New Packaging Technology Qualification Methodology

Project Leaders:
Feng Xue - IBM
Curtis Grosskopf - IBM

Call for Participation Webinar
July 10/11, 2017
iNEMI Staff: M. Tsuriya
Agenda

• Introduction of Project Chairs and Facilitators
• iNEMI Project Development Process
• Project Briefing
  – Background & Objectives
  – Project Scope
    • Project IS/IS Not
  – Timeline
• How to Join
• Q&A

Note: All phones will be on mute until the end of the presentation
Introduction of Project Chairs & Facilitators

Project Leader: Feng Xue, IBM

Project Leader: Curtis Grosskopf, IBM

iNEMI Staff: M. Tsuriya
iNEMI Project Development Process - 5 Steps

0 INPUT

1 SELECTION

2 DEFINITION

3 PLANNING

4 EXECUTION / REVIEW

5 CLOSURE

"Initiative"
Open for Industry input

iNEMI Technical Committee (TC) Approval Required for Execution

"Project"
Limited to committed Members
iNEMI Project Management Policy

• Two governing documents for projects
  – SOW (statement of work): sets out project scope, background, purpose, benefits, and outlines required resources, materials, processes, project schedule, etc.
  – Project Statement (PS): signed by participating companies to secure commitment on resource and time contributions.

• iNEMI Project requires iNEMI membership
  – Signed membership agreement
  – Commitment to follow iNEMI By-laws and IP policy
Problem Statement

• Lack of understanding of the assembly processes and application environments of all potential end-users (vs targeted end-users) to develop the reliability test methodology for new package/materials development
  • Test plan only focus on standard test methodology and comply to customer requirements
  • Current test standards may not capture the reliability risk in the new package, or may over stress the new package.
  • Field failures do not really feedback to test plan
  • For new materials/package development, test plan completeness is always questionable.
  • Little effort for the industry to come out with new test standard
• Past issues with standard test plan when qualifying new technology
  – Variability of bondpad structure and strength for qualification of Cu wire bonding
  – New failure mechanism and unique manufacturing controls for embedded IC packages
  – Are we sure the standard test plan is able to detect and characterize all weak points in a new technology?
The Purpose of Project

- The purpose of this project is to develop a methodology for qualifying new packaging technology to address the gaps resulted from:
  - Lack of understanding of the assembly processes
  - Lack of understanding of the interactions of the materials and components within the new package
  - Lack of understanding of the application environment
  - Lack of understanding of the use conditions of all potential end-users
  - Lack of understanding how variations of the manufacturing process could affect product quality and reliability
Scope of Work

- Develop a methodology highlighting best practices (e.g., FMEAs, technology qualification prior to product qualification, detailed construction analysis, test to fail) for qualifying new packaging technology

- Validate the methodology by reviewing case study of issues and failure modes from a few recent packaging technologies developed in past ten years (e.g., copper wire bonding, wirebonded stack die, Solder Joint Reliability, Package on Package, packages with internal SAC solder – non-high melting temp.)

- Target market segment will be determined by the survey result which is planned to conduct at work plan#2. (focused areas would be IoT (sensor, wearable), Automotive electronics and so on)
Task 1 – Collecting current industry standards among project members
Task 2 – Survey within Industry.
Task 3 – Develop the methodology based on the gap analysis from the interim report.
Task 4 – Validate the methodology.
Task 5 – Optional: Apply the methodology to selected new technology
Task 6 – Final report and Recommendation to the industry
<table>
<thead>
<tr>
<th>This Project IS:</th>
<th>This Project IS NOT:</th>
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<tbody>
<tr>
<td>Collect current industry specifications and methodology on packaging</td>
<td>Develop new reliability test items</td>
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<tr>
<td>qualification and reliability testing requirements</td>
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<tr>
<td>Develop a methodology to address the gaps in current standards and standard</td>
<td>Conduct qualification efforts on specific Technology at a specific company</td>
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<tr>
<td>practices for package qualification</td>
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<tr>
<td>Validate the methodology via known issues</td>
<td>Develop a specific standard(s)</td>
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<tr>
<td>Apply the methodology on selected new technologies</td>
<td>Repeat prior or existing work</td>
</tr>
<tr>
<td>Recommend the methodology developed in this project to the industry</td>
<td>Biased towards specific suppliers, geographies, or market segments</td>
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<tr>
<td>Focus on package technology qualification metrology</td>
<td>Work on device test plan</td>
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Outcome of Project

• A documented methodology for new packaging qualification best practice
• Recommendations are provided to industry and the standards organizations
• A summary report is available to all iNEMI members in reports from this project.
How to Join
Sign-Up Due on August 15, 2017

- iNEMI membership is required to join the project
- Download SOW and PS from iNEMI web:
  http://community.inemi.org/content.asp?contentid=550

- Process to participate this project:
  - Sign the PS
  - Send scanned PS to infohelp@inemi.org
  - iNEMI VP of Operations will approve your participation and send you back the completed PS with acceptance

- Join iNEMI membership, or questions, contact M. Tsuriya (m.tsuriya@inemi.org)
Path to Kick-off Meeting

• Call for Participation Webinar: July 10/11, 2017
• Sign-up Due: by August 15, 2017
• Kick-off Meeting:
  August 29, 2017 from 11:00AM Japan time

Note:
Meeting time might be changed due to the participants’ preference and availability
Questions?

Project webpage:
http://community.inemi.org/content.asp?contentid=550