Achieving Interoperability

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Basis

- ISO 14443 A/B
  - Contactless interface
  - 13,56 MHz
  - Proximity
- Standard with tolerances leaves room for interpretation for chip + reader

Need for tests -> targets

- Variety of interoperability scenarios
- Benchmark the performance
- Record compliance
- Isolate areas for improvement
- No attribution of results to specific vendors

Interoperability Tests

	eMRPs	Readers	Participants
Canberra, AUS	10	6	-
Morgantown, USA	100	18	150
Sydney, AUS	120	15	~100
Baltimore, USA	~25	8	~20
Tsukuba, JAP	600	35	200
Singapore	140	40	240
Berlin, GER	443	45	400

Benchmark Software

Golden Reader Tool

Picture

Personal Data

Name | Surname

Date of Birth (dd.mm.yy) | Nationality

Sex | Valid until (dd.mm.yy)

Document Number | Document Type

Issuer | Optional Data

Operation

Autodetect

Read

Read BAC / EAC

Read from Disk

Write to Disk

Reset Display

About...

Options

Configuration

Close

Printed MRZ

Access Control

BAC | Chip Authentication

EAC | Terminal Authentication

Active Authentication

Chip Data

UID | ATR/ATS | ISO-14443

Reading time

Seconds

Passive Authentication

DG1 DG16

Signature EF.SOD

Algorithm

Certificate-Chain | Revocation

Logging

Sample Data Sets

- Silver Data Set
- Tsukuba Data S
- Orchid Data

Golden Reader Tool

Picture

Facial Image < >

Personal Data

Name	Surname
YIH	LIN
Date of Birth (dd.mm.yy)	**Nationality**
01.01.60	Singapore
Sex	**Valid until (dd.mm.yy)**
Male	31.12.05
Document Number	**Document Type**
S1234567D	P
Issuer	**Optional Data**
Singapore	

Printed MRZ

```
<SGPLIN<<YIH<<<<<<<<<<<<<<<<<<<<<<<<<<<<___
S1234567D5SGP6001010M0512310<<<<<<<<<<<<___
```

Operation

- Autodetect
- Read
- Read BAC / EAC
- Read from Disk
- Write to Disk
- Reset Display
- About...
- Options
- Configuration
- Close

Access Control

- BAC
- Chip Authentication
- EAC
- Terminal Authentication
- Active Authentication

Chip Data

UID	ATR/ATS	ISO-14443
n/a	3b888111fde00000007781e70014	n/a

Reading time: 12.34 Seconds

Passive Authentication

DG1 ■■□□□□□□□□□□□□□□□□ DG16

- Signature EF.SOD
- Algorithm RSA / SHA256
- Certificate-Chain
- Revocation

Logging

```
11.20    : CBEFF Format Type 0501
12.27    : Old CBEFF format type 0501 used for DG2. Must be changed to new format type
0008.
12.29    : Facial Image Type 0002
12.31    : Image data type: JPEG
12.35    : The overall size is 13080
12.37    : The average reading speed was 8.48 kpbs.
```

Test Objectives

Interoperability test	Objective
Canberra	Examine compatibility of Type-A & B and explore additional requirements that need to be specified
Morgantown	Research if ICAO specifications addressed all basic issues in multi-vendor condition
Sydney	Investigate incompatibility reason and test readability/ usability for corrections of specifications
Baltimore	Determine the operational impact on primary inspection system
Tsukuba	Test with standard equipments and measure reading speed/chip characteristics with scientific approach
Singapore	Promote interoperability between ePassports and ePassport readers including optional features
Berlin	Simulate border situations, no standard data sets allowed, focus on reliability of reading rather than speed

	Canberra	Morgantown	Sydney	Baltimore	Tsukuba	Singapore	Berlin
Reading	Poor	OK	OK	?	Good	Very Good	Very Good
Data Set	–	Silver	Silver & 34k	Silver	Tsukuba & 8 ICAO references	Orchid & Unique	Solely Unique
Tool	–	–	–	GRT	GRT & NMDA	GRT, NMDA InterFest tool	50% GRT 50% own
Read range	–	2, 5, 10cm, Rotate	Rotate, Side down	–	0, 2cm X 4 points	0, 2cm, Flip	0 cm
Eavesdrop	–	Yes	–	Shield test	–	–	–
Bio Verify	–	–	–	Yes	–	–	fingerprint
Bps Ave.	106kbps	212kbps	212kbps	212kbps	424kbps	848kbps	848kbps
Time Ave.	> 30sec	> 30sec	30sec	20sec?	3sec – 10sec	?	
SoD test	–	–	Yes	–	Yes	Yes	Yes
BAC	–	–	–	–	Yes	Yes	Yes
AA	–	–	–	–	–	Yes	Yes
EAC	–	–	–	–	–	Yes	Yes

Test Results

Interoperability test	Findings
Baltimore	Slow reading speed; Poor ergonomic usability; Power problem; SoD is not verified by readers
Tsukuba	Short File Identifier not used as specified; 3byte Le needs clarification; BAC successfully implemented
Singapore	Antennae orientation can be an issue; AA, EAC, BAC lite many variations
Berlin	low quality MRZ (necessary for BAC); Type B sensible to field strength variations; shielded passports difficult to read; reader conformity tests are necessary

Summary

- Tests were extremely important for development of interoperability
- Reader + passport manufacturers found a common understanding of the specifications
- ePassport implementation phase started as of 2006

Next steps

- EU made Extended Access Control mandatory for implementation of fingerprints
- EAC Interoperability Test currently carried out by Brussels Interoperability Group (BIG)

Thank you

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