

DRAFT INTERNATIONAL STANDARD

ISO/IEC DIS 18745-2.2

ISO/IEC JTC 1/SC 17

Secretariat: BSI

Voting begins on:
2015-11-06

Voting terminates on:
2016-01-06

Test methods for machine readable travel documents (MRTD) and associated readers —

Part 2:

Test methods for the contactless interface

Méthodes d'essai pour les documents de voyage lisibles par machine (MRTD) —

Partie 2: Méthodes d'essai de l'interface sans contact

ICS: 35.240.15

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 18745-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

ISO/IEC 18745 consists of the following parts, under the general title *Test methods for machine readable travel documents (MRTD) and associated readers*:

- *Part 1: Physical Test Methods for Passport Books (durability)*
- *Part 2: Test methods for the contactless interface*
The test methods dates back on the test methods of e-passports, which was deliberated as ISO/IEC 10373-6:2001/Amd.7:2010.
- *Part 3: LDS and security protocols*

Introduction

ISO/IEC 18745-2 defines the test plan regarding contactless interface for eMRTDs and eMRTD associated readers compliant to ICAO Doc 9303 .

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Test methods for machine readable travel documents (MRTD) and associated readers — Part 2: Test methods for the contactless interface

1 Scope

ISO/IEC 18745-2 defines the test plan, based on ISO/IEC 10373-6, for the contactless interface of eMRTDs and eMRTD associated readers compliant with ICAO Doc 9303 .

Application requirements for eMRTD and eMRTD reader are outside of the scope of this standard.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 10373-6:2015, Identification cards — Test methods — Part 6: Proximity cards

ISO/IEC 14443-1:2015, Identification cards — Contactless integrated circuit cards — Proximity cards — Part 1: Physical characteristics

ISO/IEC 14443-2:2015, Identification cards — Contactless integrated circuit cards — Proximity cards — Part 2: Radio frequency power and signal interface

ISO/IEC 14443-3:2015, Identification cards — Contactless integrated circuit cards — Proximity cards — Part 3: Initialization and anticollision

ISO/IEC 14443-4:2015, Identification cards — Contactless integrated circuit cards — Proximity cards — Part 4: Transmission protocol

ISO/IEC 7816-4:2013, Identification cards — Integrated circuit cards — Part 4: Organization, security and commands for interchange

ISO/IEC 7810:2003/Amd1:2009, Identification cards — Physical characteristics — Criteria for cards containing integrated circuits

ICAO Doc 9303 Machine Readable Travel Documents — Seventh Edition, 2015

Technical Guideline TR-03110-1 “Advanced Security Mechanisms for Machine Readable Travel Documents - Part 1: eMRTDs with BAC/PACEv2 and EACv1”, Version 2.10, March 2012

(https://www.bsi.bund.de/SharedDocs/Downloads/EN/BSI/Publications/TechGuidelines/TR03110/TR-03110_v2.1_P1pdf.pdf)

TECHNICAL REPORT "Supplemental Access Control for Machine Readable Travel Documents" Version - 1.01 Date – November 11, 2010

(<http://www.icao.int/Security/mrtd/Downloads/Technical%20Reports/Technical%20Report.pdf>)

If ISO/IEC 10373 or ISO/IEC 14443 series are referred, read with replacing PICC with eMRTD and PCD with eMRTD associated reader

3 Terms and definition

For the purposes of this document, the following terms and definitions apply.

3.1 test method

method for testing the characteristics of eMRTDs and eMRTD associated readers for the purpose of assessing their conformance with International Standards

3.2 sample

a sample is one piece of the total number of eMRTDs or eMRTD associated readers required and presented for testing according to this specification

3.3 room temperature

room temperature is defined as any convenient temperature within the range of $23\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ ($73\text{ }^{\circ}\text{F} \pm 5\text{ }^{\circ}\text{F}$)

3.4 intended operation

operation as defined in ISO/IEC 14443-1 3.4

4 Symbols and abbreviated terms

For the purposes of this document, the following abbreviations apply:

AA	Active Authentication
BAC	Basic Access Control
CVCA	Country Verifying Certification Authority
DV	Document Verifier
EAC	Extended Access Control Throughout this document, the term EAC refers to EAC v1
IS	Inspection System
LDS	Logical Data Structure
PACE	Password Authenticated Connection Establishment Throughout this document, the term PACE refers to PACE v2
DUT	Device Under Test
H_{\min}	Minimum field strength as defined in ISO/IEC 14443-2
H_{\max}	Maximum field strength as defined in ISO/IEC 14443-2
eMRTD	Electronic Machine Readable Travel Document
'XY'	Hexadecimal notation, equal to XY in base 16

5 Test methods for eMRTD

5.1 General test conditions

The test methods defined in clause 5 are in line with the test methods defined in ISO/IEC 10373-6:2001/Amd.7:2010, but updated in accordance with the 3rd Edition of ISO/IEC 10373-6.

Test conditions and procedures in this clause are based on ISO/IEC 10373-6:2015 taking into account specific needs of eMRTD application.

The clause 7 addresses only requirements introduced by amendments on the 2nd edition of ISO/IEC 10373-6 published after 2011 and integrated in the 3rd edition of ISO/IEC 10373-6:

- ISO/IEC 10373-6:2011/Amd.1:2012, Identification cards — Test methods — Part 6: Proximity cards, AMENDMENT 1: Additional PICC classes
- ISO/IEC 10373-6:2011/Amd.2:2012, Identification cards — Test methods — Part 6: Proximity cards, AMENDMENT 2: Test methods for electromagnetic disturbance
- ISO/IEC 10373-6:2011/Amd.3:2012, Identification cards — Test methods — Part 6: Proximity cards, AMENDMENT 3: Exchange of additional parameters, block numbering, unmatched AFI and TR2
- ISO/IEC 10373-6:2011/Amd.4:2012, Identification cards — Test methods — Part 6: Proximity cards, AMENDMENT 4: Bit rates of $fc/8$, $fc/4$ and $fc/2$ and frame size from 512 to 4096 bytes
- ISO/IEC 10373-6:2011/Amd.5:2015, Identification cards — Test methods — Part 6: Proximity cards, AMENDMENT 5: Bit rates of $3fc/4$, fc , $3fc/2$, $2fc$ from PCD to PICC¹
- ISO/IEC 10373-6:2011/Amd.6:2015, Identification cards — Test methods — Part 6: Proximity cards, AMENDMENT 6: Alternating between PICC and PCD functionalities¹
- ISO/IEC 10373-6:2011/Amd.7:2015, Identification cards — Test methods — Part 6: Proximity cards, AMENDMENT 7: Frame with error correction¹

The following subclauses specify the different test setups, the values used for the tests, and a recommendation for the format of the test report.

Depending on the implementation statement of the applicant, Type A or Type B tests shall be performed.

For tests of ISO/IEC 14443-1 and ISO/IEC 14443-2 parameters, the minimum number of samples provided for testing is three, unless explicitly defined otherwise. The applicant may request that a larger number of samples are tested. The samples provided by the applicant should be personalized and marked each with a unique serial number. Serial numbers shall be reported in the test report.

It's not mandatory to use the same samples to run all the tests defined in this standard. For example, an applicant can provide:

- 3 samples for static electricity test,
- 3 samples for alternating magnetic field test
- 3 samples for ISO/IEC 14443-2 parameters
- 1 sample for ISO/IEC 14443-3 and ISO/IEC 14443-4 parameters

¹ Not published but integrated in the 3rd revision of ISO/IEC 10373-6

5.1.1 Test setup

The Test PCD assembly that is defined in ISO/IEC 10373-6 is the basis for the physical and electrical tests. The matching network defined in ISO/IEC 10373-6:2015, A.2.2 is used together with the Test PCD assembly.

The Test PCD assembly shall be adapted to carry an eMRTD with the additional ability to center an ID-1 sized antenna of an eMRTD in the Test PCD assembly.

NOTE Some of the following tests are assuming an antenna size within ID-1 outline. If antenna is greater than ID-1 size, those tests might not generate accurate results.

5.1.2 Values unless otherwise specified

The values defined in Table 1 are typical values for communication parameters.

Unless otherwise specified, the following environmental parameters and values defined in Table 1 shall be used.

Table 1 — Values unless otherwise specified

Parameter	Value	To be applied to
Parameters applicable for all bit rates		
Environment temperature	room temperature	Type A and Type B
Relative humidity	25 % to 75 % ^a	Type A and Type B
Start Of Frame timing (SOF)	10 etu "0" followed by 2 etu "1"	Type B
End Of Frame timing (EOF)	10 etu "0"	Type B
Extra Guard Time (EGT)	0 etu	Type B
Maximum Frame Size Code in ATTRIB	8	Type B
FSDI	8	Type A
Parameters applicable for eMRTD reader to eMRTD bit rate $fc/128$		
Modulation	100 %	Type A
t_1	$40/fc$	Type A
t_2	$7/fc$	Type A
t_3	$12/fc$	Type A
t_4	$6/fc$	Type A
Overshoot	0 %	Type A and Type B
Modulation index m	12 %	Type B
Rise time t_r , fall time t_f	$12/fc$	Type B
Parameters applicable for eMRTD reader to eMRTD bit rate $fc/64$		
a	0,1	Type A
t_1	$18/fc$	Type A
t_5	$15/fc$	Type A
t_6	$9/fc$	Type A
Overshoot	0 %	Type A and Type B
Modulation index m	12 %	Type B

Parameter	Value	To be applied to
Rise time t_r , fall time t_f	$10/fc$	Type B
Parameters applicable for eMRTD reader to eMRTD bit rate $fc/32$		
a	0,2	Type A
t_1	$9/fc$	Type A
t_5	$7/fc$	Type A
t_6	$8/fc$	Type A
Overshoot	0 %	Type A and Type B
Modulation index m	12 %	Type B
Rise time t_r , fall time t_f	$8/fc$	Type B
Parameters applicable for eMRTD reader to eMRTD bit rate $fc/16$		
a	0,4	Type A
t_1	$5/fc$	Type A
t_5	$4/fc$	Type A
t_6	$5/fc$	Type A
Overshoot	0 %	Type A and Type B
Modulation index m	12 %	Type B
Rise time t_r , fall time t_f	$6/fc$	Type B
^a Any convenient relative humidity within the specified range.		

5.1.3 Test report

The test report shall include the number of successful evaluations versus the total number of evaluations for each sample and for each test. A description of each test, the information whether the result was a pass or a fail, and the date of the tests shall be included.

For all functionality check tests, the report shall state what tools and methods have been used to verify the functionality of the eMRTD.

5.1.4 Applicant declaration

In order to set up the tests properly, the applicant shall provide the information specified in Table 2.

Table 2 — Applicant information on eMRTD product

Product Characteristic	Standard Reference	Applicant Declaration
Physical Size of Product ^a	ICAO Doc 9303	ID-1: YES/NO
Location of antenna within eMRTD	ICAO Doc 9303-10	
Claimed PICC class ^b	ISO/IEC 14443-1:2015 ISO/IEC 14443-2:2015 ICAO Doc 9303-10	PICC Class 1 or 2 or 3 or 4 or 5 or 6
(Optional) shielding of eMRTD	ICAO Doc 9303-10	YES/NO If yes, precise where shielding is applied
(Optional) eMRTD resonance frequency	ICAO doc 9303-10	Minimum and maximum resonance

ISO/IEC FCD 18745-2.2

range		frequency in MHz
Modulation type	ISO/IEC 14443-2:2015 ISO/IEC 14443-3:2015 ISO/IEC 14443-4:2015	Type A / Type B
Random or fixed UID (Type A) or PUPI (Type B)	ISO/IEC14443-3:2015	Indicate if the UID (Type A) or PUPI (Type B) is random or fixed
(Optional) eMRTD reader to eMRTD supported bit rates	ISO/IEC14443-2:2015 ISO/IEC 14443-3:2015 ISO/IEC 14443-4:2015	List of supported optional eMRTD reader to eMRTD bit rates
(Optional) eMRTD to eMRTD reader supported bit rates		List of supported optional eMRTD to eMRTD reader bit rates
(Optional) support of exchange of additional parameters	ISO/IEC 14443-4:2015	YES/NO
Maximum frame size supported	ISO/IEC 14443-3: 2015 ISO/IEC 14443-4:2015	Declare the maximum frame size integer in reception supported by the eMRTD
(Optional) Frames with error corrections supported	ISO/IEC 14443-3:2015	YES/NO
(Optional) support of NAD and CID	ISO/IEC 14443-3:2015	NAD: YES/NO CID: YES/NO
Command requesting S(WTX)	ISO/IEC 14443-4:2015	Provide a command needing more than FWT time for execution. If the eMRTD does not support any command needing more than FWT time for execution, the scenarios using this command are not applicable.
Access control applied ^c	ICAO Doc 9303 -11	BAC: YES/NO EAC: YES/NO PACE: YES/NO
Active Authentication ^d	ICAO Doc 9303-11	YES/NO
(Optional) Extended Length APDU supported	ISO/IEC 7816-4:2013	YES/NO
<p>^a If eMRTD size is ID-2 or ID-3, select NO.</p> <p>^b If no PICC Class is claimed, PICC Class 1 is used in the test methods</p> <p>^c Information required to perform authentication will be provided by the applicant (Machine Readable Zone (MRZ) /Card Access Number (CAN), EAC certificates chain with IS private key, static/dynamic binding). If no access control is selected by the applicant, eMRTD supports plaintext access.</p> <p>^d Information required to perform Active Authentication will be provided by the applicant (Extended Length).</p>		