Counterfeit Components: Assessment Methodology and Metric Development

Speaker: Jeffrey Lee, IST
Sally Arno,
Martin Huehne,
Harrison Miles

October 26, 2012
iNEMI Session, IMPACT
Counterfeit Components Assessment

Project Members

- IBM
- Plexus
- Celestica
- Corelis
- Flextronics
- Dell
- INEMI
- National Institute of Standards and Technology (NIST)
- SANMINA-SCI
What Counterfeit Components Are

A counterfeit component is a fraudulent part that has been confirmed to be a copy, imitation, or substitute that has been represented, identified, or marked as genuine, and/or altered by a source without legal right with intent to mislead, deceive, or defraud.

Definition is from Draft SAE 5553 and 6081
Sampling of Counterfeit Device Categories*

1. Cloning – copy that appears operationally and functionally equivalent
2. Product “skimming”, subcontractors, or second source suppliers
3. Disposal of scrap and rejects
4. Devices used as qualification samples
5. Reclamation and reuse of component
6. Re-branding and/or Re-marking
7. False claims of conformity to industry certifications (e.g. RoHS)
8. Devices containing embedded malicious malware - “trojans” (e.g. flash device with “trojan” software)

The SOW discusses possible definitions and strategies to deal with each category
Why CC Is an Issue/Why Do You Care

• 2 problems
  – Top line problem from biz perspective – how brand is respected
  – Bottom line concern – warranty costs, RMA - impact on profit

• Liability issues
  – Expenditure of resources (man-hours) to support field accidents/failures for products that significantly impact human safety
  – Public Safety
Impact of CC in Electronics

• Numbers!
  – Field service cost in US is over $1100/incident\(^1\)

• Limited Supply of high demand market products and end-of-life products
  – Enhance likelihood of CC

1. TSIA (Technology Services Industry Association), December 15, 2011
Counterfeiting Components

• Business practices that lend themselves to increased counterfeit activity, such as:
  – Lead time reduction or
  – Demand pull in,
  – Poor planning,
  – Multiple emergency supply requests giving a false level of demand etc

• Part of the roadmap should be to address these practices
  – Either by iNEMI or
  – By some other group like the SIA who may be better placed or already working on that
Supply Chain Security

• iNEMI member products live in the middle of supply chains
  – Member products rarely begin or end a chain
  – We live in the middle of supply chains
• Therefore, iNEMI members must play both roles:
  – As the consumer / customer
  – As the supplier / vendor
• iNEMI is an ideal organization to pilot concepts or to test proposals
• What iNEMI member companies demand from suppliers must also be delivered to their customers
  – More specifically, all customers will need improved visibility into manufacturing data
Situation Analysis

• iNEMI segregates the electronics industry into the following 6 product sectors:
  1. Aerospace and Defense
  2. Automotive
  3. Medical
  4. Netcom (Network, Data communications & Telecommunications)
  5. Office and Large Business Systems
  6. Consumer and Portable

• None of these product sectors is immune from the introduction of counterfeit components; however, each has its own set of unique requirements.
  – It is not clear that there is a "one size fits all" solution due to the variations in requirements.

The SOW provides an expanded view for each product sector
What Is this iNEMI Project

• Scope
• What we hope to achieve
• Example Cluster Map
• Status
## Project Is / Is Not Analysis

<table>
<thead>
<tr>
<th>This Project IS:</th>
<th>This Project IS NOT:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project 1: Counterfeit Components - Assessment Methodology and Metric Development</strong></td>
<td></td>
</tr>
<tr>
<td>Identify any related research or development within the industry and academic communities</td>
<td>Development of a specific standard(s)</td>
</tr>
<tr>
<td>Review and tabulate successes that have worked in the past (BKM/BKP)</td>
<td>Biased towards specific brokers, suppliers, geographies, or market segments</td>
</tr>
<tr>
<td>Develop a methodology to evaluate or assess the risk of counterfeit use</td>
<td>Repeat of prior or existing work</td>
</tr>
<tr>
<td>Assess the aggregated risk of untrusted sources of supply</td>
<td>Not focused on quality issues or standards</td>
</tr>
<tr>
<td>Develop an assessment / mitigation strategy</td>
<td></td>
</tr>
<tr>
<td>Long term cost of ownership</td>
<td></td>
</tr>
<tr>
<td>Define / develop a metric that can identify the scope of the problem</td>
<td>Missing piece is the history (e.g., storage conditions, …)</td>
</tr>
<tr>
<td>Assess the effectiveness of the methodologies developed</td>
<td></td>
</tr>
<tr>
<td>Review and finalize methodology</td>
<td></td>
</tr>
<tr>
<td>Focused on those attributes which are of most value to supply chain and the participating project members</td>
<td>How to capture quality information / data</td>
</tr>
<tr>
<td>Applicable to multiple spaces across the supply chain</td>
<td></td>
</tr>
</tbody>
</table>
Scope of Work – Phase 1

• Focused on those attributes which are of most value to supply chain and the participating project members.
• Applicable to multiple spaces across the supply chain.
• Identify and develop methodologies with associated metrics to assess the overall extent of the counterfeit problem in the electronics industry. The output will enable iNEMI members to:
  – Assess the risk of counterfeit use in their respective industries
  – Assess the risk of untrusted sources of supply in that industry
  – Provide methodology to generate the total cost of ownership associated with those risks.
• The methodologies and strategies apply to all phases of the manufacturing cycle and supply chain. Not only do counterfeit components have a serious impact on the OCM, but impact all downstream users from the legitimate component brokers; to the OEMs that integrate these components; and to the end-user.
• Metrics to assess the overall extent of the problem and anti-counterfeiting will be identified for all phases.
Scope of Work – Phase 2 and Beyond

- The project team will consider additional activities that would constitute follow-on work (Phase 2 activities) and will develop an extension of this effort into a separate project.

- The development of protocol(s) to assist in identifying the pedigree of parts in the supply chain would fall outside the scope of this initial project and would be one possibility for Phase 2, for example:
  - Define protocol(s) for tracking the life of components such that a pedigree is developed for each part that identifies when, where, and under what conditions they were manufactured and what paths they have taken within the supply chain.
Supply Chain Assessment

• iNEMI wants to complement any activities that are being worked

• Possible Activities:
  – Assess types of threats and how parts traceability can help mitigate the risks
  – Develop a roadmap to prioritize needs for addressing the threats
  – Assess and document industry needs in order to develop a strategy
    • Increase product/parts/material traceability
    • Increase reliability of product authentication information in the supply chain
    • Ease process of product authentication for new and legacy product, components, and materials in the electronics industry supply chain
  – Investigate types of information needed for product authentication
  – Review existing supply chain data exchange standards to assess the ability to integrate standards-based unique identification codes
A chip mfg relative to board mfg is an open market entry strategy. Multiple channel Marketing of their product. Driven by economy of scale of the factory/fab.
Summary

• Done: Set of definitions collected and complemented
• Done: Best known methods/practices against counterfeit use
• Mostly done: Cluster maps created to support development of methodologies and metrics
• Ongoing: Collection of related activities and results elsewhere
• Ongoing: Development and assessment of methodologies and definition of a metric to identify the extent of the counterfeit problem.
• The team expects that measurement of counterfeit occurrence can be integrated into a feedback mechanism for an improved supply chain methodology.
• Detailed pedigrees for batches of components appear to be crucial for a successful methodology.
Relationship to Previous Work

• The project team will continue to identify any related research or development within the industry and academic communities.

• With the amount activity in the counterfeit components arena, this task should be ongoing throughout the project execution.

• Based on our discussions, the project activities seem to be outside the scope of other counterfeit component activities; however we have not done an exhaustive study of everything that is being worked.

• If the project team finds directly related / relevant activities they will have the option of modifying tasks to ensure there is no duplication of effort.

• A summary of the team's findings will be included in the final team report.