FCOS Press Briefing

FCOS Integration at Giesecke & Devrient

Thomas Tarantino,
Head of Development for Module and Embedding Technology, Card Segment

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Agenda

- G&D Development Activities for FCOS™
- FCOS™ Development Roadmap
- Difference between FCOS™ and Standard Modules for Card Manufacturers
- FCOS™ Benefits for Card Manufacturers
- FCOS™ Benefits for Applications
- G&D Qualification Tests
- Production Flow

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G&D Development Activities for FCOS™

- Pre-testing for module design optimization
- Setup of manufacturing process at G&D
- Intensive reliability tests based on international standards and internal requirements
- Organization and analysis of field trials
- Volume production ramp-up
- Market launch
FCOS™ Development Roadmap

- **1987 TAB module**
- **1990 Wire bond module**
- **FCOS™ project start**
- **Field trial @ GDMEX**
- **Start of production ramp-up @ GDMEX**
- **10 mill. FCOS™ memory cards delivered**
- **Qual. of FCOS™ µController module**
- **Banking**
- **GSM**
- **Over 80 mill. FCOS™ memory cards delivered**

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- **Jan. 2002**
- **Dec. 2002**
- **Aug. 2003**
- **Jan. 2004**
- **Mar. 2004**
- **June 2004**
- **2005**

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Difference between FCOS™ and Standard Modules for Card Manufacturers

- More flexible module tape
  - Training in handling

- Advanced module tape material
  - Adaptation of adhesive used for bonding into card body

- Thinner module and different temperature sensitivity
  - Modification of process parameters
FCOSTM Benefits for Card Manufacturers

- Improvement resulting in high dynamic bending stress (e.g. mailing stability)
- Increased mechanical reliability for static tests
- Increased flatness of the module
- Optical improvement of overall card appearance
- Increased bonding area module/card body
- Same or better machine throughput
- Standard card production equipment usable
Benefits of FCOS™

- High corrosion resistance
- Housing for large IC area
- FIPS -140* compatibility
- Green package (RoHS** compliant)
- Proven technology - successful in the field
- Meets future technology requirements (such as 3FF/Mini-UICC)

* FIPS Federal Information Processing Standards **Restrictions of Hazardous Substances
Benefits for Applications (Example: Mini-UICC)

- Standard modules have to be modified to fit into the new Mini-UICC form factor
- MFC5.6 is suitable for immediate use in the Mini-UICC
Extract of Qualification Tests @ G&D

Module qualification

Electrical reliability tests
• Life test (125°C; 168h; $V_{cc}$)
• Data retention (125°C, 500h)
• Temperature cycling (-40°C...+125°C)
• THB (85°C; 85%rel. $V_{cc}$; 168h)
• ...

Mechanical reliability tests
• ISO bending and torsion
• Hand test A/B
• Wrapping test
• Mailing test
• ...

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Sample Qualification Tests @ G&D

Three wheel test

Wrapping test

G&D hand test
Production Flow FCOS™ to Smart card

1. Module tape on reel
2. Printed card body with cavity
3. Adhesive tape lamination reel to reel (hot-melt)
4. Chip module embedding
5. Temperature and force
6. Personalization
7. Electrical outgoing inspection
8. Finished smart card

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security at work.

Thank you for your attention.