

HRPPD Meeting #4 Update

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Current Status

HRPPD Tasks: Due by 01/12/2026

- **Simulations**
 - Complete - stitching vias, air side interposer pad reduction, GND planes
 - Complete 12/16 - Vacuum side pad size selection
 - Complete 12/23 – air side pad size, interposer ground pour
 - Complete 1/6 – Max air pad size + ground pour
 - TBD – Hi-Z input simulations
- **High Voltage (HV) Design**
 - Complete - preliminary pogo pins selected, HV spacing determined
 - Complete 1/6 – determined pad size for 2 pogos or 1 4x4 interposer, if needed
 - TBD
 - Location of ground and power connections to MCPs
- **Mechanical Changes**
 - TBD
 - **Interposer positional tolerance**
 - Match outline to mechanical changes
- **Other**
 - Complete - Break in ground ring placed
 - Test file import with Kyocera
 - Update 12/23 Kyocera confirmed successful import of ODB++
 - TBD
 - Update HRPPD with final design changes
 - Need to complete nets connections
 - Stitching vias mostly implement in 1 interposer group, need to copy-paste
 - Pad size changes - <1 day
 - Estimated to complete: 1 week + TBD changes

Awaiting input:

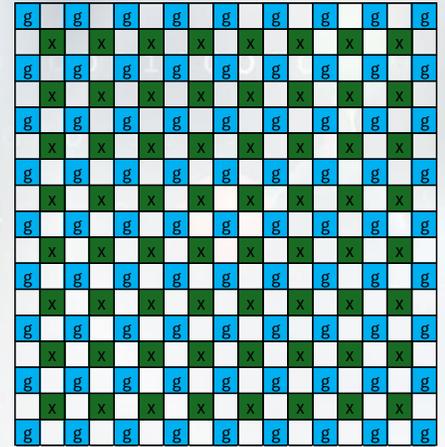
- HRPPD air pad location tolerance
 - Update 1/6 – waiting for feedback from Kyocera
- Need mechanical outline update
- Optimization of number of vias – may not be needed depending on HV change to sidewall

Non-HRPPD Tasks: Due after

- Interposer downselection - thickness + # grounds vs crosstalk
 - Update 1/6 – waiting 1mm thick model from Neoconix, estimated this week
- **Backplane Changes**
 - Cables
 - Safety resistors
 - Bypass capacitors + ringing resistors
 - Plastic connectors for HV connections
 - **Pogo pins vs interposer for HV connections**
- **FCFD Test Board**
 - Aiming for arrival end of January
 - 1/6 -waiting for response and PO to issue

Maximum air pad size

- 1mm pitch interposer, but pins are not populated side-side, only at diagonal of adjacent pin (see image)
- Diagonal pin pitch is $\sim 1.414\text{mm}$
- Desired spacing between pad-pad or pad-pour is 8mils (0.2032mm)
- Maximum pad size is (pitch – spacing) = 1.211mm
 - $\approx 1.2\text{mm}$ (47.2mil) pad with 0.203mm (8.4mil) gap



Air Pad Size Comparison - ICR

Higher is better
Target >40dB (<1% voltage xtalk)

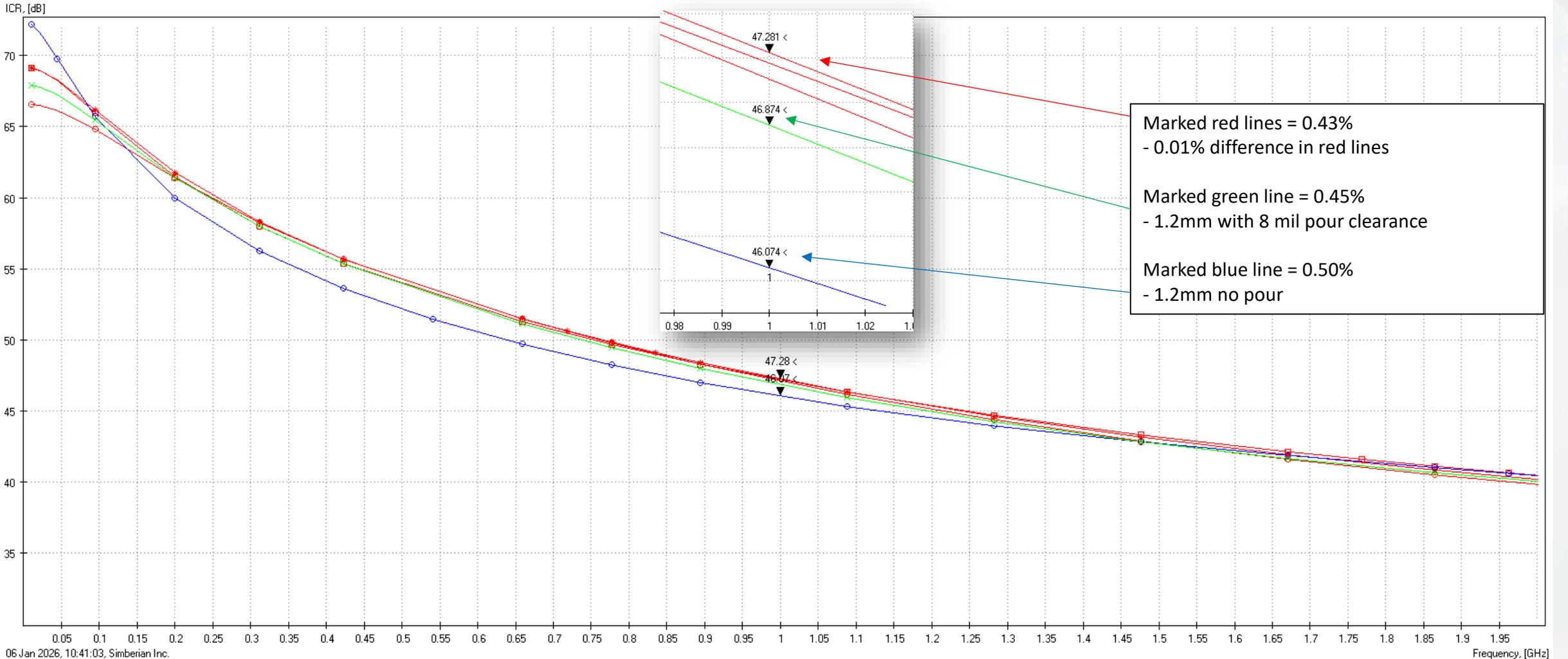
Red lines = Vacuum pad 2.75mm with varying air pad size (0.8, 0.87, 0.65)
Green line = Vacuum pad 2.75mm with air pads 1.2mm + GND pour with 8mil clearance
Green line = Vacuum pad 2.75mm with air pads 1.2mm

Takeaways

- Ground pour within air pads slightly improves signal integrity

A:3DSI[41]_Interposer-Samtec+Vacuum2.75+Vias2-15.NS_Interposer-Samtec+Vacuum2.75+Vias2-15.Simulation(1); B:3DSI[1].NS_Interposer-Samtec0.65+Vacuum2.75+Vias2-15.Simulation(1);

E:3DSI[8].NS_Interposer1.2-Rnd-wPour8mil+Vacuum2.75+Vias2-15.Simulation(1);

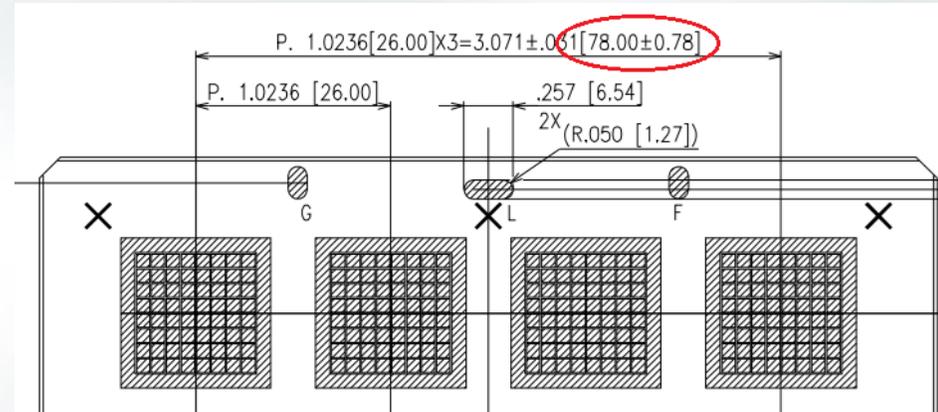


Record of Design Decisions

- Amount of stitching vias will be increased
- Vacuum pad size will be 2.75mm square
- Interposer footprint will fit either “by2” or “by4” configuration
- Preliminary
 - Air side pads will be 1.2mm round with ground pour with 8mil clearance
 - If needed, HV pads will fit both pogo pins and interposers so either can be used with the ceramic
 - 1mm vs 3mm interposer will be independent of ceramic design

Interposer Alignment Tolerance

- 1mm pitch interposer positional tolerance: $\pm 0.6\text{mm}$ using 1.2mm pad
- HRPPD tolerance: $\pm 0.78\text{mm}$
 - Waiting for input from Kyocera about better tolerance



- Interposer dimensional tolerance: $18.5 \pm 0.13\text{mm} \times 18.5 \pm 0.13\text{mm}$
 - Typical tolerance per side would be $\pm 0.13\text{mm}$ (5 mil), therefore $18.5 \pm 0.13 \times 18.5 \pm 0.13$
- Hole tolerance in spacer: ???