INTERNATIONAL STANDARD

ISO/IEC 10373-6

First edition
2001-05-15

AMENDMENT 3
2006-10-01

Identification cards — Test methods —

Part 6:
Proximity cards

AMENDMENT 3: Protocol test methods for proximity coupling devices

Cartes d'identification — Méthodes d'essai —

Partie 6: Cartes de proximité

AMENDEMENT 3: Méthodes d'essai du protocole pour dispositifs de couplage de proximité

Reference number
ISO/IEC 10373-6:2001/Amd.3:2006(E)

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Contents

Page

Foreword ... iv

Annex H (normative) **Additional PCD test methods** ... 2
H.1 PCD-test-apparatus and accessories ... 2
H.1.1 Test method ... 2
H.1.2 PCD-test-apparatus structure ... 2
H.1.3 PCD-test-apparatus interface ... 3
H.1.4 Emulating the I/O protocol ... 3
H.1.5 Generating the I/O character timing in transmission mode ... 4
H.1.6 Measuring and monitoring the RF I/O protocol ... 4
H.1.7 Protocol Analysis ... 4
H.1.8 Protocol activation procedure ... 4
H.1.9 Test scenario ... 5
H.1.10 UT, LT and PCD behaviour ... 5
H.1.11 Relationship of test methods versus base standard requirement ... 6
H.2 Type A specific test methods ... 7
H.2.1 Frame delay time PICC to PCD ... 7
H.2.2 Request Guard Time ... 7
H.2.3 Handling of bit collision during ATQA ... 8
H.2.4 Handling of anticollision loop ... 9
H.2.5 Handling of RATS and ATS ... 15
H.2.6 Handling of PPS response ... 19
H.2.7 Frame size selection mechanism ... 21
H.2.8 Handling of Start-up Frame Guard Time ... 23
H.2.9 Handling of the CID during activation by the PCD ... 24
H.3 Type B specific test methods ... 26
H.3.1 I/O transmission timing ... 26
H.3.2 Frame size selection mechanism ... 26
H.3.3 Handling of the CID during activation by the PCD ... 28
H.4 Test method for logical operations of the PCD ... 30
H.4.1 Handling of the polling loop ... 30
H.4.2 Reaction of the PCD to request for waiting time extension ... 31
H.4.3 Error detection and recovery of a transmission error ... 34
H.4.4 Handling of NAD during chaining ... 48
H.5 Continuous monitoring of packets sent by the PCD ... 49
H.5.1 RFU fields ... 49
H.5.2 RFU values ... 49
H.5.3 R-Block ... 49
H.5.4 S-Block ... 49
H.5.5 PCB ... 49
H.5.6 Short Frame ... 50
H.5.7 Apparatus ... 50
H.5.8 Procedure ... 50
H.5.9 Test report ... 50
H.6 Reported results ... 51

Bibliography ... 55

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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.

Amendment 3 to ISO/IEC 10373-6:2001 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

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Identification cards — Test methods —

Part 6:
Proximity cards

AMENDMENT 3: Protocol test methods for proximity coupling devices

Page 2, Subclause 3.2

Add the following abbreviations and symbols:

CRC	Cyclic Redundancy Check
CRC_A	Cyclic Redundancy Check, as defined for the PICC type A in ISO/IEC 14443-3
CRC_B	Cyclic Redundancy Check, as defined for the PICC type B in ISO/IEC 14443-3
IUT	Implementation Under Test (ISO/IEC 9646), within the scope of this document IUT represents the PCD under the test
LT	Lower Tester (ISO/IEC 9646), the PICC-emulation part of the PCD-test-apparatus
Mute	No response within a specified timeout
Test Scenario	A defined typical protocol and application-specific communication to be used with the test methods defined in this document
TB-PDU	Transmission Block Protocol Data Unit, which consists of either I-block, R-block or S-Block
TM-PDU	Test Management Protocol Data Unit (ISO/IEC 9646-1, PDU)
SELECT(I)	Select cascade level I command where I is equal to 1, 2 or 3
SAK(cascade)	The SELECT(I) answer with the cascade bit (bit 3) set to 1
SAK(complete)	The SELECT(I) answer with the cascade bit (bit 3) set to 0
BCC	The one byte block checksum as described in ISO/IEC 14443-3
UID	Unique Identifier, Type A
uid*n*	Byte number *n* of Unique Identifier, $n \geq 0$
UT	Upper Tester (ISO/IEC 9646), the master part of the PCD-test-apparatus
UT-APDU	Upper Tester Application Protocol Data Unit: a packet of data to be sent by the PCD to the LT through the RF interface

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Add the following annex after Annex G:

Annex H
(normative)

Additional PCD test methods

H.1 PCD-test-apparatus and accessories

This clause defines the PCD-test-apparatus and test circuits for verifying the operation of the PCD according to ISO/IEC 14443-3:2001 and ISO/IEC 14443-4:2001.

H.1.1 Test method

The ISO/IEC 9646 series abstract model is chosen and the local test method is used for the testing of the ISO/IEC 14443 protocol between the tested PCD and the LT.

H.1.2 PCD-test-apparatus structure

The PCD-test-apparatus consists of two parts:

— Upper Tester (can be personal computer with a host interface suitable for a tested PCD)

— Lower Tester (LT)

Tested PCD is treated as Implementation Under Test (IUT).

When a PCD is embedded in a product, it includes the UT. For this case some tests may not be applicable. Also, in case the standard does not have a specific requirement the test method will end up in a report of capabilities only.

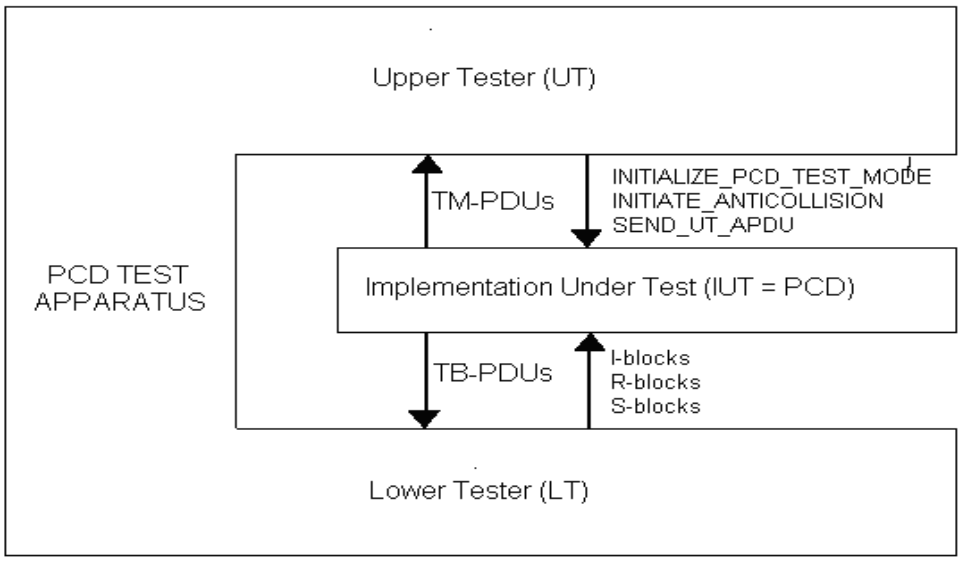

Figure H.1 — Conceptual tester architecture

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The LT part of the PCD-test-apparatus includes:

— A PICC emulation hardware and software device capable of emulating of type A and type B protocols.

— Digital sampling oscilloscope (see ISO/IEC 10373-6:2001, 6.4)

H.1.3 PCD-test-apparatus interface

The UT and the IUT communicate with the TM-PDU (Test Management PDU). The definition of TM-PDUs is product dependant and provided by the IUT manufacturer.

	TM-PDU name	Required IUT action
1	INITIALIZE_PCD_TEST_MODE	Return to Power On state (The IUT is expected to enter to anticollision loop). The IUT returns the result code of its action to the UT.
2	INITIATE_ANTICOLLISION	Initiate anticollision sequence arriving at the ACTIVE state when a PICC is found (if the IUT starts the anticollision sequence automatically upon initialize, the sequence can be empty). The IUT returns the result code of its action to the UT.
3	SEND_UT_APDU	Transmit the UT_APDU through the RF interface to LT and return the IUT result code of its action to the UT. The response from the IUT shall include the answer of LT to the sent UT_APDU.

Figure H.2 — Logical interface commands

The PCD-test-apparatus shall be able to initialize the IUT utility information provided by the IUT manufacturer over the UT interface and to configure itself to perform the necessary procedures, protocols and analysis over its LT interface.

H.1.4 Emulating the I/O protocol

The PCD-test-apparatus at its LT interface shall be able to emulate the protocol type A and type B and PICC applications, which are required to run the Test Scenario. The LT shall be able to break the transmitted packets into chained blocks with the required length.

It shall be possible to configure the LT to simulate different options:

— NAD and CID configuration;

— Frame size, bit rates and any other parameter as required for the implementation of the test methods.

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H.1.5 Generating the I/O character timing in transmission mode

The PCD-test-apparatus at its LT interface shall be able to generate the I/O bit stream according to ISO/IEC 14443-3:2001. Timing parameters: start bit duration, extra guard time (type B only), bit duration, frame delay time, start of frame width, end of frame width shall be configurable. For the purpose of tests of type A, the LT shall be capable of simulating a bit collision at a selected bit position(s).

H.1.6 Measuring and monitoring the RF I/O protocol

The PCD-test-apparatus at its LT interface shall be able to measure and monitor the timing of the logical low and high states transmitted by the PCD.

H.1.7 Protocol Analysis

The PCD-test-apparatus shall be able to analyze the I/O-bit stream at its LT interface in accordance with protocol type A and type B as specified in ISO/IEC 14443-3:2001 and ISO/IEC 14443-4:2001 and extract the logical data flow for further protocol analysis.

H.1.8 Protocol activation procedure

H.1.8.1 Activation procedure for anticollision test methods

Activate the LT by the following sequence:

a) Configure the LT to emulate the type A or type B protocol.

b) The UT sends INITIALIZE_PCD_TEST_MODE TM-PDU to the PCD.

c) The UT sends INITIATE_ANTICOLLISION TM-PDU to the PCD.

H.1.8.2 Activation procedure for type A protocol test methods

Activate the LT by the following sequence:

a) Configure the LT to emulate the type A protocol.

b) The UT sends INITIALIZE_PCD_TEST_MODE TM-PDU to the PCD.

c) The UT sends INITIATE_ANTICOLLISION TM-PDU to the PCD. The PCD shall apply the anticollision sequence as defined in ISO/IEC 14443-3:2001, Clause 6 (request, anticollision loop and select). The PCD shall apply the protocol activation sequence as defined in ISO/IEC 14443-4:2001, Clause 5.

d) The PCD reports the UT the result of the activation procedure.

H.1.8.3 Activation procedure for type B protocol test methods

Activate the LT by the following sequence:

a) Configure the LT to emulate the type B protocol.

b) The UT sends INITIALIZE_PCD_TEST_MODE TM-PDU to the PCD.

c) The UT sends INITIATE_ANTICOLLISION TM-PDU to the PCD. The PCD shall apply the anticollision sequence as defined in ISO/IEC 14443-3:2001, Clause 7.

d) The PCD reports the UT the result of the activation procedure.

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H.1.9 Test scenario

H.1.9.1 Description

Testing of the IUT as defined in this document requires a Test Scenario to be executed. This Test Scenario is a 'typical protocol and application specific communication', dependent on the protocol and application specific functionality foreseen for the normal use of and implemented in the IUT.

The typical Test Scenario is the set of command TM-PDUs defined in H.1.3.

The Test Scenario shall be defined by the entity carrying out these tests and shall be documented with the test results. The Test Scenario shall encompass a representative subset or preferably, if practical, the full functionality of the IUT expected to be utilized during normal use.

NOTE The testing entity may require information about the implemented protocol and functionality.

The UT-APDU to be sent may be one from the following:

— UT_TEST_COMMAND1, decided by the PCD-test-apparatus, specifies the ISO instruction used as the default instruction for test scenarios not needing PCD chaining. (In case PCD decides anyway to chain, the test scenario should be adapted accordingly by the test laboratory).

— UT_TEST_COMMAND2, decided by the PCD-test-apparatus, specifies the ISO instruction used as the default instruction for test scenarios dealing with PCD chaining.

H.1.9.2 Test scenario example

The typical Test Scenario may be as follows:

```
INITIALIZE_PCD_TEST_MODE
INITIATE_ANTICOLLISION
SEND_UT_APDU (UT_TEST_COMMAND1)
SEND_UT_APDU (UT_TEST_COMMAND2)
….
```

H.1.10 UT, LT and PCD behaviour

The following items summarize the behaviour of the UT, the LT and the PCD:

a) The UT runs the activation procedure as defined in H.1.8.

b) If the activation procedure went wrong, the PCD goes to exception processing. This exception processing may include reporting the error to the UT.

c) In case of anticollision test methods the PCD-test-apparatus ends the test at this point. For protocol test methods the UT continues to the next step.

d) The UT sends the first command UT_APDU to the PCD.

e) The PCD is expected to transfer this command UT_APDU to the LT using TB-PDUs. The PCD splits the current UT-APDU into the appropriate TB-PDUs (I-blocks), sends the first I-block to LT and response block is awaited. The PCD manages communication blocks according to ISO/IEC 14443-4.

f) The command UT_APDU is received by the LT. The LT sends the response UT_APDU to the PCD. The LT manages communication blocks (TB-PDUs) according to ISO/IEC 14443-4 (the LT may use chaining mechanism at any time even if not mandated by either PCD or PICC maximum frame size). The PCD is expected to transfer response UT_APDU, received from the LT, back to the UT.

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g) If the command failed at protocol level (i.e. error detected by the PCD), the PCD goes to exception processing. Exception processing may include error reporting to the UT.

h) If the command succeeded, the PCD reports the UT about successful result. In this case, if the test scenario defines additional UT-APDU to be sent to the LT, the UT sends the next UT-APDU to the PCD. This loop continues until the last test UT-APDU is sent.

H.1.11 Relationship of test methods versus base standard requirement

All tests shall be executed and reported in the corresponding tables.

Table H.1 — Type A specific test methods

Test method from ISO/IEC 10373-6		Corresponding requirement	
Clause	Name	Base standard	Clauses
H.2.1	Frame delay time PICC to PCD	ISO/IEC 14443-3:2001	6.1.3
H.2.2	Request Guard Time	ISO/IEC 14443-3:2001	6.1.4
H.2.3	Handling of bit collision during ATQA	ISO/IEC 14443-3:2001	6.4.2
H.2.4	Handling of anticollision loop	ISO/IEC 14443-3:2001	6.4.3
H.2.5	Handling of RATS and ATS	ISO/IEC 14443-4:2001	5.6.1.1
H.2.6	Handling of PPS response	ISO/IEC 14443-4:2001	5.6.2.1
H.2.7	Frame size selection mechanism	ISO/IEC 14443-4:2001	5.2
H.2.8	Handling of Start-up Frame Guard Time	ISO/IEC 14443-4:2001	5.2.5
H.2.9	Handling of the CID during activation by the PCD	ISO/IEC 14443-4:2001	5.6.3

Table H.2 — Type B specific test methods

Test method from ISO/IEC 10373-6		Corresponding requirement	
Clause	Name	Base standard	Clauses
H.3.1	I/O transmission timing	ISO/IEC 14443-3:2001	7.1
H3.2	Frame size selection mechanism	ISO/IEC 14443-3:2001	7.9
H.3.3	Handling of the CID during activation by the PCD	ISO/IEC 14443-3:2001	7.10

Table H.3 — Test methods for logical operation

Test method from ISO/IEC 10373-6		Corresponding requirement	
Clause	Name	Base standard	Clauses
H.4.1	Handling of the polling loop	ISO/IEC 14443-3:2001	5
H.4.2	Reaction of the PCD to request for waiting time extension	ISO/IEC 14443-4:2001	7.3
H.4.3	Error detection and recovery of a transmission error	ISO/IEC 14443-4:2001	7.5.5
H.4.4	Handling of NAD during chaining	ISO/IEC 14443-4:2001	7.1.1.3

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H.2 Type A specific test methods

H.2.1 Frame delay time PICC to PCD

The purpose of this test is to determine the timing between a PICC frame and the next PCD frame.

H.2.1.1 Apparatus

See H.1.

H.2.1.2 Procedure

Place the LT into the PCD operating volume.

During the following procedure the RF Input/Receive data shall be continuously monitored and verified correct to ISO/IEC 14443-2:2001. All signal transitions (level and timing) as well as the logical content of the communication shall be recorded.

Use the following sequence:

a) The UT performs the activation procedure according to H.1.8.1

b) The LT waits until the PCD sends a valid REQA/WUPA Command frame.

c) The LT answers with a valid ATQA.

d) The LT waits until the PCD sends a valid Anticollision command according to Figure 6 in the ISO/IEC 14443-3:2001.

e) Measure the time between the last modulation transmitted by the LT and the first pause transmitted by the PCD (see ISO/IEC 14443-3:2001, 6.1.3).

H.2.1.3 Test report

Report the signal recording. Fill the item 1 of “Table H.4 — Type A Specific Timing table” with measured value of frame delay time and Table H.6.

H.2.2 Request Guard Time

The purpose of this test is to determine the Request Guard Time of two consecutive REQA/WUPA commands. This test is relevant for PCDs, which send consecutive REQA/WUPA.

H.2.2.1 Apparatus

See H.1.

H.2.2.2 Procedure

Place the LT into the PCD operating volume.

During the following procedure the RF Input/Receive data shall be continuously monitored and verified correct to ISO/IEC 14443-2:2001. All signal transitions (level and timing) as well as the logical content of the communication shall be recorded.

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Use the following sequence:

a) The UT performs the activation procedure according to H.1.8.1.

b) The LT waits until the PCD sends a valid REQA/WUPA Command frame. The LT remains mute.

c) The LT waits until the PCD sends a valid REQA/WUPA Command frame. The LT remains mute.

d) Measure the time between the start bits of two consecutive REQA/WUPA (see ISO/IEC 14443-3:2001, 6.1.4).

H.2.2.3 Test report

Report the signal recording. Fill item 2 in “Table H.4 — Type A Specific Timing table” with measured value of request guard time and in the appropriate row in Table H.6.

H.2.3 Handling of bit collision during ATQA

The purpose of this test is to determine the handling of bit collision during ATQA by the PCD.

H.2.3.1 Apparatus

See H.1.

H.2.3.2 Procedure

Place the LT into the PCD operating volume.

Use the following sequence:

a) The UT performs the activation procedure according to H.1.8.1.

b) The LT waits until the PCD sends a valid REQA/WUPA Command frame).

c) Maintain the LT to answer with ATQA using simulation of the bit collision at bit N (N from 1 up to 16). Collision at a bit causes a collision also in associated parity bit.

d) Record the presence, the content of the PCD response.

H.2.3.3 Expected result

The PCD shall start the bit oriented anticollision algorithm.

H.2.3.4 Test report

Record the presence and the content of the PCD commands.

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Fill the appropriate row in “Table H.6 — Reported Results for type A specific test methods“ according to the test results as follows:

Explanation	Test result
If the PCD starts the bit oriented anticollision loop	Pass
Any other case	Fail

Figure H.3 — Result criteria for Handling of bit collision during ATQA

H.2.4 Handling of anticollision loop

The purpose of this test is to determine the handling of bit anticollision loop according to ISO/IEC 14443-3:2001, 6.4.3.

H.2.4.1 Apparatus

See H.1.

H.2.4.2 Procedure

Place the LT into the PCD operating volume.

H.2.4.2.1 Procedure 1 (single size UID)

Use the following sequence:

a) The UT performs the activation procedure according to H.1.8.1.

b) The LT waits until the PCD sends a valid REQA/WUPA Command frame).

c) The LT answers with ATQA indicating bit frame anticollision and UID size: single (bits b8 and b7 equal (00)b).

d) The PCD shall send ANTICOLLISION Command '93 20' (cascade level 1).

e) The LT answers with UID CL1 ('uid0 uid1 uid2 uid3 BCC').

f) The PCD shall send SELECT Command '93 70 uid0 uid1 uid2 uid3 BCC CRC_A'.

g) The LT answers with SAK (cascade bit is cleared), indicating that UID is complete.

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Scenario H 1 — Handling of anticollision loop for PICC with single size UID (Procedure 1)

Test	PCD		LT	Stage
REQA/WUPA	REQA/WUPA	→		
		←	ATQA (single size UID)	1
ANTICOLLISION Level 1	ANTICOLLISION Command Level 1 ('93 20')	→		
		←	UID CL1 ('uid0 uid1 uid2 uid3 BCC')	2
SELECT	SELECT Command ('93 70 uid0 uid1 uid2 uid3 BCC CRC_A')	→		
		←	SAK(complete)	3

H.2.4.2.1.1 Expected result

The PCD shall operate as described in Scenario H 1.

H.2.4.2.1.2 Test report

Record the presence, the content of the PCD commands.

Fill the appropriate row in “Table H.6 — Reported Results for type A specific test methods“ according to the test results as follows:

Explanation	Test result
If the PCD command sequence is as expected	Pass
Any other case	Fail

Figure H.4 — Result criteria for Handling of anticollision loop Procedure 1 (single size UID)

H.2.4.2.2 Procedure 2 (double size UID)

Use the following sequence:

a) The UT performs the activation procedure according to H.1.8.1.

b) The LT waits until the PCD sends a valid REQA/WUPA Command frame).

c) The LT answers with ATQA indicating bit frame anticollision and UID size: double (bits b8 and b7 equal (01)b).

d) The PCD shall send ANTICOLLISION Command '93 20' (cascade level 1).

e) The LT answers with UID CL1 ('88 uid0 uid1 uid2 BCC').

f) The PCD shall send SELECT Command '93 70 88 uid0 uid1 uid2 BCC CRC_A'.

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g) The LT answers with SAK (cascade bit is set).

h) The PCD shall increase the cascade level and shall send ANTICOLLISION Command '95 20' (cascade level 2).

i) The LT answers with UID CL2 ('uid3 uid4 uid5 uid6 BCC').

j) The PCD shall send SELECT Command '95 70 uid3 uid4 uid5 uid6 BCC CRC_A'.

k) The LT answers with SAK (cascade bit is cleared), indicating that UID is complete.

Scenario H 2 — Handling of anticollision loop for PICC with double size UID (Procedure 2)

Test	PCD		LT	Stage
REQA/WUPA	REQA/WUPA	→		
		←	ATQA (double size UID)	1
ANTICOLLISION Level 1	ANTICOLLISION Command Level 1 ('93 20')	→		
		←	UID CL1 ('88 uid0 uid1 uid2 BCC')	2
SELECT	SELECT Command ('93 70 88 uid0 uid1 uid2 BCC CRC_A')	→		
		←	SAK(cascade)	3
ANTICOLLISION Level 2	ANTICOLLISION Command Level 2 ('95 20')	→		
		←	UID CL2 ('uid3 uid4 uid5 uid6 BCC')	4
SELECT	SELECT Command ('95 70 uid3 uid4 uid5 uid6 BCC CRC_A')	→		
		←	SAK(complete)	5

H.2.4.2.2.1 Expected result

The PCD shall operate as described in Scenario H 2.

H.2.4.2.2.2 Test report

Record the presence, the content of the PCD commands.

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Fill the appropriate row in “Table H.6 — Reported Results for type A specific test methods“ according to the test results as follows:

Explanation	Test result
If the PCD command sequence is as expected	Pass
Any other case	Fail

Figure H.5 — Result criteria for Handling of anticollision loop Procedure 2 (double size UID)

H.2.4.2.3 Procedure 3 (triple size UID)

Use the following sequence:

a) The UT performs the activation procedure according to H.1.8.1.

b) The LT waits until the PCD sends a valid REQA/WUPA Command frame).

c) The LT answers with ATQA indicating bit frame anticollision and UID size: triple (bits b8 and b7 equal (10)b).

d) The PCD shall send ANTICOLLISION Command '93 20' (cascade level 1).

e) The LT answers with UID CL1 ('88 uid0 uid1 uid2 BCC').

f) The PCD shall send SELECT Command '93 70 88 uid0 uid1 uid2 BCC CRC_A'.

g) The LT answers with SAK (cascade bit is set).

h) The PCD shall increase the cascade level and shall send ANTICOLLISION Command '95 20' (cascade level 2).

i) The LT answers with UID CL2 ('88 uid3 uid4 uid5 BCC').

j) The PCD shall send SELECT Command '95 70 88 uid3 uid 4 uid5 BCC CRC_A'.

k) The LT answers with SAK (cascade bit is set).

l) The PCD shall increase the cascade level and shall send ANTICOLLISION Command '97 20' (cascade level 3).

m) The LT answers with UID CL3 ('uid6 uid7 uid8 uid9 BCC').

n) The PCD shall send SELECT Command '97 70 uid6 uid7 uid8 uid9 BCC CRC_A'.

o) The LT answers with SAK (cascade bit is cleared), indicating that UID is complete.

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Scenario H 3 — Handling of anticollision loop for PICC with triple size UID (Procedure 3)

Test	PCD		LT	Stage
REQA/WUPA	REQA/WUPA	→		
		←	ATQA (triple size UID)	1
ANTICOLLISION Level 1	ANTICOLLISION Command Level 1 ('93 20')	→		
		←	UID CL1 ('88 uid0 uid1 uid2 BCC')	2
SELECT	SELECT Command ('93 70 88 uid0 uid1 uid2 BCC CRC_A')	→		
		←	SAK(cascade)	3
ANTICOLLISION Level 2	ANTICOLLISION Command Level 2 ('95 20')	→		
		←	UID CL2 ('88 uid3 uid4 uid5 BCC')	4
SELECT	SELECT Command ('95 70 88 uid3 uid4 uid5 BCC CRC_A')	→		
		←	SAK(cascade)	5
ANTICOLLISION Level 3	ANTICOLLISION Command Level 3 ('97 20')	→		
		←	UID CL3 ('uid6 uid7 uid8 uid9 BCC')	6
SELECT	SELECT Command ('97 70 uid6 uid7 uid8 uid9 BCC CRC_A')	→		
		←	SAK(complete)	7

H.2.4.2.3.1 Expected result

The PCD shall operate as described in Scenario H 3.

H.2.4.2.3.2 Test report

Record the presence, the content of the PCD commands.

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Fill the appropriate row in “Table H.6 — Reported Results for type A specific test methods“ according to the test results as follows:

Explanation	Test result
If the PCD command sequence is as expected	Pass
Any other case	Fail

Figure H.6 — Result criteria for Handling of anticollision loop Procedure 3 (triple size UID)

H.2.4.2.4 Procedure 4 (Full Bitwise Anticollision, single size UID)

Use the following sequence:

a) The UT performs the activation procedure according to H.1.8.1.

b) The LT waits until the PCD sends a valid REQA or WUPA Command frame.

c) The LT answers with ATQA indicating bit frame anticollision and UID size: single (bits b8 and b7 equal (00)b).

d) The PCD shall send ANTICOLLISION Command: '93 20'.

e) The LT answers by a stream of 40 bits by emulating a collision on every bit, including parity bits.

f) Repeat the steps g) to h) for values k from 1 to 31.

g) The PCD shall send ANTICOLLISION Command: '93' NVB $UIDTX_1[[1..k]]$, where $UIDTX_1[[1..k-1]]$ is either empty (i.e. k=1) or the value already known by the PCD and $UIDTX_1[[k]]$ is an arbitrary bit selected by the PCD.

h) The LT answers by a stream of 40 minus k bits by emulating a collision on every bit, including parity bits.

i) The PCD may optionally send ANTICOLLISION Command: '93 60’ UIDTX1[[1..32]]. In this case the LT answers with BCC.

j) The PCD shall send SELECT Command ‘93 70’ $UIDTX_1[[1..32]]$ BCC CRC_A, with BCC calculated by the PCD if it has not run the optional step i).

k) The LT answers with SAK (cascade bit is cleared), indicating that UID is complete.

Scenario H 4 — Handling of full bitwise anticollision loop for PICC (Procedure 4)

Test	PCD		LT	Stage
REQA/WUPA	REQA/WUPA	→	ATQA (single size UID)	1
		←		
ANTICOLLISION	ANTICOLLISION Command (’93 20’)	→		2
		←	40 bits full collision frame	

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