Counterfeit EEE Parts Risk Mitigation

G-19 Activities

October, 2010
Introduction

- SAE G-19 Standards Development Activities
- Overview of AS5553 for Buyers/End-Users
- Overview of AS6081 for Distributors
- Distributor Process Rating Committee
- Test Laboratory Standards Development Committee
- Organizations Adopting Policies to Address Threat
About SAE: Purpose

SAE's main purpose is to collect, develop, and disseminate technical information related to mobility technology.
Transparent standards development

- The document is proposed
- The technical committee works to develop the document draft
- The draft document is balloted – first by the committee, then by Aerospace Council
- Required changes made; affirmation ballot
- The document is published by SAE
The **G-19 Counterfeit Electronic Components** Committee is chartered to address aspects of preventing, detecting, responding to and counteracting the threat of counterfeit electronic components.
G-19 Makeup

• OEMs
• OCMs
• Regulators, Government & Military Agencies
• Legal Experts
• Industry associations
• Distributors
• Research Laboratories
• Suppliers
• Independent Experts, Consultants
SAE G-19 Committee Structure

Main Committee

Test Laboratory Sub-Committee

International Committee
SAE G-19 Committee Meetings

• 70 Committee Members

• Standards developed in regular virtual (teleconference, Webex) meetings
G-19 Supplier Certification Standards

1. Buyers
   AS5553

2. Distributors
   AS6081

3. Test Laboratories
   ASxxxx
SAE AS5553 Requirements

Counterfeit Parts Control Plan

Parts Availability

Purchasing

Verification of Purchased Product

Purchasing Information

Reporting

In Process Investigation

Material Control

Appendixes for Guidance
Counterfeit Parts Control Plan:

The organization shall develop and implement a counterfeit electronic parts control plan that documents its processes used for risk mitigation, disposition, and reporting of counterfeit parts…

4.1 Counterfeit Electronic Parts Control Plan

The organization shall develop and implement a counterfeit electronic parts control plan that documents its processes used for risk mitigation, disposition, and reporting of counterfeit parts. The control plan shall include the processes described in 4.1.1 through 4.1.7 below.

4.1.1 Parts Availability

The processes shall maximize availability of authentic, originally designed and/or qualified parts throughout the product’s life cycle, including management of parts obsolescence. Information and guidance for ensuring parts availability is provided in Appendix A, Parts Availability.
Counterfeit Parts Control Plan: Parts Availability

… The process shall maximize availability of authentic, originally designed … parts throughout the product’s life cycle, including management of part obsolescence…

4.1 Counterfeit Electronic Parts Control Plan

The organization shall develop and implement that documents its processes used for risks management of counterfeit parts. The control plan shall consist of 4.1.1 through 4.1.7 below.

4.1.1 Parts Availability

The processes shall maximize availability of authentic, originally designed and/or qualified parts throughout the product's life cycle, including management of parts obsolescence. Information and guidance for ensuring parts availability is provided in Appendix A, Parts Availability.
Counterfeit Parts Control Plan: Purchasing Process

**Source of Supply**
- Determine risk of receiving counterfeit part…
- Actions may include surveys, audits, review…
- Specify a preference to procure directly from OCMs…

**Approved Suppliers**
- Maintain a register of approved suppliers
- Guidance on source selection and approval process
- Assure sources of supply are maintaining processes for counterfeit risk mitigation

**Risk Mitigation**
- Mitigate the risks of procuring counterfeit parts from sources other than OCMs…
- Specify supply chain traceability to the OCM…
- Specify flow down of applicable requirements to contractors and sub-contractors…

**Requirements**
Counterfeit Parts Control Plan: Purchasing Information & Verification

4.1.3 Purchasing Information

The documented process shall specify contract/purchase order quality requirements and clauses are provided in Appendix E, Product Assurance.

4.1.4 Verification of Purchased Product

The documented process shall specify contract/purchase order quality requirements and clauses are provided in Appendix E, Product Assurance.

...The documented process shall assure detection of counterfeit parts prior to formal product acceptance...

...This documented process shall specify contract/purchase order quality requirements...
Counterfeit Parts Control Plan:

In Process Investigation
Shall address the detection, verification, and control of ... counterfeit parts.

Material Control
Shall control ... nonconforming parts from entering supply chain
Shall control counterfeit parts to preclude their use ...

Reporting
Shall assure that all occurrences of counterfeit parts are reported...
Example Procurement Clause

D.3.1 Test and Inspection Requirements

“The seller shall establish and implement test and inspection activities necessary to assure the authenticity of purchased products. These activities shall include:
- Traceability and documentation verification,
- Visual examination
- [see Appendix E of this Aerospace Standard for a complete list of test and inspection activities]

Tests and inspections shall be performed in accordance with clearly delineated accept/reject criteria provided or approved by <BUYER>. The seller shall prepare and provide to the <BUYER> records evidencing tests and inspections performed and conformance of the product to specified acceptance criteria.

Tests and inspections shall be performed by persons that have been trained and qualified concerning types and means of electronic parts counterfeiting and how to conduct effective product authentication.”

Solutions
SAE AS6081 Requirements
SAE AS6081 Requirements

QMS & Counterfeit Parts Control Plan:

...The organization shall develop and implement a quality management system (e.g., ISO 9001, SAE AS9120...)

...The organization shall develop and implement a counterfeit electronic parts control plan that documents its processes used for risk mitigation, disposition, and reporting of counterfeit parts...
Counterfeit Parts Control Plan: Purchasing Information & Supply Chain Traceability

The process shall specify contract/purchase order quality requirements … including the flow down of applicable requirements of this document …

The documented processes shall require … traceability to the OCM … If … unavailable, the customer shall be notified …
Counterfeit Parts Control Plan:

Verification of Purchased Product

4.2.1.3 Verification of Purchased Product

The documented processes shall specify test and inspection methods for the detection of counterfeit parts. The verification process shall be designed to receive counterfeit parts, to identify counterfeits of the specific part, and to be defined for all inspections.

Results of each inspection and test performed shall be documented, retained, and traceable to product information. All personnel performing inspection and test activities shall be formally qualified for the specific inspections and test that they perform based on demonstrated competency.

Product test and inspection requirements are provided in Appendix C, Product Assurance.

Requirements

“...The documented processes shall specify test and inspection methods for the detection of counterfeit parts...Results of each inspection and test performed shall be documented, retained, and traceable to product information...”
Distributor Process Rating

Origin and Evolution of the Rating Scheme

• Government agencies and prime contractors all have their own IDs & brokers they prefer.
• MDA & NASA poll government agencies and prime contractors on their Independent Distributor ASL.
• MDA & NASA concerned with the lack of information about the IDs and brokers.
• MDA creates assessment form.
• MDA-QS starts site visits.
• NASA/JPL assist in the visits through JAPC audits.
Framework of Distributor Process Rating

Key Characteristics

Quality System & Quality Processes

General Company Information

Parts Availability

Material Handling, Inspection, Training & Certification

Corrective & Preventative Action

Supplier Qualification & Purchasing Process

Non-Conforming Material Control

Document Control & Record Retention
To develop an Aerospace Standard that standardizes practices to detect suspect counterfeit components, to maximize the use of authentic parts, and to ensure consistency across the supply-chain for test techniques and requirements. …
SAE G-19A Sub-Committee Members

Representation from Gov’t, Aerospace, Military, & Commercial

US Government Members …
- DCMA
- Defense Logistics Agency
- IARPA
- MDA
- NASA/JPL
- Navy-Crane
- NSWC Crane
- SUBMEPP
- Tinker Air Force
- US Army - AMRDEC

Participating Industry Association …
- Independent Distributors of Electronics Association (IDEA)

Participating Test Laboratories …
- Center for Advanced Life Cycle Engineering (CALCE)
- Evans Analytical Group
- Hi-Reliability Microelectronics
- Integra Technologies
- Premier Semiconductor Services
- Process Sciences
- Silicon Cert Laboratories
- Trace Laboratories
- White Horse International

Industry Members …
- Boeing
- General Dynamics
- Honeywell
- L-3 Communications
- Left Coast Tech. Svc’s
- Lockheed Martin
- Northrup Grumman
- NQA
- PerkinElmer
- Plexus
- Raytheon
Test Laboratory Sub-Group Activity

Many Additional SME’s Participate in Sub-Groups
Standardize Test & Inspection Requirements Across Industry

Test Matrix – testing performed by certified test laboratories (Asxxxx)

- Type of Part
- Testing Technique
- Sampling Plan
- Testing Tier

Risk Based Recommendations:
- Application
- Part
- Supplier

System intended to create standardized testing methodology throughout industry
Recommended Risk Decision Tree

- Risk of Supplier
- Risk of Application
- Risk of Part
- Other Identified Risks

Recommendation
<table>
<thead>
<tr>
<th>Level 0</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
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| • External Visual Inspection  
• Marking permanency  
• Internal Die De-cap and inspection  
• Optional: (X-RAY, XRF, Hermeticity, SAM, Solderability & others...) | • 25C limited DC testing at room temp  
• (Device pin DC characteristics) | • DC parametric testing at 2 room temp  
• (Selected key DC datasheet parameters) | • DC parametric testing & functionality at room temp  
• (Key DC datasheet parameters & basic device functionality) | • DC parametric testing & AC parameters at room temp  
• (Key DC & AC datasheet parameters including device functionality) |
Recommended Sampling Plan

- **Level of Confidence Required**
- **Tier Level of Accepted Risk**
- **Acceptable Reject Criteria**

Recommendation
Counterfeit Parts Control Plan

Organizations Adopting Policies:

- NASA Policy Directive 8730.2C
- MDA Policy Memo and PMAP
- DOD adopts AS5553 August 2009
  - SMC and NRO do not accept AS5553 in its current form and have more stringent requirements
- Other companies with plans:
  - BAE Systems
  - Orbital Sciences Corp.
  - Lockheed Martin
  - Honeywell
  - Ball Aerospace

Flow Down will Invoke Requirements
Summary

• Understand G-19 Activities

• Understand the AS5553 for Buyers and the AS6081 for Distributors

• Awareness of G-19 Future Developments

• Understand trend of organizations adopting standards and invoking requirements
Thank you for your time!

Questions?