Mastercard
Card Quality Management Overview

August 2018
Introduction

- Involved companies:
  - Personalization bureaus
  - Card manufacturers (card vendors)
  - Suppliers of the card vendors (chip, modules, inlays manufacturers)

- Involved products:
  - Mastercard EMV chips based products (historically cards)

- Requirements:
  - Quality Management
  - Product Quality (modular structure)

- Methodology:
  - Self-assessment controlled by on-site audits
  - Corrective actions plan.

CQM = Mastercard Card Quality Management
<table>
<thead>
<tr>
<th><strong>Global Vendor Certification Program</strong></th>
<th><strong>Company Program</strong></th>
<th><strong>Product Program</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>“Physical and Logical Security”</td>
<td>GVCP</td>
<td><a href="mailto:GVCP-helpdesk@mastercard.com">GVCP-helpdesk@mastercard.com</a></td>
</tr>
<tr>
<td>Brand and <strong>Card Design</strong> Rules</td>
<td></td>
<td>Card Design (1)</td>
</tr>
<tr>
<td><strong>Card Structure Integrity and security</strong></td>
<td></td>
<td>CSI</td>
</tr>
<tr>
<td>“Innovative form factors or card bodies”</td>
<td></td>
<td><a href="mailto:CSI_Security@mastercard.com">CSI_Security@mastercard.com</a></td>
</tr>
<tr>
<td><strong>Card Quality Management</strong></td>
<td>CQM</td>
<td><a href="mailto:cqm@smart-consulting.com">cqm@smart-consulting.com</a></td>
</tr>
<tr>
<td><strong>Compliance And Security Testing</strong></td>
<td></td>
<td>CAST</td>
</tr>
<tr>
<td>“Functional testing”</td>
<td></td>
<td><a href="mailto:cast@mastercard.com">cast@mastercard.com</a></td>
</tr>
<tr>
<td><strong>Interface Security Testing</strong></td>
<td></td>
<td>IAT</td>
</tr>
<tr>
<td>“Functional testing”</td>
<td></td>
<td><a href="mailto:chip_certification_chd@mastercard.com">chip_certification_chd@mastercard.com</a></td>
</tr>
</tbody>
</table>

(1) The e-mail address depends on the region, it will be communicated by the Mastercard local contact
A Mastercard Letter of Approval (LoA) is issued to a chip card vendor for each chip card or device that has successfully completed the following items:

- IAT
- CAST
- CQM

For non-ID1 cards or innovative features please contact CSI_security@mastercard.com
Mastercard Chip Card Based Approval Process 2/2

Integrated Model
- GVCP
- Contactless License
- M/Chip Develop. Agreement
- Card Vendor: From full product conception to end-user delivery
  - IAT
  - CAST
  - CQM
  - CCN
  - Labels

Multi-stakeholders Model
- GVCP
- Contactless License
- M/Chip Dev. Agreement
- Module Supplier: Chip + Operating System + Payment App
  - IAT
  - CAST
  - CQM
  - CCN
  - Labels
  - Conformity Compliance Statement (CCS)
- Card Supplier: End-user product manufacturing and delivery based on an approved Module
  - IAT
  - CQM
  - CCN
  - Labels
  - LoA
Categories

- Interoperability with ATMs and POS terminals:
  Electrical, contactless, magnetic, physical characteristics
- Durability and Reliability:
  Mechanical, Electro-Static Discharges, magnetic, ageing, resistance to chemicals...
- Mastercard Brand
  Design, colors, layout.
- Visual Security Features
  UV print, hologram, signature panel...
- Miscellaneous
  No toxicity for health and environment...

Examples

- Reading distance between the contactless card and a POS
- Resistance to:
  - ESD
  - Card bending or torsion
  - Abrasion
  - Chemicals: sweat, fuel...
  - Temperature and humidity
  - Mechanical stress
  - Chip module extraction
Requirements (2/2)
Quality Management

- Objectives definition and measurement
- Training program
- Written procedures
- Specifications
- Qualification and Change Control
- Customer satisfaction
- Statistical Process Control
- Internal audits
- Continuous improvement
<table>
<thead>
<tr>
<th>Benefits</th>
<th>For the Bank (Card Issuer)</th>
<th>For the Supplier or Vendor</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Cardholder satisfaction</td>
<td></td>
<td>✓ Bank tenders compliance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ Mastercard rules compliance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ Corporate quality tool to both support and control the remote sites</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ External independent view</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ Modular activities</td>
</tr>
</tbody>
</table>

CQM labels are required for every suppliers
The Letter of Approval (LoA) requires the CQM certification.
Smart Card manufacturing is splitted in modular activities. The CQM label identifies the activity for the card interface technology (Contact, Dual, Contactless).
✓ CQM labels are identifiers granted to a CQM certified company to cover their certified activities.

✓ CQM label structure is “ACCLLLTTTTTS”.

- **A** = Activity of manufacturing
- **CC** = Company
- **LL** = Location of the manufacturing site
- **TTTT** = Interface Technology (Contact, Dual, Contactless)
- **S** = Status (R: interim label for Recognition, A: label for Approval)

CQM Recognition is a 6 month max interim period aimed
- for companies starting the CQM process
- for a new activity started by a CQM certified company

CQM Approval is the step achieved when the audit pass recommendation is accepted.
The labels for CQM recognition are no longer listed in the CQM certificate. Only Labels for CQM approval are listed.
Documents

Documents available on line: smart-consulting.com
- Overview presentation (this presentation)
- Registration Form
- Assessment Plan (Quality questionnaire)
- Requirements specification
- Non Disclosure Agreement (NDA) template.

Documents available on demand: cqm@smart-consulting.com
- Annual services offer and quote.

Always check online for the last release of the documents. Your documentation system shall point smart-consulting.com
## Accredited Auditors

<table>
<thead>
<tr>
<th>Name</th>
<th>First Name</th>
<th>Company</th>
<th>Tel office</th>
<th>Email</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chen</td>
<td>Luke</td>
<td>陳明乾 TÜV SÜD</td>
<td>+886 228986818</td>
<td><a href="mailto:luke.chen@tuv-sud.tw">luke.chen@tuv-sud.tw</a></td>
<td>Taiwan</td>
</tr>
<tr>
<td>Ferreira</td>
<td>Luis</td>
<td>Agora Consult</td>
<td>+32 470822142</td>
<td><a href="mailto:agoraconsultsprl@skynet.be">agoraconsultsprl@skynet.be</a></td>
<td>Belgium</td>
</tr>
<tr>
<td>Gase</td>
<td>Axel</td>
<td>Kiwa Telefication</td>
<td>31 316 583 114</td>
<td><a href="mailto:agase@telefication.com">agase@telefication.com</a></td>
<td>Netherlands</td>
</tr>
<tr>
<td>Janczek</td>
<td>Thies</td>
<td>Cocaso</td>
<td>+49 4347701433</td>
<td><a href="mailto:janczek@cocaso.com">janczek@cocaso.com</a></td>
<td>Germany</td>
</tr>
<tr>
<td>Shinmoto</td>
<td>Tamon</td>
<td>真本 多聞 TÜV SÜD</td>
<td>+81 449801675</td>
<td><a href="mailto:tamon.shinmoto@tuv-sud.jp">tamon.shinmoto@tuv-sud.jp</a></td>
<td>Japan</td>
</tr>
<tr>
<td>Trüggelmann</td>
<td>Uwe</td>
<td>TruCert</td>
<td>+1 2504349456</td>
<td><a href="mailto:uwe@trucert.com">uwe@trucert.com</a></td>
<td>Canada</td>
</tr>
<tr>
<td>Van Voorst</td>
<td>Ries</td>
<td>Dekra</td>
<td>+31 263563419</td>
<td><a href="mailto:ries.vanvoorst@dekra.com">ries.vanvoorst@dekra.com</a></td>
<td>Netherlands</td>
</tr>
</tbody>
</table>
Audit 2/4
Findings

- Major non-conformity
  Product functionality might be compromised

- Minor non-conformity
  Product functionality is not compromised

- Observation
  Identified issue that should be resolved to reduce the risk of NC

- Improvement opportunity
  Auditor leaves the decision to the vendor if the vendor wants to resolve/implement it.
Audit 3/4
Quality Ranking

<table>
<thead>
<tr>
<th>Grade</th>
<th>Action plan Completion Check</th>
<th>Certificate Validity</th>
<th>Next audit</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pass without major NC with limited number of minor NC</td>
<td>12 months</td>
<td>&lt; 3 years</td>
</tr>
<tr>
<td>B</td>
<td>Pass with limited number of major NC</td>
<td>&lt; 6 months</td>
<td>12 months</td>
</tr>
<tr>
<td>C</td>
<td>Interim Pass</td>
<td>&lt; 6 months</td>
<td>12 months</td>
</tr>
<tr>
<td>D</td>
<td>Fail</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Smart Consulting will notify the rank decision to the auditee after the audit report reception and notify next audit deadline accordingly. 3 subsequent C will be managed as a fail (D)
# Audits 4/4

## Timeline

<table>
<thead>
<tr>
<th>Owner</th>
<th>Recipients</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Registration</strong></td>
<td>Auditee to Smart Consulting</td>
<td></td>
</tr>
<tr>
<td><strong>Audit Agreement</strong></td>
<td>Auditee + Auditor to Auditee + Auditor</td>
<td></td>
</tr>
<tr>
<td><strong>Audit Preparation</strong></td>
<td>Auditee to Auditor</td>
<td>2 weeks before the Audit (*)</td>
</tr>
<tr>
<td><strong>Audit</strong></td>
<td>Auditor to Auditor</td>
<td></td>
</tr>
<tr>
<td><strong>Action Plan</strong></td>
<td>Auditee to Auditor</td>
<td>2 weeks after the Audit (*)</td>
</tr>
<tr>
<td><strong>Final Audit Report</strong></td>
<td>Auditor to Smart Consulting and Auditee</td>
<td>4 weeks after Audit End</td>
</tr>
<tr>
<td><strong>Audit Report Assessment</strong></td>
<td>Smart Consulting to Auditee and Auditor</td>
<td>5 weeks after Final Audit Report</td>
</tr>
<tr>
<td><strong>Action Plan Completion</strong></td>
<td>Auditee to Auditor</td>
<td>17 weeks after Audit End (*)</td>
</tr>
<tr>
<td><strong>Action Plan Completion Report</strong></td>
<td>Auditor to Smart Consulting and Auditee</td>
<td>19 weeks after Audit End</td>
</tr>
<tr>
<td><strong>Action Plan Completion Report Assessment</strong></td>
<td>Smart Consulting to Auditee and Auditor</td>
<td>2 weeks after Action Plan Completion Report</td>
</tr>
</tbody>
</table>

(*) Typical values. They shall be defined inside the bilateral Audit Agreement binding on the Auditor and the Auditee
Overview

1. Recognition
2. Approval
   - Next audit deadline?
   - Certificate expired?
     - N: Renewal
     - N: One Year Extention

Details next slide
## Process 2/4

### Details

<table>
<thead>
<tr>
<th>RECOGNITION 6 months max</th>
<th>Smart Consulting</th>
<th>CQM Candidate</th>
<th>CQM Auditor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services offer for 1 year</td>
<td>Registration to Smart Consulting</td>
<td>Acceptance of the offer</td>
<td></td>
</tr>
<tr>
<td>Yearly fees invoice</td>
<td>Yearly fees payment</td>
<td>Audit offer with quote and schedule</td>
<td></td>
</tr>
<tr>
<td>Labels for CQM recognition</td>
<td>Auditor selection and notification</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>APPROVAL</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit preparation</td>
<td>Support for the Audit preparation</td>
<td>Audit</td>
<td>Non conformities</td>
</tr>
<tr>
<td>Action-plan</td>
<td>Audit-Report and recommendation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notification of the audit results</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signed certificate with approval labels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Action-Plan Completion Report</td>
<td>Action-Plan Completion Report Assess</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YEARLY EXTENTION</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yearly fees invoice</td>
<td>Yearly fees payment</td>
<td></td>
</tr>
<tr>
<td>Signed Certificate with labels</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| RENEWAL | Refer to above approval process | | |

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**Smart Consulting**

**CQM Candidate**

**CQM Auditor**
New Comer

- To register immediately for CQM recognition together with Mastercard GVCP registration in order to gain time.
- CQM labels require the related GVCP certification.

Already Certified

- The audit date shall be initiated by the auditee directly with the auditor taken into account
  - The last audit acknowledgement issued by Smart Consulting
  - The certificate birthday (max 60 days before)
  - The auditor availability in the region
- Pay the CQM yearly extension fees 60 days before the certificate expiration date.
- Notify changes in real time:
  - new primary contact
  - new location
  - new workshops

Sooner is better contact: cqm@smart-consulting.com
✓ Confirmation by smart-consulting of audit report recommendation A, B or C.

✓ Next audit(s) plan is agreed with the auditor committed by the auditee and agreed by Smart-Consulting.

✓ 60 days after annual fees payment.

Note: All the sites of the Group that are GVCP certified shall also be CQM certified
<table>
<thead>
<tr>
<th></th>
<th>Auditor</th>
<th>Smart Consulting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>~ 1500€ per day + T&amp;E</td>
<td>960€ annual fees + 540€ per activity</td>
</tr>
<tr>
<td>Payment term (new candidates)</td>
<td>to be defined</td>
<td>60 days after CQM offer date</td>
</tr>
<tr>
<td>Payment term (already certified)</td>
<td>to be defined</td>
<td>60 days before certificate birthday</td>
</tr>
<tr>
<td>Negotiable?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
The CQM scheme is owned by Mastercard.

The CQM operations are performed by Smart Consulting.
CQM Certification Trend

- Companies number
- Sites number
- Activities number
- Labels number

Year:
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
1. Mastercard mandates CQM:

- for all Mastercard EMV chip based products
- for all activities (formerly called “workshops”)
- for all countries worldwide
- for every GVCP certified site belonging to the same group of companies.

2. CQM certified companies list is public

CQM certified companies are available inside the Mastercard Vendors list Managed by Mastercard GVCP

3. Increasing number of bank tenders are mandating CQM

Mastercard Sources: Card Vendor Product Approval Process Guide CQM certified companies public list (GVCP), monthly update Security Bulletin (GVCP)
August 2018

- Findings definition
- Ranking criteria A B C D clarification
- 3 subsequent C will be managed as a fail (D)