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## **Identification cards — Test methods — Part 6: Proximity cards**

### **AMENDMENT 6**

Alternating between PICC and PCD functionalities

*Cartes d'identification — Méthodes d'essai — Partie 6: Cartes de proximité*

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### *AMENDMENT 6*

*Alternance entre fonctionnalités PICC et PCD*

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Amendment 6 to ISO/IEC 10373-6:2011 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.



## Identification cards — Test methods — Part 6: Proximity cards

### Amendment 6: Alternating between PICC and PCD functionalities

*Page 1, Clause 1*

Replace first sentence of last paragraph with:

"This part of ISO/IEC 10373 defines test methods which are specific to proximity cards and objects, proximity coupling devices and proximity extended devices, defined in ISO/IEC 14443-1:2008, ISO/IEC 14443-2:2010, ISO/IEC 14443-3:2011 and ISO/IEC 14443-4:2008."

*Page 14, Clause 6*

Add new subclause 6.3 at the end of Clause 6:

"

#### **6.3 PXD tests**

PCD and PICC tests shall be applied as follows:

- when the PXD is in PCD mode, tests defined in 6.1 shall be applied;
- when the PXD is in PICC mode, tests defined in 6.2 shall be applied.

NOTE In automatic mode alternation the PXD may be forced into the required mode.

"

*Page 22, Clause 7*

Add new subclause 7.3 at the end of Clause 7:

"

#### **7.3 PXD tests**

PCD and PICC tests shall be applied as follows:

- when the PXD is in PCD mode, tests defined in 7.1 shall be applied;
- when the PXD is in PICC mode, tests defined in 7.2 shall be applied.

NOTE In automatic mode alternation the PXD may be forced into the required mode.

"

Page 22, Clause 8

Add new subclause 8.3 at the end of Clause 8:

"

### **8.3 PXD tests**

#### **8.3.1 PCD and PICC modes**

PCD and PICC tests shall be applied as follows:

- when the PXD is in PCD mode, tests defined in 8.1 shall be applied;
- when the PXD is in PICC mode, tests defined in 8.2 shall be applied.

NOTE In automatic mode alternation the PXD may be forced into the required mode.

#### **8.3.2 Automatic mode alternation**

The tests defined in this subclause apply only to PXD supporting automatic mode alternation.

One cycle is defined as the duration between two consecutive beginnings of PCD mode (RF field on).

##### **8.3.2.1 PCD mode and PICC mode alternation cycle**

###### **8.3.2.1.1 Purpose**

This test checks that:

- each cycle does not last longer than  $t_{cyc}$ ,
- in each cycle, the PICC mode lasts longer than PCD mode,
- the PICC mode duration varies randomly and differs by at least  $t_{diff}$ .

###### **8.3.2.1.2 Test conditions**

The PXD should not be in close proximity to another PXD, PCD or PICC.

###### **8.3.2.1.3 Test procedure**

The RF field of the PXD shall be monitored and evaluated for at least 10 consecutive cycles.

- a) Ensure that the PXD is in automatic mode alternation.
- b) Measure all RF field on and RF field off durations.

###### **8.3.2.1.4 Test Report**

The test result is PASS if all the following conditions are met:

- no cycle lasts more than  $t_{cyc}$ ,
- for each  $t_{cyc}$  the PICC mode duration (RF field off) is longer than the PCD mode duration (RF field on),

- the PICC mode durations vary,
- the minimum and maximum PICC mode durations differ by at least  $t_{diff}$ ,

otherwise the test result is FAIL.

NOTE 1 The appreciation of the randomness of the PICC mode duration may be done with common statistical methods.

NOTE 2 Due to statistical reasons the test result may be FAIL and the test may be repeated.

### 8.3.2.2 PCD mode

#### 8.3.2.2.1 Polling

##### 8.3.2.2.1.1 Purpose

This test checks that the PXD in automatic mode alternation polls for Type A and Type B PICCs as defined in ISO/IEC 14443-3, 5.1 in each cycle of PCD mode.

##### 8.3.2.2.1.2 Test conditions

The PXD should not be in close proximity to another PXD, PCD or PICC.

##### 8.3.2.2.1.3 Test procedure

All modulations during PCD mode shall be monitored, and the timings between the Request commands shall be measured for at least 10 consecutive cycles.

- a) Ensure that the PXD is in automatic alternation mode.
- b) Monitor all Request commands during PCD mode.
- c) Measure timings before and between each command.

##### 8.3.2.2.1.4 Test Report

The test result is PASS if all the following conditions are met in each cycle:

- at least one REQA/WUPA command is sent by the PXD,
- at least one REQB/WUPB command is sent by the PXD,
- the duration of unmodulated field before at least one of the REQA/WUPA commands is more than 5 ms,
- the duration of unmodulated field before at least one of the REQB/WUPB commands is more than 5 ms,

otherwise the test result is FAIL.

#### 8.3.2.2.2 End of PCD mode

##### 8.3.2.2.2.1 Purpose

This test checks that the PXD in automatic mode alternation leaves the PCD mode after processing of a PICC, and resumes its automatic mode alternation with the PICC mode first.



**8.3.2.2.2.2 Test conditions**

The PCD-test-apparatus shall be used.

**8.3.2.2.2.3 Test procedure**

Perform the following steps:

- a) Place the PCD-test-apparatus in the operating volume of the PXD.
- b) Send responses to all anticollision commands sent by the PXD until the PCD-test-apparatus is in ACTIVE or PROTOCOL state.
- c) Do not answer any further PXD commands.

**8.3.2.2.2.4 Test Report**

The test result is PASS if the PXD resumes its automatic mode alternation, possibly after application of the error handling or PICC presence check rules, with the PICC mode first, otherwise the test result is FAIL.

**8.3.2.3 PICC mode**

**8.3.2.3.1 Reaction to polling**

**8.3.2.3.1.1 Purpose**

This test checks that the PXD in automatic mode alternation responds to Type A or Type B request commands as defined in ISO/IEC 14443-3, 5.1 in each cycle of PICC mode.

**8.3.2.3.1.2 Test conditions**

The PICC-test-apparatus shall be used to poll for ISO/IEC 14443-3 Type A and Type B PICCs.

**8.3.2.3.1.3 Test procedure 1**

Perform the following steps:

- a) Switch the PICC-test-apparatus RF operating field off.
- b) Place the PXD into the test position of the PICC-test-apparatus and ensure that the PXD is in automatic alternation mode.
- c) Switch the PICC-test-apparatus RF operating field on while the PXD RF field is on.
- d) Send a REQA command 5 ms after the start of PICC mode (PXD RF field off).
- e) Send a REQB command 5 ms after the end the REQA command.
- f) Record the presence and the content of the PXD response.

**8.3.2.3.1.4 Test procedure 2**

Perform the following steps:

- a) Switch the PICC-test-apparatus RF operating field off.

- b) Place the PXD into the test position of the PICC-test-apparatus and ensure that the PXD is in automatic alternation mode.
- c) Switch the PICC-test-apparatus RF operating field on while the PXD RF field is on.
- d) Send a REQB command 5 ms after the start of PICC mode (PXD RF field off).
- e) Send a REQA command 5 ms after the end the REQB command.
- f) Record the presence and the content of the PXD response.

#### **8.3.2.3.1.5 Test Report**

The test result is PASS if the PXD response is either ATQA or ATQB in each of the two test procedures, otherwise the test result is FAIL.

#### **8.3.2.3.2 PICC mode duration and exit conditions**

##### **8.3.2.3.2.1 Purpose**

This test checks that, after reception of a valid REQA/WUPA or REQB/WUPB command, the PXD in automatic mode alternation does not go in PCD Mode before a POWER-OFF state.

##### **8.3.2.3.2.2 Test conditions**

The PICC-test-apparatus shall be used.

##### **8.3.2.3.2.3 Test procedure**

Perform the following steps:

- a) Switch the PICC-test-apparatus RF operating field on.
- b) Place the PXD into the test position of the PICC-test-apparatus and ensure that the PXD is in automatic alternation mode.
- c) Send a REQA when the PXD is in PICC mode (PXD RF field off).
- d) Send a REQB if there is no answer to the REQA.
- e) Keep the PICC-test-apparatus RF field on for more than 2 s.
- f) Continue with anticollision commands to put the PXD in ACTIVE or PROTOCOL state and check the PXD responses.
- g) Send a HALT or S(DESELECT) command to put the PXD in HALT state.
- h) Keep the PICC-test-apparatus RF field on for more than 2 s.
- i) Send a Request command of the Type which was answered in step c) or d) and check there is no PXD response.
- j) Send a WUP command of the Type which was answered in step c) or d) and check there is a PXD response.
- k) Switch the PICC-test-apparatus RF operating field off.
- l) Check that the automatic alternation resumes in less than 1 s by monitoring the PXD RF field.

#### 8.3.2.3.2.4 Test Report

The test result is PASS if all steps of the test procedure succeed, otherwise the test result is FAIL.

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Add new subclause G.5.6:

"

### G.5.6 PICC supporting Type A and Type B

#### G.5.6.1 Purpose

This test checks that, if the PICC supports Type A and Type B, then it stays locked in the type of the first processed request command until POWER-OFF state (after Answer to Request of one type, the other type is disabled until the PICC enters POWER-OFF state).

#### G.5.6.2 Test conditions

The PICC-test-apparatus shall be used.

#### G.5.6.3 Test procedure

Perform the following steps:

- a) Place the PICC into the test position of the PICC-test-apparatus.
- b) Switch the PICC-test-apparatus RF operating field on and wait at least 5 ms.
- c) Send a WUPA and check there is a valid PICC response.
- d) Keep the PICC-test-apparatus RF field on for more than 1 s.
- e) Send a sequence of 10 WUPB and check there is no PICC response.
- f) Switch the RF operating field off for a minimum time for resetting a PICC (see ISO/IEC 14443-3:2010, 5.4).
- g) Switch the PICC-test-apparatus RF operating field on and wait at least 5 ms.
- h) Send a WUPB and check there is a valid PICC response.
- i) Keep the PICC-test-apparatus RF field on for more than 1 s.
- j) Send a sequence of 10 WUPA and check there is no PICC response.

#### G.5.6.4 Test Report

The test result is PASS if all steps of the test procedure succeed, otherwise the test result is FAIL.

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