

E-brain (ESREF 2012) - EXTRACT

Implementing A/C technologies into IC packages – Impacts & challenges in terms of reliability & failure analysis

ST Corporate Security

Stephanie Pesseguier

Technical Product Security Manager



Counterfeiting is profitable !

Product	1 kg Cocaine	10Kpcs Microcontrolleurs
Cost price	\$30,000	\$1000
Revenue after selling	\$60,000	\$90,000
Profit	100%	3 000%
Risk (prison)	14 years	3 to 5 years



Aerospatial



Appliances



Automotive



Military



Medical

Counterfeited parts in applications

- Examples of Incidents caused by CF parts:

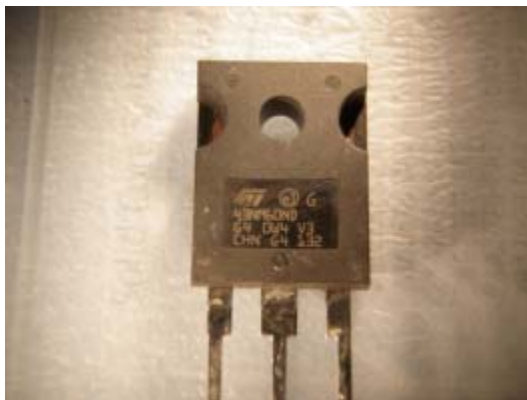


- Automated External - Defibrillator or AED
- Defibrillator overvoltage



- Fire on vacuum cleaner
- Melted heater
- Burnt Sauna
- Customs discovered a counterfeit part for defense (military sector, application: weapons!)

- Part returned due to failures



- Picture of inside the parts



- End application: Power Supply for Airport signals (LED)

Reliability & Failure Issues due to Counterfeits (1/2)

- Growing reliability and failure customers returns due to counterfeited products
- Since early 1990s, global trade in counterfeits has increased **8 times faster than legitimate trade.**
- **SIA ACTF** (Anti-Counterfeit Task Force) considers **1%** of the total SC industry business volume as the business impact of counterfeiting (**3B\$ in 2011**)



Legitimate manufacturers are meticulous about quality



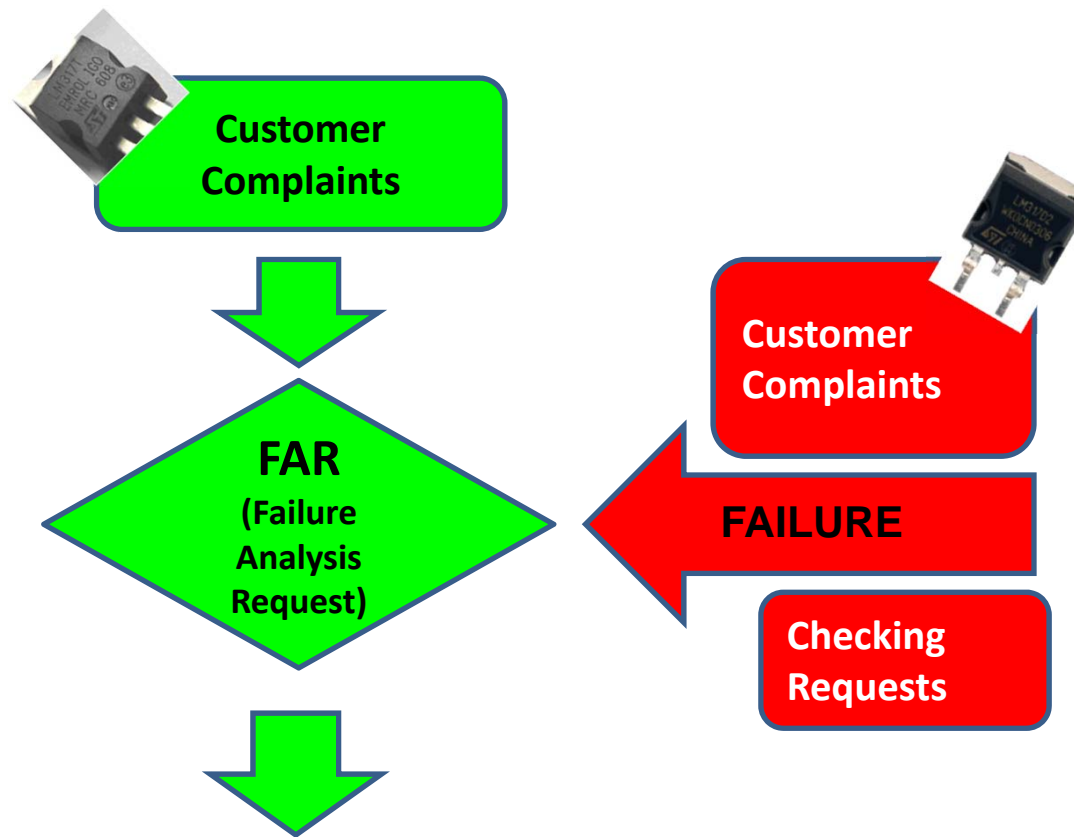
Counterfeiters not much caring about Quality...

"Sun-dried" ICs



Sidewalk sorting process

Reliability & Failure Issues due to Counterfeits (2/2)



- Increased Failure Analysis Cost & Resources !
- Reliability issues can be catastrophic depending on the final application and create an impact on the IC manufacturer image

Challenges For Semiconductor Industries

Genuine or Counterfeits ?

6



ICs go into critical applications



Automotive



Medical



Home



Aerospace

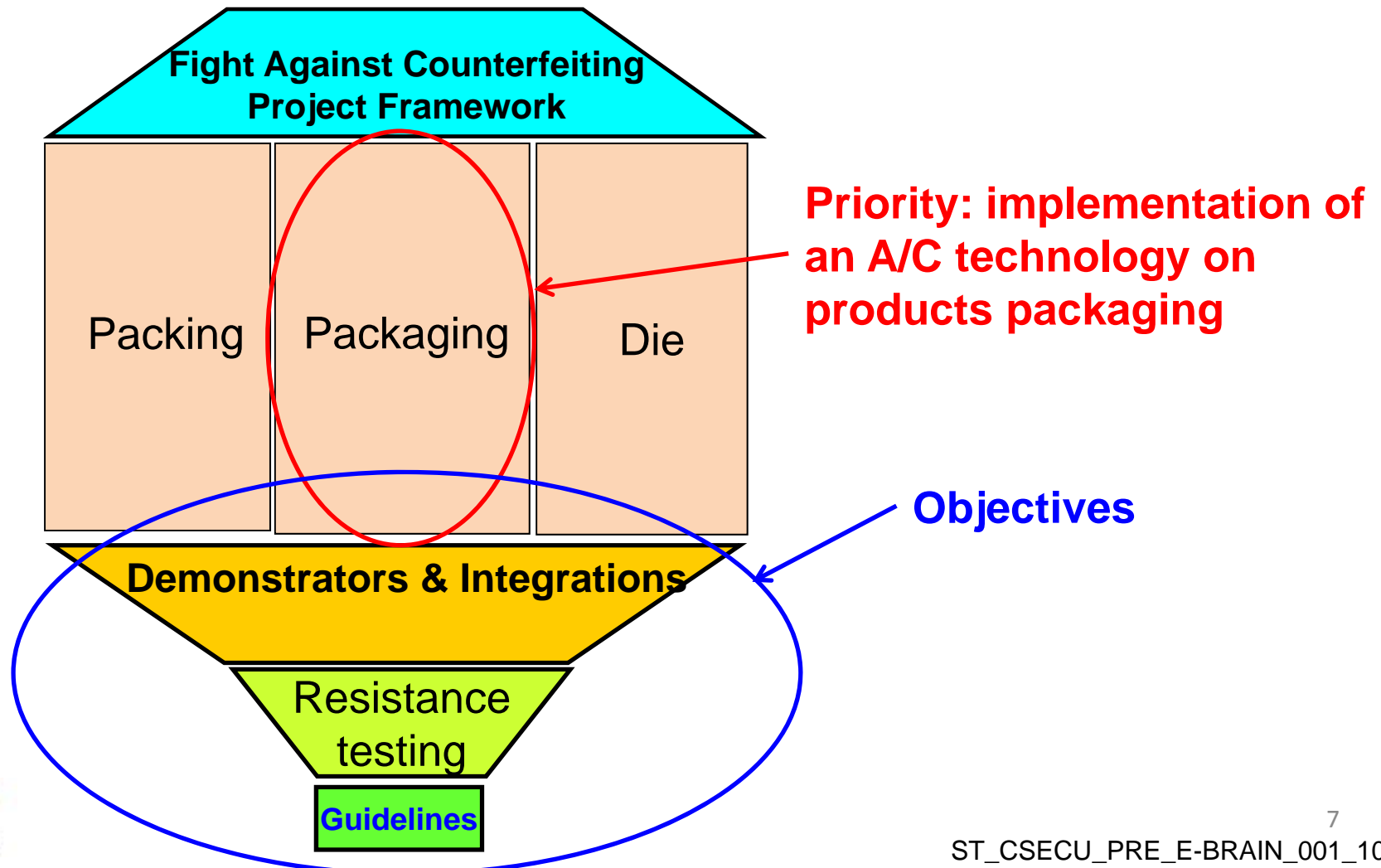


Defense

- Counterfeit products can cause **serious damage to human health and safety** !
- SC Industries have **Social Responsibility** towards the safety and security of human communities
- SC Industries must also protect **their reputation, brand and employees** from the effects of counterfeiting.

ESIP Project Objectives

- **ESIP** project focussing on the packages, ST has investigated and is continuously prospecting for A/C technologies implementable on electronic components packages:



Selected Tests: Reliability & FA

- For each selected A/C technology different reliability tests and failure analysis prevention tests have been performed to avoid components potential failure and to ensure they remain in line with their initial specifications:

- **Reliability:** to simulate all the thermo-mechanical stresses met by the technology during the product lifetime (from JEDEC standards)

- **Failure Analysis prevention:**

- Functionnal & Electrical tests to check if products still in line with their specifications
- Visual aspect inspection to check the A/C technology insertion does not impact the product visual acceptance