



inEMI[®]


International Electronics Manufacturing Initiative

BFR-Free High Reliability Project

*Project Chair
Stephen Tisdale,
Intel Corporation*

Advancing manufacturing technology

Goal: Understand Reliability Aspects of BFR-free (Brominated Flame Retardant) Printed Wiring Boards

Strategy	Issues	Graphics	
<ul style="list-style-type: none"> Extend results of the Halogen Free PCB Phase I Project Build on industry knowledge and capability Create a proactive stance in the electronics industry for other non-regulated halogenated organic substances 	<ul style="list-style-type: none"> Stimulate supply capability Consider unique market segment requirements Identify technology readiness and gaps Determine HF board level reliability for various components 		
<p>Project Lead: Stephen Tisdale, Intel Project Co-Lead: None</p>			
Tactics	Milestones and/or Deliverables	Plan	Actual
<ul style="list-style-type: none"> Phase 1.0- Initiate project Phase 1.1- Review prior work and identify testing method Phase 1.2- Develop, manage, and execute performance testing Phase 1.3- Compile results, evaluate and publish results 	<p>Initiative Launch Date</p> <p>Project Inauguration - Two PS Signers</p> <p>Develop, manage, and execute performance testing</p> <p>Project Final Report</p>	<p>1Q-08</p> <p>3Q-08</p> <p>4Q-09</p> <p>2Q-10</p>	<p>1Q-08</p> <p>3Q-08</p>

Project Members



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IS / IS NOT

This Project IS:

Technical evaluation of key electrical and mechanical properties

Focused on those attributes which are of most value to supply chain

Build on learning from prior investigations

Focused on completely HF SMT and Wave Solder Assembly & Rework Capability

Focused on circuit board materials in LF assembly and LF solder joint reliability – Board / Component Interaction

This Project IS NOT:

An EHS assessment

Biased towards specific laminate suppliers, geographies, or market segments

Repeat of prior work

Focused on standard processing

Focused only on materials characterization



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Phase 1: Design

Goal: Review prior work and make recommendations for testing needed. Investigation should take into account the needs of electronic product sectors represented by iNEMI membership

- **Identify market segment requirements**
- **Identify candidate materials**
- **Identify key performance characteristics and test criteria**
- **Design test vehicle(s) and test methodologies, leverage standards where possible**
 - Identify Components to be used in this project to evaluate SJR / board reliability

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Phase 2: Test

Goal: Develop, manage, and execute performance testing

- **Develop evaluation schedule**
- **Procure parts and test vehicles**
- **Assign teams to carry out completion of the testing in a standardized fashion**
- **Perform mechanical and reliability testing on test vehicles.**

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Phase 3: Results

Goal: Compile results, assess significance, make recommendations, and publish report

- **Assess performance relative to market segment requirements**
- **Assess technology readiness / identify gaps**
- **Assess manufacturing capability and supply capacity**
- **Publish results**

Anticipated Outcomes

- **Validate electrical and mechanical properties**
 - Loss tangent and Dk modeling over required range of signal speed
 - Mechanical performance validation for lead free assembly and rework (delamination)
 - Critical Test Parameter Evaluation (CAF, IST, flex, etc.)
- **Validate Board Level Reliability Capability**
 - PCB Modulus / Thickness Impact on Mechanical Capability
 - HF Board Level Assy / Rework Process Characterization
 - Mechanical Characteristics (Pad Crater / Ball Pull etc)
 - CTE Characteristics
 - SJR (Shock / TC etc)
 - HF Component / HF PCB

Project Team Decisions - Status

- **Focus will be on Hi-Rel (Server) Market Segment Application Space**
- **PCB and PCBA components should be HF**
- **Board Thicknesses Will be 0.093” & 0.125”**
- **PCB Material should be LF compatible, low/med loss and HVM Capable**
 - 6 BFR-free Materials Identified with 1 Halogenated Material as Control
- **Two Test Vehicles have been identified to evaluate Material Properties and Board Assembly Reliability**
 - Final Design Modification Underway

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