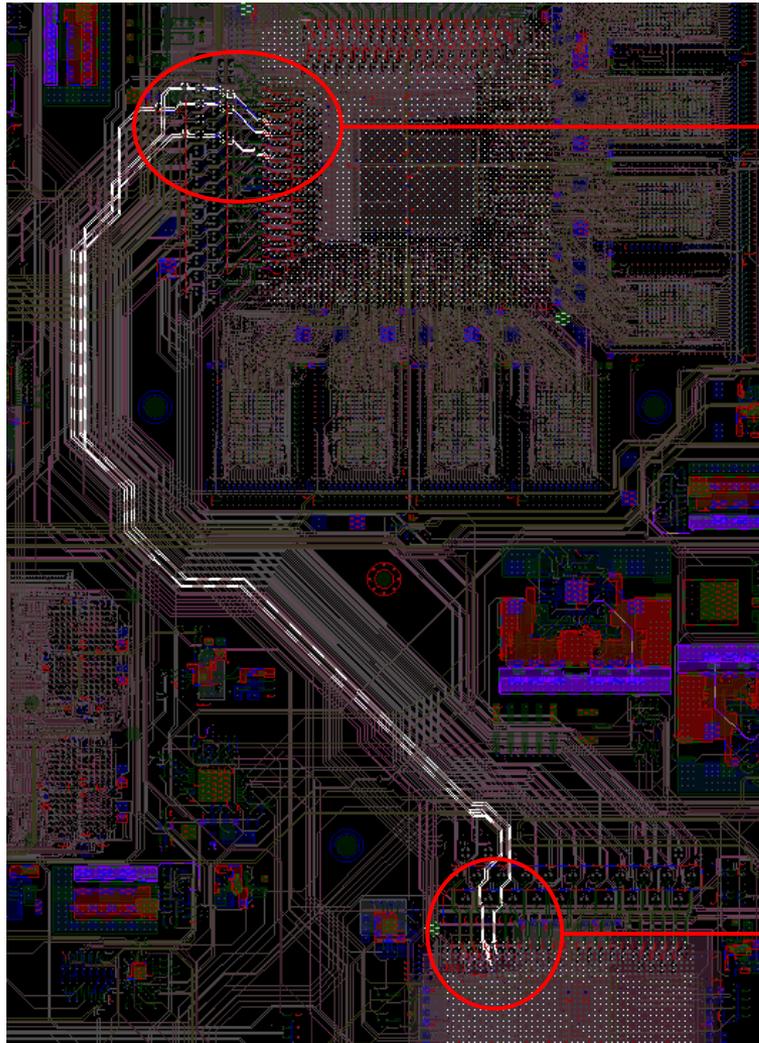


Introduction

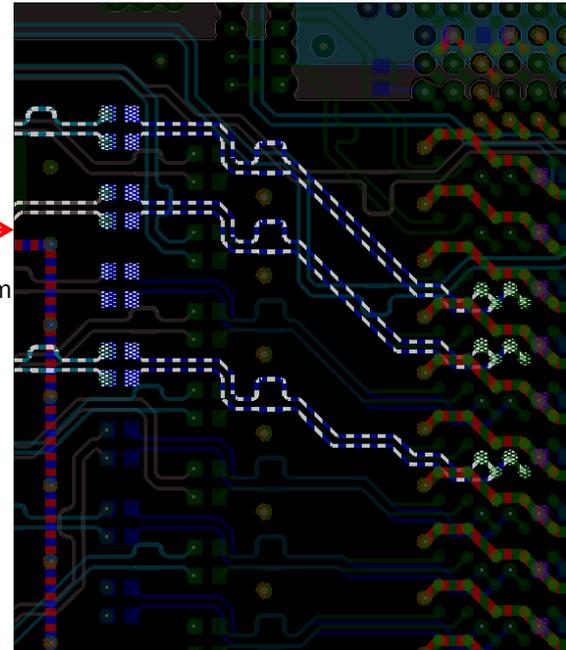
- In the *SLi_01_160913_caui.pdf*, 20 dB channel was proposed for CAUI-4 C2C.
- This presentation will show S parameters of some typical channels in our systems measured from chip ball to chip ball using Picoprobes.



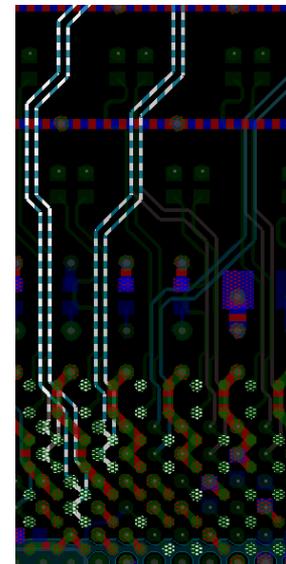
Channel Routing for Chip-to-Chip



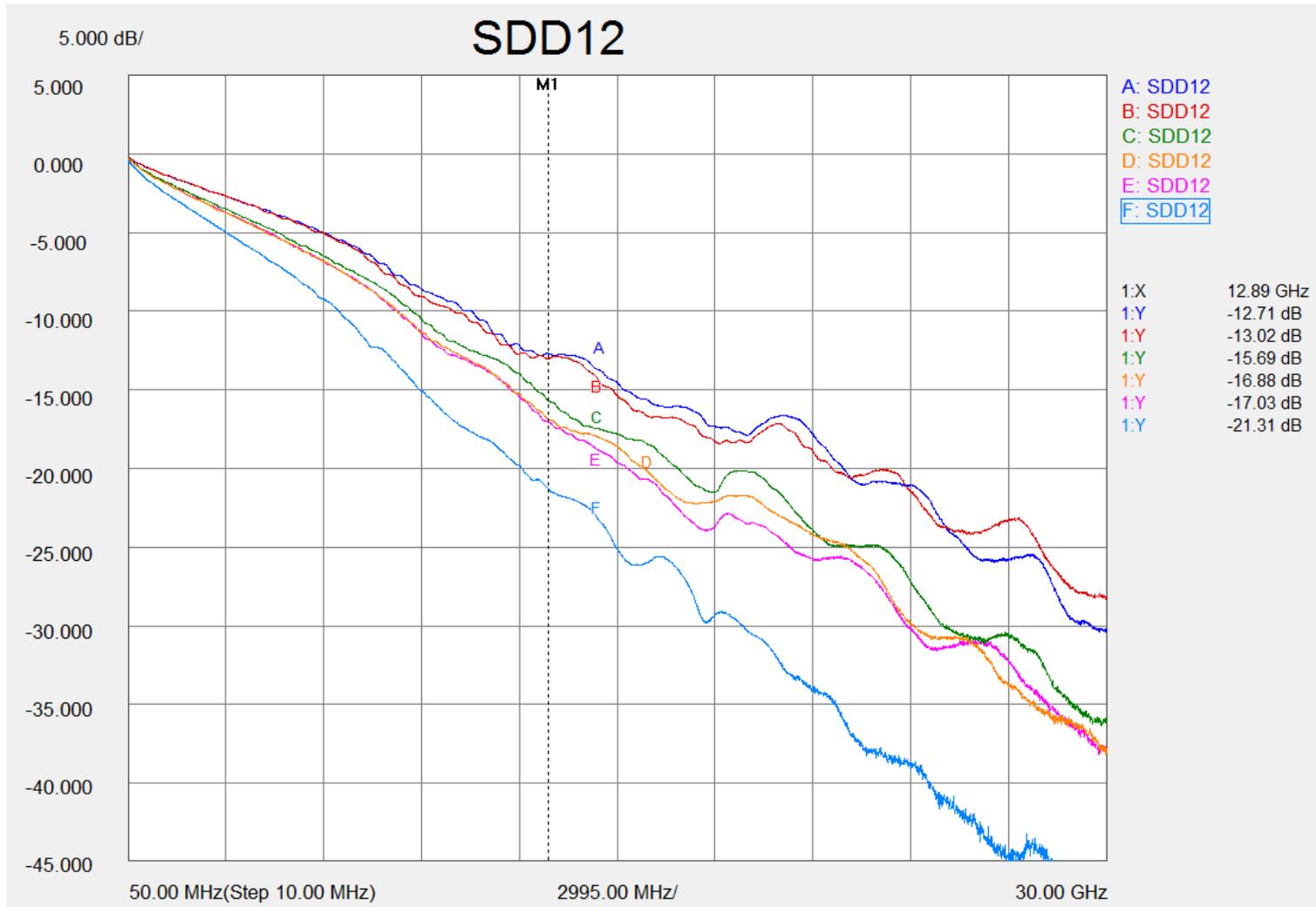
Zoom in



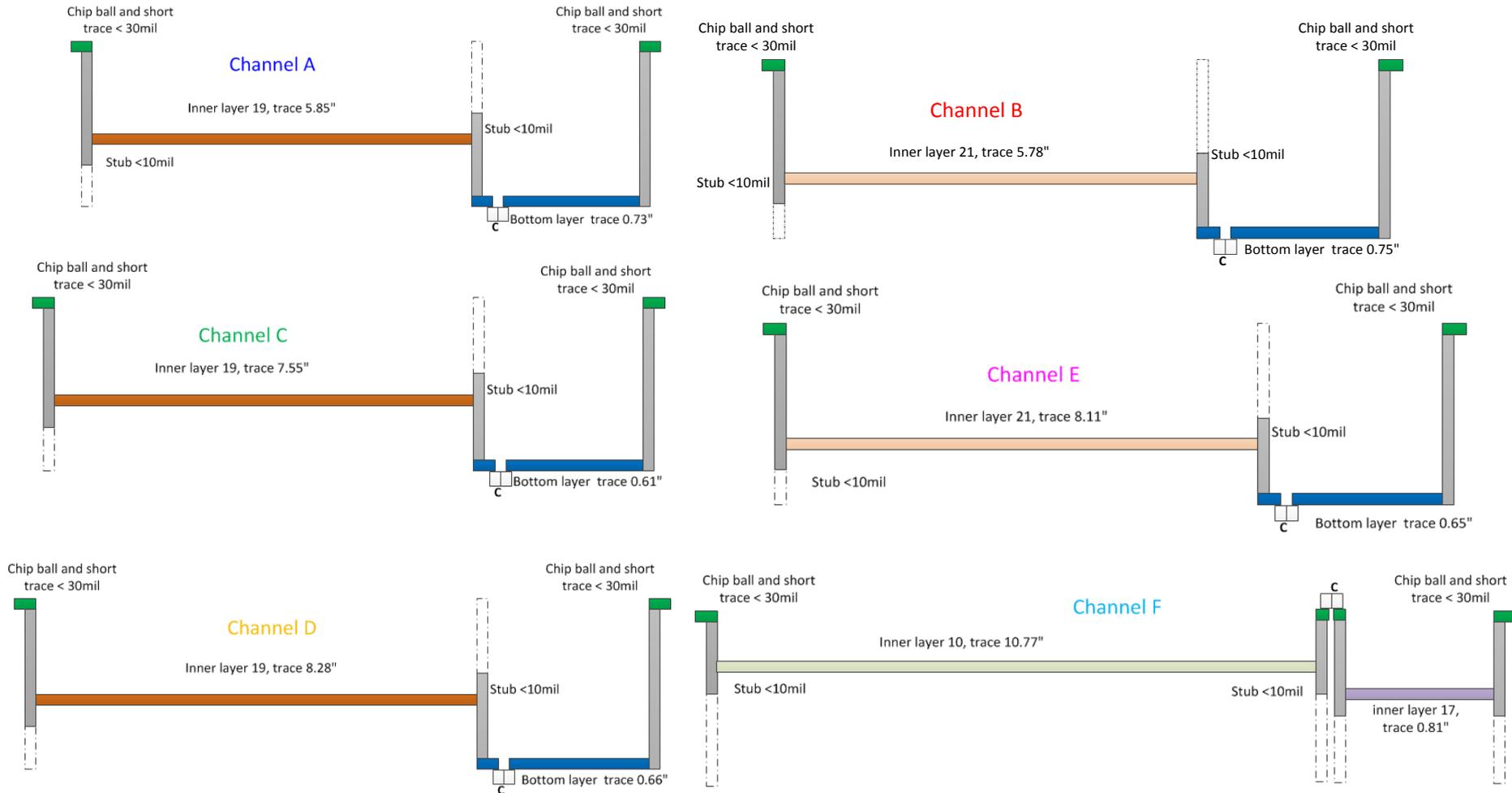
Zoom in



Insertion Loss of Some Channels



Cross Section View of the High Speed Differential Pairs in PCB



Explanation and Thoughts on the Channel Measurement

- The channels measured are typical channels from chip to chip. They usually have AC capacitors. On the ball sides, they have transition via going to inner layers. The whole channel will have minimum three via. The via stub length are usually limited to 20 mil.
- Dielectric material used on this measurement board is Isola 408HR. The claimed loss tangent is 0.008~0.009
- At 12.9GHz, not only dielectric loss but also roughness of copper, trace width, via length, AC capacitors, and PCB glass grids and orientations play big roles in the channel performance. The channel performance will become more difficult to control, especially for system boards which always have other factors to limit the optimization of channels.



Conclusions

- In this presentation, I have shown
 - 9 inch long trace already has 17 dB loss at 12.9 GHz.
 - 11 inch trace has 21 dB loss at 12.9 GHz.
- On a single board, 7-10 inch traces are most common for chip to chip routing. For mother-daughter cards, the length of channel can be 15 inches!
- The performance of the board to board connector is a big concern at 12.9GHz too.
- 15 dB CAUI-4 chip to chip channel is very difficult to be realized in current systems.
- 20 dB CAUI-4 chip to chip channel will better fit system vendors' needs.



Thank You

