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Air Cooled Thermal Tool for System Level High Volume Manufacturing Testing

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INTRODUCTION

Thermal Margining tools are used to:

Accelerate Fault Detection	Identify Bugs
Test and Validate Silicon	Thermal Design Power Extraction
Reduce Escapes	Cooling and Margining capability

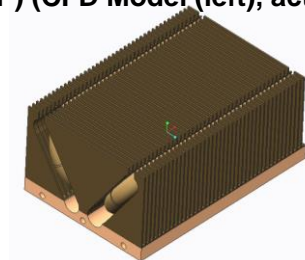
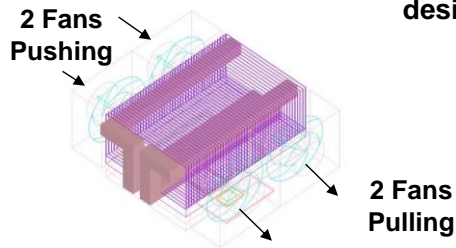
Air-cooled thermal tools (ACTT) remove the liquid detection, harness management issues, and lab infrastructure needs

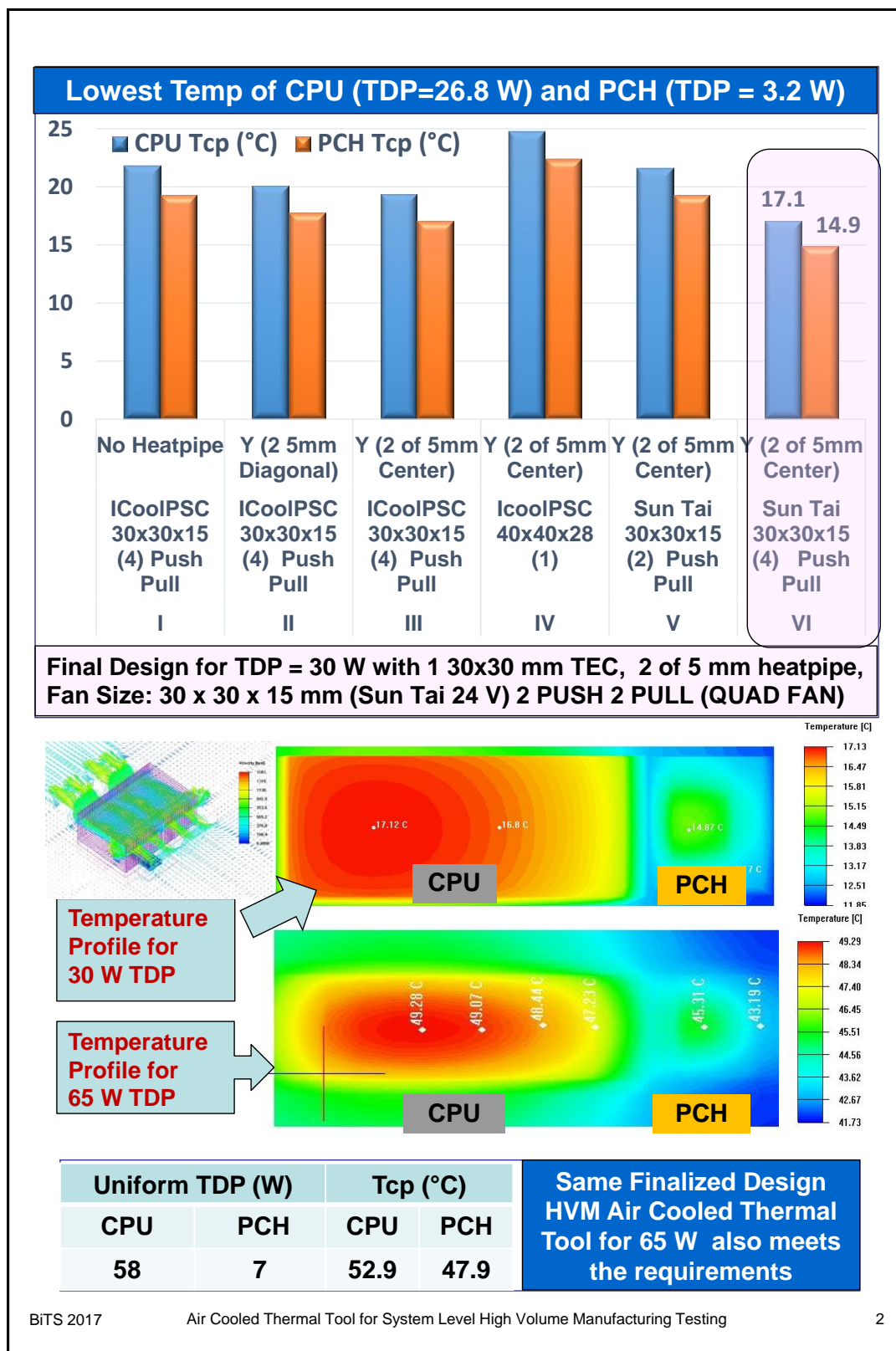
Goal

Design a new low cost high volume manufacturing (HVM) ACTT solution for System level testing automation environment for Client Multi-dies with Central Processing Unit (CPU) and Peripheral Component Hub (PCH) for 2 in 1's, laptop etc.

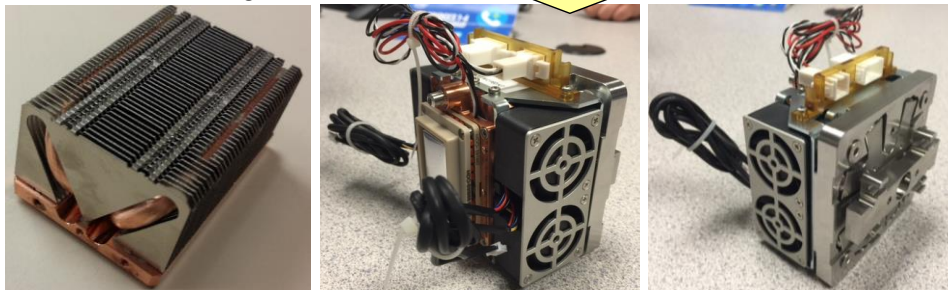
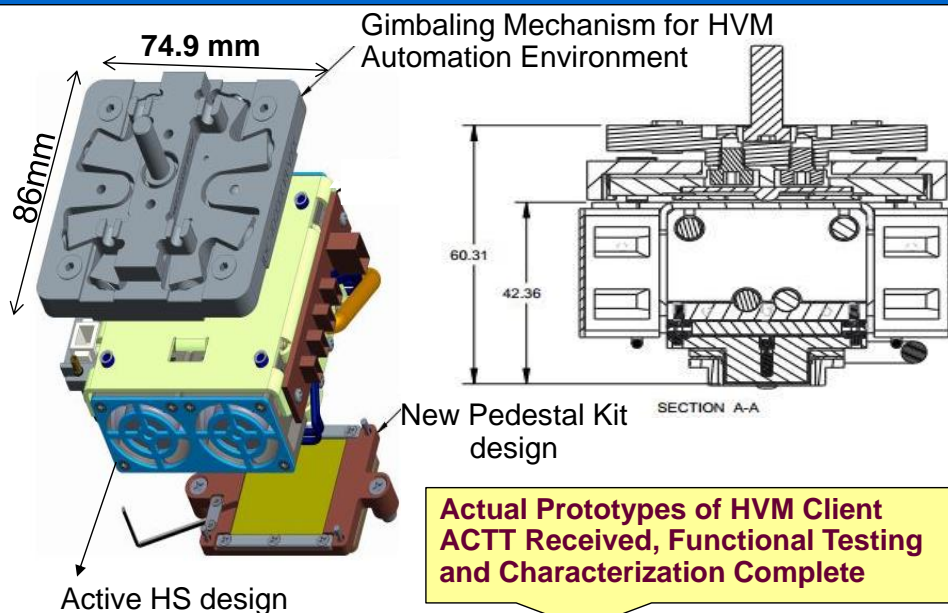
- Thermal Design Target : CPU Cold Plate Temp (T_{cp}) 40 °C @ 30 W
CPU T_{cp} 60 °C to 85 °C @ 65 W
- Keep Out Zone (KOZ) of the ACTT: Active Heatsink (HS) Keep out volume (KOV) of 45 mm x 60 mm x 26 mm, Single-staged Thermoelectric cooler (TEC) and the pedestal Kit

Active HS design with 2 central heat pipes (HP) (CFD Model (left), actual design (right))





Finalized Mechanical Design and Actual Prototype



Performance of HVM ACTT latest design w/ updated cold plate/pedestal and all TIM layers w/ 30 x 30 x 15 mm fan

Uniform TDP (W)		w/pedestal		T _{cp} (°C)	
CPU	PCH	CPU	PCH	CPU	PCH
26.8	3.2	15.4	13.7		
58	7	49.3	45.3		

Summary

New HVM ACTT meets all the design requirements removing the liquid detection, harness management issues and lab infrastructure needs

- Reduces the cost by 80% compared to the existing liquid cooled thermal tools
- Next step is to collect the field testing data at HVM