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Test report no. : 1-0510-01-02/08
Type identification : ePassport with Shielding B
Applicant : Ministerie van Binnenlandse Zaken en
Koninkrijksrelaties, The Netherlands
Test standards : BSI TR-03105; ePassport Conformity Testing, part 2

{ REF Prüfstandard_2 * MERGEFORMAT ICAO
RF protocol and application test standard for E-

Table of Contents

1 General Information 4

1.1 Notes4

1.2 Testing Laboratory5

1.3 Details of Applicant.....5

1.4 Application Details5

1.5 Information about test item6

1.6 Implementation conformance statement.....7

1.7 Photo documentation of the test item.....8

1.8 Test standard/s9

2 Technical Tests 10

2.1 Summary of Test Results.....10

2.2 Test Environment.....14

2.3 Measurement and Test set-up14

2.4 Test Equipment utilised14

2.5 Test results15

2.5.1 Test Case 5.1 (BSI TR-03105; ePassport Conformity Testing, part2) Coil Dimension Check (Type A and B)15

2.5.2 Test Case 5.2 (BSI TR-03105; ePassport Conformity Testing, part2) Static Electricity (ESD) Test (Type A and B).....15

2.5.3 Test Case 5.5 (BSI TR-03105; ePassport Conformity Testing, part2) Alternating Magnetic Field Test (Type A and B)15

2.5.4 Test Case 6.1 (BSI TR-03105; ePassport Conformity Testing, part2) Load Modulation Amplitude16

2.5.5 Operating Field strength (Type A and B).....17

2.5.5.1 Test Case 6.2 (BSI TR-03105; ePassport Conformity Testing, part2) Operating Field strength17

2.5.5.2 Test Case 4.2 (ICAO RF protocol and application test standards for e-Passport – part 2) Operating Field strength.....17

2.5.6 Communication Stability (Type A and B)19

2.5.6.1 Test Case 6.3 (BSI TR-03105; ePassport Conformity Testing, part2) Communication Stability.....19

2.5.6.2 Test Case 4.3 (ICAO RF protocol and application test standards for e-Passport – part 2) Communication stability test.....19

2.5.7 Test Case 6.4 (BSI TR-03105; ePassport Conformity Testing, part2) Threshold resonance frequency (Type A and B).21

2.5.8 Test Case 7.1 (BSI TR-03105; ePassport Conformity Testing, part2) Start-Up time21

2.5.9 Test Case 7.2 (BSI TR-03105; ePassport Conformity Testing, part2) Frame Delay Time (Type A only).....21

2.5.10 Test Case 7.3 (BSI TR-03105; ePassport Conformity Testing, part2) Start-of-Frame & End-of-Frame-Timing (Type B only).....21

2.5.11 Test Case 7.4 (BSI TR-03105; ePassport Conformity Testing, part2) Extra Guard Time (EGT) (Type B only)21

2.5.12 Test Case 7.5 (BSI TR-03105; ePassport Conformity Testing, part2) Timing before PICC SOF (TR0 & TR1) (Type B only)21

2.5.13 Test Case 7.6 (BSI TR-03105; ePassport Conformity Testing, part2) Timing before PICC to PCD EOF (TR2) (Type B only).....21

2.5.14 Test Case 8.1 (BSI TR-03105; ePassport Conformity Testing, part2) Type A Activation21

2.5.15 Test Case 8.2 (BSI TR-03105; ePassport Conformity Testing, part2) Type B Activation21



2.5.16 Test Case 8.3 (BSI TR-03105; ePassport Conformity Testing, part2) Data Exchange Protocol
Tests (Type A and B).....22

3 Observations 22

1 General Information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

Test Laboratory Manager:

2008-05-21	Oliver Altmeyer	
Date	Name	Signature

Technical Responsibility for Area of Testing:

2008-05-21	Andreas Ehre	
Date	Name	Signature

1.2 Testing Laboratory

Name: CETECOM ICT Services GmbH

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Country: Germany

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1.3 Details of Applicant

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Town: 2513 AC Den Haag
Country: The Netherlands

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Contact: Jan Verschuren
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1.4 Application Details

Date of receipt of order: 2008-05-13
Date of receipt of test item: 2008-05-20
Date of test: 2008-05-21

Persons(s) who have been present during the test:

1.5 Information about test item

Description of the Test Item:

Type Identification: ePassport with Shielding B
Serial Number: ZZ1324219
Hardware Version:
Software Version:

Description of System under Test (SUT): secure contactless chip inlay

Additional Information: The ePassport contains a shielding. Therefore special care needed to be taken in the positioning of the ePassport at the Test PCD Assembly during the test. The test has been performed with the ePassport opened completely.

Manufacturer:

Name: SDU Identification
Street: Oudeweg 32
Town: 2000 GH Haarlem
Country: The Netherlands

1.6 Implementation conformance statement

Information for test setup	Applicant declaration
Location of antenna in e-Passport <ul style="list-style-type: none"> • which page • which area in the page 	data page centered, vertically oriented
Size of antenna <ul style="list-style-type: none"> • dimension • compliance to Class-1 definition [R4] 	Yes
Electrical parameters of antenna <ul style="list-style-type: none"> • Resonance frequency range (if optional test is performed) 	
Modulation type <ul style="list-style-type: none"> • Type A or B 	Type A
e-passport shielded or not and how	Shielded; Shielding in 2 visa pages
Bit rates supported as claimed by the ATS/ATQB <ul style="list-style-type: none"> • From PCD to SCIC <ul style="list-style-type: none"> ○ 106 kbps ○ 212 kbps ○ 424 kbps ○ 848 kbps • From SCIC to PCD <ul style="list-style-type: none"> ○ 106 kbps ○ 212 kbps ○ 424 kbps ○ 848 kbps 	Yes Yes Yes No Yes Yes Yes No
Random or fixed UID (Type A) or PUPI (Type B)	Random UID
Access control applied <ul style="list-style-type: none"> • Plaintext • Basic Access Control • Extended Access Control 	No Yes No
Authentication supported <ul style="list-style-type: none"> • Passive Authentication • Active Authentication 	
CID supported	Yes
NAD supported	No
Commands supporting WTX	Not supported

1.8 Test standard/s

The following standards and recommendations form the basis for the tests as reported in this document.

BSI TR-03105; ePassport Conformity Testing, part 2	2006-03-30	Test Plan for ICAO compliant MRTD with secure contactless integrated circuit, Version 1.03.1
ICAO RF protocol and application test standard for E- Passport, part 2	2006-12-07	Tests for air interface, initialisation, anticollision and transport protocol

2 Technical Tests

2.1 Summary of Test Results

- No deviations from the technical specifications were ascertained**
- There were deviations from the technical specifications ascertained**

In this document those tests are reported which have been performed to investigate the terminal's ability to support the ePassport behaviour as specified in the BSI ePassport Conformity Testplan v1.03.1 (based on ISO/IEC 14443 and ISO/IEC 10373).

The following list shows those test cases which have been performed and the result which was achieved. A more detailed report of the single test cases is then following in the next section of this test report.

Clause	Tested Characteristic	Verdict
2.5.1	Test Case 5.1 (BSI TR-03105; ePassport Conformity Testing, part2) Coil Dimension Check (Type A and B) Test Case 3.1 (ICAO RF protocol and application test standards for e-Passport – part 2) Class-1 verification test (conditional)	not selected
2.5.2	Test Case 5.2 (BSI TR-03105; ePassport Conformity Testing, part2) Static Electricity (ESD) Test (Type A and B) Test Case 3.2 (ICAO RF protocol and application test standards for e-Passport – part 2) Static electricity (ESD) test	not selected
2.5.3	Test Case 5.5 (BSI TR-03105; ePassport Conformity Testing, part2) Alternating Magnetic Field Test (Type A and B) Test Case 3.3 (ICAO RF protocol and application test standards for e-Passport – part 2) Alternating magnetic field test	not selected
2.5.4	Test Case 6.1 (BSI TR-03105; ePassport Conformity Testing, part2) Load Modulation Amplitude Test Case 4.1 (ICAO RF protocol and application test standards for e-Passport – part 2) Load modulation amplitude test	Pass
2.5.5.1	Test Case 6.2 (BSI TR-03105; ePassport Conformity Testing, part2) Operating Field strength	not selected
2.5.5.2	Test Case 4.2 (ICAO RF protocol and application test standards for e-Passport – part 2) Operating field strength test	Pass
2.5.6.1	Test Case 6.3 (BSI TR-03105; ePassport Conformity Testing, part2) Communication Stability	not selected
2.5.6.2	Test Case 4.3 (ICAO RF protocol and application test standards for e-Passport – part 2) Communication stability test	Pass
2.5.7	Test Case 6.4 (BSI TR-03105; ePassport Conformity Testing, part2) Threshold Resonance Frequency Test Case 4.4 (ICAO RF protocol and application test standards for e-Passport – part 2) Resonance frequency test optional test case	not selected
2.5.8	Test Case 7.1 (BSI TR-03105; ePassport Conformity Testing, part2) Start-Up time Test Case 5.1 (ICAO RF protocol and application test standards for e-Passport – part 2) Startup time – Polling	not selected
2.5.9	Test Case 7.2 (BSI TR-03105; ePassport Conformity Testing, part2) Frame Delay Time (Type A only) Test Case 5.2 (ICAO RF protocol and application test standards for e-Passport – part 2) Frame delay time (type A only)	not selected
2.5.10	Test Case 7.3 (BSI TR-03105; ePassport Conformity Testing, part2) Start-of-Frame & End-of-Frame-Timing (Type B only) Test Case 5.3 (ICAO RF protocol and application test standards for e-Passport – part 2) Strat-Of-Frame and End-Of-Frame timing (type B only)	not applicable
2.5.11	Test Case 7.4 (BSI TR-03105; ePassport Conformity Testing, part2) Extra Guard Time (EGT) (Type B only) Test Case 5.4 (ICAO RF protocol and application test standards for e-Passport – part 2) Extra guard time (type B only)	not applicable

Clause	Tested Characteristic	Verdict
2.5.12	Test Case 7.5 (BSI TR-03105; ePassport Conformity Testing, part2) Timing before PICC SOF (TR0 & TR1) (Type B only) Test Case 5.5 (ICAO RF protocol and application test standards for e-Passport – part 2) Timing before SCIC SOF (TR0 and TR1) (type B only)	not applicable
2.5.13	Test Case 7.6 (BSI TR-03105; ePassport Conformity Testing, part2) Timing before PICC to PCD EOF (TR2) (Type B only) Test Case 5.6 (ICAO RF protocol and application test standards for e-Passport – part 2) Timing after SCIC EOF (subcarrier turn-off time) (type B only) Test Case 5.7 (ICAO RF protocol and application test standards for e-Passport – part 2) Timing after SCIC SOF (TR2) (type B only)	not applicable
2.5.14	Type A Activation	
2.5.14.1	Test Case 8.1.1 (BSI TR-03105; ePassport Conformity Testing, part2) Handling of Type A Anticollison Test Case 6.1.2 (ICAO RF protocol and application test standards for e-Passport – part 2) Handling of type A anticollison	not selected
2.5.14.2	Test Case 8.1.2 (BSI TR-03105; ePassport Conformity Testing, part2) State Transitions Test Case 6.1.1 (ICAO RF protocol and application test standards for e-Passport – part 2) State transitions	not selected
2.5.14.3	Test Case 8.1.3 (BSI TR-03105; ePassport Conformity Testing, part2) Handling of RATS Test Case 6.1.3 (ICAO RF protocol and application test standards for e-Passport – part 2) Handling of RATS	not selected
2.5.14.4	Test Case 8.1.4 (BSI TR-03105; ePassport Conformity Testing, part2) Handling of PPS Test Case 6.1.4 (ICAO RF protocol and application test standards for e-Passport – part 2) Handling of PPS	not selected
2.5.14.5	Test Case 8.1.5 (BSI TR-03105; ePassport Conformity Testing, part2) Handling of FSD optional test case Test Case 6.1.5 (ICAO RF protocol and application test standards for e-Passport – part 2) Handling of FSD	not selected
2.5.15	Type B Activation	
2.5.15.1	Test Case 8.2.1 (BSI TR-03105; ePassport Conformity Testing, part2) PICC Reception	not applicable
2.5.15.2	Test Case 8.2.2 (BSI TR-03105; ePassport Conformity Testing, part2) State Transitions Test Case 6.2.1 (ICAO RF protocol and application test standards for e-Passport – part 2) State transitions	not applicable
2.5.15.3	Test Case 8.2.3 (BSI TR-03105; ePassport Conformity Testing, part2) Handling of Type B Anticollison Test Case 6.2.2 (ICAO RF protocol and application test standards for e-Passport – part 2) Handling of type B anticollison	not applicable
2.5.15.4	Test Case 8.2.4 (BSI TR-03105; ePassport Conformity Testing, part2) Handling of ATTRIB Test Case 6.2.3 (ICAO RF protocol and application test standards for e-Passport – part 2) Handling of ATTRIB	not applicable

Clause	Tested Characteristic	Verdict
2.5.15.5	Test Case 8.2.5 (BSI TR-03105; ePassport Conformity Testing, part2) Handling of Maximum Frame Size optional test case Test Case 6.2.4 (ICAO RF protocol and application test standards for e-Passport – part 2) Handling of maximum frame size	not applicable
2.5.16	Data Exchange Protocol Tests (Type A and B)	
2.5.16.1	Test Case 8.3.1 (BSI TR-03105; ePassport Conformity Testing, part2) Exchange of I-Blocks Test Case 6.3.1 (ICAO RF protocol and application test standards for e-Passport – part 2) Exchange of I-blocks	not selected
2.5.16.2	Test Case 8.3.2 (BSI TR-03105; ePassport Conformity Testing, part2) Chaining of I-Blocks Test Case 6.3.2 (ICAO RF protocol and application test standards for e-Passport – part 2) Chaining of I-blocks	not selected
2.5.16.3	Test Case 8.3.3 (BSI TR-03105; ePassport Conformity Testing, part2) DESELECT Test Case 6.3.3 (ICAO RF protocol and application test standards for e-Passport – part 2) DESELECT	not selected
2.5.16.4	Test Case 8.3.4 (BSI TR-03105; ePassport Conformity Testing, part2) Request for Waiting Time Extension optional test case Test Case 6.3.4 (ICAO RF protocol and application test standards for e-Passport – part 2) Request for waiting time extension optional test case	not applicable
2.5.16.5	Test Case 8.3.5 (BSI TR-03105; ePassport Conformity Testing, part2) PICC Reaction on CID Test Case 6.3.6 (ICAO RF protocol and application test standards for e-Passport – part 2) SCIC reaction on CID	not selected
2.5.16.6	Test Case 8.3.6 (BSI TR-03105; ePassport Conformity Testing, part2) PICC Reaction on NAD optional test case	not selected
2.5.16.7	Test Case 8.3.7 (BSI TR-03105; ePassport Conformity Testing, part2) Handling of PICC error detection optional test case Test Case 6.3.5 (ICAO RF protocol and application test standards for e-Passport – part 2) Handling of SCIC error detection optional test case	not selected

2.2 Test Environment

Temperature: + 22 °C,

Relative humidity content: 55 %

Other parameters:

2.3 Measurement and Test set-up

Note: The test configuration is in accordance with the requirements given in the standards in point 1.8.

2.4 Test Equipment utilised

To simplify the identification of the test equipment used on each page of the test report, each item of test equipment and ancillaries such as probes are identified throughout the report by numbers in brackets according to the table below.

No.	Instrument/Ancillary	Source	Inventory ID
1.	ISO 10373-6 Test Apparatus	Arsenal Research	300003401
2.	Modified ISO 10373-6 Test Apparatus	Arsenal Research, modified by CETECOM	300003402
3.	Micropross MP300TCL1	Micropross	300003383
4.	TX/RX-Antenna	Micropross	300003383
5.	Spy-Antenna	Micropross	ISN:TNB198
6.	Calibration Coil	Arsenal Research	300003403
7.	Active Probe LeCroy HFP 100 P6202	LeCroy	300003417
8.	LeCroy Digital Storage Oscilloscope	LeCroy	300003390
9.	RF Amplifier 50 W	Amplifier Research	AR13503
10.	Control PC	Toshiba	300003365
11.	CETECOM Test Software	CETECOM	Version 2.0 beta1
12.	UltraSmart X-Core Series	Smartware	300003608
13.	ISO 14443 Test Software	Soliatis	Version 4.02

2.5 Test results

During the testing of the ePassport the following test cases were performed. With each test case the achieved result is given. The test report does not contain log traces which might have been taken during the performance of the test. However, for reproducibility and clarification these are kept available at CETECOM archive.

2.5.1 Test Case 5.1 (BSI TR-03105; ePassport Conformity Testing, part2) Coil Dimension Check (Type A and B)

Not selected

2.5.2 Test Case 5.2 (BSI TR-03105; ePassport Conformity Testing, part2) Static Electricity (ESD) Test (Type A and B)

Not selected

2.5.3 Test Case 5.5 (BSI TR-03105; ePassport Conformity Testing, part2) Alternating Magnetic Field Test (Type A and B)

Not selected

**2.5.4 Test Case 6.1 (BSI TR-03105; ePassport Conformity Testing, part2)
Load Modulation Amplitude**

The purpose of this test is to determine the sideband levels of the inlay.
Method of measurement and test environment see conditions of ISO / IEC 14443-2.
This test has to be performed for ePassports of both types (A and B).

The sideband levels shall be more than $[mV] = 30/H^{1.2}$. For meeting this limit the measured sideband voltage for the upper and lower sideband must be higher than:

- 18.44 mV at 1.5 A/m
- 4.93 mV at 4.5 A/m
- 3.49 mV at 6.0 A/m
- 2.67 mV at 7.5 A/m

Test Conditions:

Parameters	Date of test	Number of Samples	Passed tests	Failed tests
Field strength 1.5 A/m, 4.5 A/m, 7.5 A/m Temperature RT, -10 °C, 50 °C	2008-05-21	1	1 * 1	0

Test Results:

Sample 1:

Conditions			1.5 A/m	4.5 A/m	7.5 A/m (6 A/m @ 50 °C)	Result
Data rate fc/128	Normal temperature	Lower sideband [mV]	30,15	31,44	27,59	Pass
		Upper sideband [mV]	28,38	28,73	25,45	
Data rate fc/128	High temperature	Lower sideband [mV]				not selected
		Upper sideband [mV]				
Data rate fc/128	Low temperature	Lower sideband [mV]				not selected
		Upper sideband [mV]				

2.5.5 Operating Field strength (Type A and B)

**2.5.5.1 Test Case 6.2 (BSI TR-03105; ePassport Conformity Testing, part2)
Operating Field strength**

Not selected

**2.5.5.2 Test Case 4.2 (ICAO RF protocol and application test standards for
e-Passport – part 2)
Operating Field strength**

The purpose of this test is to check the required performance between 1,5 A/m and 7,5 A/m. The ePassport shall operate as intended over the full range.

This test has to be performed for samples of both types (A and B) but the concrete test procedures differ (see ICAO RF protocol and application test standards for e-Passport – part 2, Section 4.2, for details).

Method of measurement and test environment see conditions of ISO / IEC 14443-2.

The inlay shall operate as intended within 1.5 A/m and 7.5 A/m.

Test Conditions:

Parameters	Date of test	Number of Samples	Passed tests	Failed tests
Field strength 1.5 A/m .. 7.5 A/m Temperature RT, -10 °C, 50 °C	2008-05-21	1	1 * 3	0

Test Results:

Sample 1:

Data rate: fc/128	1.5 A/m, 2.5 A/m, 3.5 A/m, 4.5 A/m, 5.5 A/m, 6.5 A/m, 7.5 A/m (max 6 A/m @ 50°C)	Number of passed tests
Normal temperature	Pass	1
High temperature	not selected	
Low temperature	not selected	

Data rate: fc/64	1.5 A/m, 2.5 A/m, 3.5 A/m, 4.5 A/m, 5.5 A/m, 6.5 A/m, 7.5 A/m (max 6 A/m @ 50°C)	Number of passed tests
Normal temperature	Pass	1
High temperature	not selected	
Low temperature	not selected	

Data rate: fc/32	1.5 A/m, 2.5 A/m, 3.5 A/m, 4.5 A/m, 5.5 A/m, 6.5 A/m, 7.5 A/m (max 6 A/m @ 50°C)	Number of passed tests
Normal temperature	Pass	1
High temperature	not selected	
Low temperature	not selected	

Data rate: fc/16	1.5 A/m, 2.5 A/m, 3.5 A/m, 4.5 A/m, 5.5 A/m, 6.5 A/m, 7.5 A/m (max 6 A/m @ 50°C)	Number of passed tests
Normal temperature	not applicable	
High temperature	not applicable	
Low temperature	not applicable	

Note: The DUT does not support fc/16.

2.5.6 Communication Stability (Type A and B)

2.5.6.1 Test Case 6.3 (BSI TR-03105; ePassport Conformity Testing, part2) Communication Stability

Not selected

2.5.6.2 Test Case 4.3 (ICAO RF protocol and application test standards for e-Passport – part 2) Communication stability test

The purpose of this test is to determine the communication stability versus field strength and rise and fall time. Method of measurement and test environment see conditions of ISO / IEC 14443-2. The inlay shall operate as intended within 1.5 A/m and 7.5 A/m.

This test has to be performed for samples of both types (A and B) but the concrete test procedures differ (see ICAO RF protocol and application test standards for e-Passport – part 2, Section 4.3, for details).

Test Conditions:

Parameters	Date of test	Number of Samples	Passed tests	Failed tests
Field strength 1.5 A/m, 4.5 A/m, 7.5 A/m Temperature RT, -10 °C, 50 °C	2008-05-21	1	1 * 18	0

Test results:

Sample 1:

Data rate: fc/128		1.5 A/m	4.5 A/m	7.5 A/m (6 A/m @ 50°C)	Number of passed tests
Normal temperature	Cond 1, 3, 5	Pass	Pass	Pass	3
	Cond 2, 4, 6	Pass	Pass	Pass	3
High temperature	Cond 1, 3, 5	n.sel.	n.sel.	n.sel.	
	Cond 2, 4, 6	n.sel.	n.sel.	n.sel.	
Low temperature	Cond 1, 3, 5	n.sel.	n.sel.	n.sel.	
	Cond 2, 4, 6	n.sel.	n.sel.	n.sel.	

Data rate: fc/64		1.5 A/m	4.5 A/m	7.5 A/m (6 A/m @ 50°C)	Number of passed tests
Normal temperature	Cond 1, 3, 5	Pass	Pass	Pass	3
	Cond 2, 4, 6	Pass	Pass	Pass	3
High temperature	Cond 1, 3, 5	n.sel.	n.sel.	n.sel.	
	Cond 2, 4, 6	n.sel.	n.sel.	n.sel.	
Low temperature	Cond 1, 3, 5	n.sel.	n.sel.	n.sel.	
	Cond 2, 4, 6	n.sel.	n.sel.	n.sel.	

Data rate: fc/32		1.5 A/m	4.5 A/m	7.5 A/m (6 A/m @ 50°C)	Number of passed tests
Normal temperature	Cond 1, 3, 5	Pass	Pass	Pass	3
	Cond 2, 4, 6	Pass	Pass	Pass	3
High temperature	Cond 1, 3, 5	n.sel.	n.sel.	n.sel.	
	Cond 2, 4, 6	n.sel.	n.sel.	n.sel.	
Low temperature	Cond 1, 3, 5	n.sel.	n.sel.	n.sel.	
	Cond 2, 4, 6	n.sel.	n.sel.	n.sel.	

Data rate: fc/16		1.5 A/m	4.5 A/m	7.5 A/m (6 A/m @ 50°C)	Number of passed tests
Normal temperature	Cond 1, 3, 5	n.a.	n.a.	n.a.	
	Cond 2, 4, 6	n.a.	n.a.	n.a.	
High temperature	Cond 1, 3, 5	n.a.	n.a.	n.a.	
	Cond 2, 4, 6	n.a.	n.a.	n.a.	
Low temperature	Cond 1, 3, 5	n.a.	n.a.	n.a.	
	Cond 2, 4, 6	n.a.	n.a.	n.a.	

Note: The DUT does not support fc/16.

**2.5.7 Test Case 6.4 (BSI TR-03105; ePassport Conformity Testing, part2)
Threshold resonance frequency (Type A and B).**

Not selected

**2.5.8 Test Case 7.1 (BSI TR-03105; ePassport Conformity Testing, part2)
Start-Up time**

Not selected

**2.5.9 Test Case 7.2 (BSI TR-03105; ePassport Conformity Testing, part2)
Frame Delay Time (Type A only)**

Not selected

**2.5.10 Test Case 7.3 (BSI TR-03105; ePassport Conformity Testing, part2)
Start-of-Frame & End-of-Frame-Timing (Type B only)**

Not applicable

**2.5.11 Test Case 7.4 (BSI TR-03105; ePassport Conformity Testing, part2)
Extra Guard Time (EGT) (Type B only)**

Not applicable

**2.5.12 Test Case 7.5 (BSI TR-03105; ePassport Conformity Testing, part2)
Timing before PICC SOF (TR0 & TR1) (Type B only)**

Not applicable

**2.5.13 Test Case 7.6 (BSI TR-03105; ePassport Conformity Testing, part2)
Timing before PICC to PCD EOF (TR2) (Type B only)**

Not applicable

**2.5.14 Test Case 8.1 (BSI TR-03105; ePassport Conformity Testing, part2)
Type A Activation**

Not selected

**2.5.15 Test Case 8.2 (BSI TR-03105; ePassport Conformity Testing, part2)
Type B Activation**

Not applicable

**2.5.16 Test Case 8.3 (BSI TR-03105; ePassport Conformity Testing, part2)
Data Exchange Protocol Tests (Type A and B)**

Not selected

3 Observations

No observations other than reported in the test case sections have been made during the performance of the tests.