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International Electronics Manufacturing Initiative

HFR-Free (Halogen Flame Retardant) Technology Leadership Projects

Stephen Tisdale, Intel

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IPC / APEX
Las Vegas, NV

Advancing manufacturing technology

HFR-Free Technology Leadership Project Proposal

Objective

- Identify HFR-free PCB technology envelope which allows drop in replacement capability with standard FR4-based designs
- Identify technology readiness, supply capability and reliability characteristics for “HFR-free” alternatives to conventional printed wiring board materials and assemblies
- Provide Industry Standard Technology Envelope for HFR-free Materials across all market segments

HFR-Free Technology Leadership Project

IS / IS NOT

This Project IS:

Technical evaluation of key electrical and mechanical properties of HFR-free PCB Materials

Focused on those design attributes which are of most value to the broader industry

Build on learning from prior investigations

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

Focused on generating data / technology envelope (design guidelines) for development of an industry standard

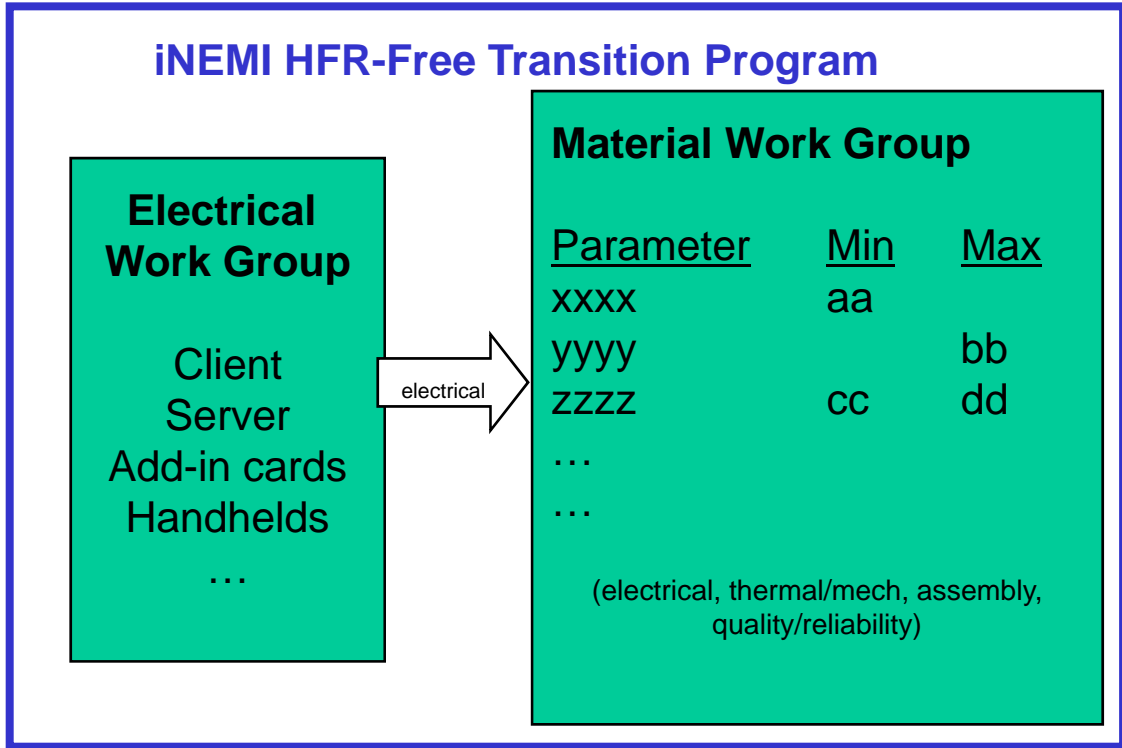
This Project IS NOT:

An EHS assessment

Biased towards specific laminate suppliers, geographies, or market segments

Repeat of prior work

Focused only on materials characterization



Program Lead:
Steve Tisdale, Intel

Electrical WG Lead:
Steve Hall, Intel

Materials WG Lead:
John Davignon, Intel

Keys to success

- **Gain participation from all members of supply chain**
 - OEM, ODM/EMS, PCB suppliers, Laminate suppliers, DIMM/add-in card suppliers
- **Member companies ensure technology envelope meets requirements**
 - Reliability, availability, performance, etc...
- **Envelope gets used (de-facto standard)**
 - Specify product, drive new material development, etc...

iNEMI HF PCB WG

John Davignon, Intel - Chair



WG Goals: Test Suite Strategy

- **Goal: To define and drive quantifiable data into the HF Laminate suppliers datasheets**
- **Define all known HF performance degradation in systems**
- **Define a System-like Test Suite**
 - Define test methods to assess margin degradation levels
 - Develop Common Test Vehicles & Coupons (DT/MS Mobile)
 - Develop DT & Mobile TV Construction/Stack up
- **Set up test house (in-house or third party)**
- **Consortia builds, test and reviews HF Material performance based on the Test Suite Methodology**
- **Set Technology Envelope/Test Methods for Laminates**
- **OEM/ODM build Products to verify PCB Reliability, SJR and Assembly Yields of Laminates in Technology Envelope**
- **Incorporate new Tech Envelope criteria into laminate data sheet**
- **Work with Supply Chain to verify Capability & Capacity of HF Laminate within Tech Envelope**



PCB Material WG Status

- **WG agreed to:**

- Limit focus on the Desktop & Mainstream Notebook market segments.
- Adopt the Test Suite Strategy (System Based)
- Started WG Teleconferences on Tuesdays @4 PM PDT
- Brainstorm the concern list areas that will be used to develop the Test Suite

- **Next steps:**

- Condense the brainstorm list (Need to have vs, Nice to have)
- Workgroup membership finalized. Assign owners and/or subteams (Mid Q2 '09)
- Identify Test Methods and Test Structures (Q3'09)
 - Sensitivity data, GR&R data
- Decide on TV construction (Q3'09)
- Design the TV (Q4'09)
- Build TV and Test (Q4'09)
- Analyze data. (Q1'10)



iNEMI HF Signal Integrity WG

Steve Hall, Intel - Chair

David Senk, Cisco – Co-Chair



Overview

Mission:

- Define and gain industry consensus on the electrical requirements of HF dielectrics ensuring suitability for high-speed digital designs

Scope:

- ✓ Develop and communicate the HF dielectric requirements to the PCB material suppliers to drive volume up and cost down
- ✓ Gain critical mass by gaining participation from the enough of the market to ensure the message is strong enough to influence the material suppliers

Mechanism:

- iNEMI SIWG kicked off Feb. 18 2008, with bi-weekly meetings



iNEMI SI WG Program Status

- **SIWG kicked off at the Feb 18th iNEMI consortium meeting**
 - 3 meetings held to date
 - Critical mass has been achieved with HP, Dell, Lenovo, Cisco, Huawei and other key industry participants
- **General agreement on a strategy has been reached**

Assessment: Strong start. The stage has been set to define industry HF electrical “standard(s)” by mid 2010.



iNEMI SI WG High Level Plans (proposed)

- **Q3'09**
 - Critical dielectric parameters/limits identified for each company and consolidated into product “types”
 - Common measurement methodology in place
- **Q1'10**
 - Characterization of all existing HF materials complete and mapped into the requirement limits to provide a data base of suitable options
- **Q2'10**
 - Validation of the “envelopes” on real systems complete
 - Deliver the HF dielectric electrical requirements to the material suppliers and ODMs through the iNEMI materials WG



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Concluding Remarks

*Chuck
Richardson,
iNEMI*

APEX 2009

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HFR-Free Leadership Program

Current Status

- **Participating team of 44 Firms Developing SOWs for two initiatives**
- **4 Firms Observing the Process**

Firms Participating in the Program Development



HFR-Free Leadership Program

April 15 Meeting

- Meeting to be held at ITRI in Taipei
- 78 individuals are currently signed up
 - 4 OEMs
 - 8 ODMs/EMS
 - 5 PCB Shops
 - 5 Laminate Providers

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