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## Identification cards — Contactless integrated circuit(s) cards - Proximity cards — Part 4: Transmission protocol

### AMENDMENT 1

#### Handling of reserved fields and values

*Cart d'identification — Carte à circuit(s) intégrés sans contacts - Cartes de proximité — Partie 4: Protocol de transmission*

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### AMENDEMENT 3

#### Manipulation des champs et des valeurs réservés

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## Foreword

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Amendment 1 to ISO/IEC 14443-4:2001 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information Technology*, Subcommittee SC 17, Cards and Personal Identification.

## Introduction

As part of maintaining the standards a need was raised to better clarify the handling of fields and values reserved by ISO/IEC for future use. This document addresses the required document enhancements.

The base standard defines certain fields and values as reserved for future ISO/IEC rules. WG8 has developed guidelines for handling such fields and values in order to ensure as much as possible compatibility of existing hardware with future hardware exploiting a later definition of such fields and values by ISO/IEC. This amendment updates the base standard in accordance with these guidelines.



## Identification cards — Contactless integrated circuit(s) cards - Proximity cards — Part 4: Transmission protocol

### AMENDMENT 1

#### Handling of reserved fields and values

## 1 Changes

*Page 3, clause 4 "Symbols and abbreviated terms"*

Change the definition of RFU to "Reserved for Future Use by ISO/IEC "

*Page 6, subclause 5.1 "Request for answer to select"*

Add the following paragraphs as the last paragraphs in the subclause:

"A received value of FSDI = '9'-'F' shall be treated by the PICC as FSDI = '8' (FSD = 256 bytes). A PICC not treating FSDI = '9'-'F' as '8' (FSD = 256 bytes) is not compliant with this standard. A PCD setting FSDI = '9'-'F' is not compliant with this standard.

A PCD setting CID = 15 is not compliant with this standard.

Note: Any action in the PICC for CID = 15 can be decided in the future by ISO. The PICC should not answer to a received value of CID = 15 sent by a PCD."

*Page 7, subclause 5.2.3 "Format byte"*

Add the following paragraph as the last paragraph in the subclause:

"A received value of FSCI = '9'-'F' shall be treated by the PCD as FSCI = '8' (FSC = 256 bytes). A PCD not treating FSCI = '9'-'F' as '8' (FSC = 256 bytes) is not compliant with this standard. A PICC setting FSCI = '9'-'F' is not compliant with this standard.

The PCD shall ignore b8 and the PCDs interpretation of any other field shall not be changed. A PCD not ignoring b8 is not compliant with this standard. A PICC not setting b8 to 0 is not compliant with this standard."

*Page 8, subclause 5.2.4 "Interface byte TA(1)"*

Add the following paragraph as the last paragraph in the subclause:

"A received value of bit rates capability with b4 = 1 shall be treated by the PCD as (b8 to b1) = (00000000)b (~106 kbit/s in both directions). A PCD not treating b4 = 1 as (b8 to b1) = (00000000)b (~106 kbit/s in both directions) is not compliant with this standard. A PICC setting b4 = 1 is not compliant with this standard."

*Page 9, subclause 5.2.5 "Interface byte TB(1)"*

Add the following paragraph as the last paragraph in the subclause:

"A PICC setting SFGI = 15 is not compliant with this standard.

A PICC setting FWI = 15 is not compliant with this standard."

*Page 9, subclause 5.2.6 "Interface byte TC(1)"*

Add the following paragraph as the last paragraph in the subclause:

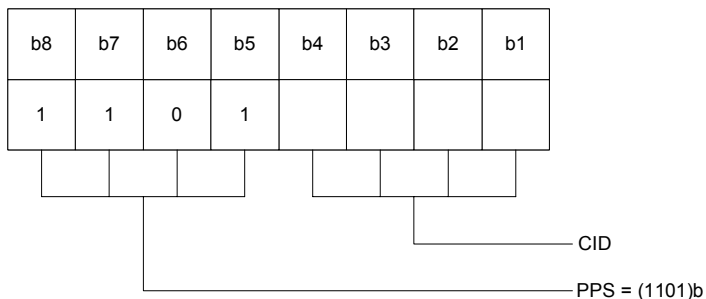
"The PCD shall ignore (b8 to b3) and the PCDs interpretation of (b2,b1) or of any other field shall not be changed. A PCD not ignoring (b8 to b3) or modifying its interpretation of any field is not compliant with this standard. A PICC not setting (b8 to b3) to (000000)b is not compliant with this standard."

*Page 10, subclause 5.3.1 "Start byte"*

Change the first list item as follows:

"- The most significant half byte b8 to b5 shall be set to (1101)b and identifies the PPS."

In Figure-10 remove the arrows and RFU and link up bits b8 to b5 in one arrow marked as (1101)b as follows:



*Page 11, subclause 5.3.2 "Parameter 0"*

Add the following paragraph as the last paragraph in the subclause:

"A PICC receiving Parameter 0 in which RFU fields are not set to the default values shall apply 5.6.2.2 (b). A PICC receiving Parameter 0 in which RFU fields are not set to their default values and not applying 5.6.2.2 (b) is not compliant with this standard."

*Page 11, subclause 5.3.3 "Parameter 1"*

Add the following paragraph as the last paragraph in the subclause:

"A PICC receiving Parameter 1 in which RFU fields are not set to the default values shall apply 5.6.2.2 (b). A PICC receiving Parameter 1 in which RFU fields are not set to their default values and not applying 5.6.2.2 (b) is not compliant with this standard."

*Page 12, subclause 5.4 "Protocol and parameter selection response"*

Add the following paragraph as the last paragraph in the subclause:

"The new bit rates shall become effective in the PICC immediately after it has sent the PPS response. A PCD changing bit rate when PPS response is missing or is invalid or when the PPSS returned to the PCD by the PICC is not identical with the PPSS sent by it to the PICC is not compliant with this standard."

*Page 12, subclause 5.6.1.2 "PICC rules" clause b)*

Replace clause (b) with a new (b) and (c):

"b) receives a valid block (HLTA):

shall process the command and shall enter HALT state

c) receives an invalid block:

shall not respond and shall enter IDLE state or HALT state as specified in Figure 6 "PICC Type A State Diagram" of ISO/IEC 14443-3."

*Page 15, subclause 7.1.1.1 "Protocol control byte field"*

Add the following paragraph as the last paragraph in the subclause:

"A PICC or PCD setting b6  $\neq$  0 of an I-block is not compliant with this standard.

A PICC or PCD setting b2  $\neq$  1 of an R-block is not compliant with this standard.

A PICC or PCD setting b2-b1  $\neq$  (10)b of an S-block is not compliant with this standard."

*Page 17, subclause 7.1.1.2 "Card identifier field"*

Add the following sentence as the last sentence in the second list item starting "The bits b6 and b5...":

"(b6,b5)  $\neq$  (00)b shall be treated as a protocol error. A PICC or PCD not treating (b6,b5)  $\neq$  (00)b as protocol error is not compliant with this standard. A PICC or PCD setting (b6,b5)  $\neq$  (00)b is not compliant with this standard."

*Page 17, subclause 7.1.1.3 "Node address field"*

Add the following sentence as the last sentence in the first paragraph starting "The NAD in the prologue...":

"b8  $\neq$  0 and/or b4  $\neq$  0 shall be treated as a protocol error. A PICC or PCD not treating b8 and/or b4  $\neq$  (0)b as protocol error is not compliant with this standard. A PICC or PCD setting b8  $\neq$  0 and/or b4  $\neq$  0 is not compliant with this standard. "

*Page 18, subclause 7.2 "Frame waiting time"*

Add the following paragraph as the last paragraph in the subclause:

"A PICC setting FWI = 15 is not compliant with this standard."

*Page 19, subclause 7.3 "Frame waiting time extension"*

Add the following sentence as the last sentence in the second list item starting with "The least significant bits b6 to b1...":

"When receiving WTXM = 0 or WTXM = 60-63 the PCD shall treat it as a protocol error. A PCD receiving WTXM = 0 or WTXM = 60-63 not treating it as a protocol error is not compliant with this standard. A PICC sending WTXM = 0 or WTXM = 60-63 is not compliant with this standard."

*Page 19, subclause 7.3 "Frame waiting time extension"*

Add the following sentence as the last sentence in the first list item starting with "The most significant bits b8 and b7...":

"The PICC shall treat (b8,b7) <> (00)b as protocol error. A PICC not treating (b8,b7) <> (00)b as protocol error is not compliant with this standard. A PCD not setting (b8,b7) = (00)b is not compliant with this standard. "

*Page 21, subclause 7.5.3.2 "PICC rules"*

Add a note after rule D:

"NOTE The PICC always ignores the block number of a received I-block."

Add a note after rule E:

"NOTE There is no block number toggling when an R(NAK) block is received."

*Page 22, subclause 7.5.4.2 "PCD rules"*

Add a note after rule 5:

"NOTE An R(ACK) block may be sent by the PCD only in case of PICC chaining, as the PICC response when receiving a R(ACK) block in other cases is not defined."

Add a note after rule 6:

"NOTE The last I-block re-transmission is not required out of PCD chaining. This allows the PCD to send R(NAK) blocks at any time out of chaining (including before sending any I-block) to check the PICC presence."

*Page 22, subclause 7.5.4.3 "PICC rules"*

Add a note after rule 10:

"NOTE If the I-block received is empty then the mandatory I-block sent may either be empty or contain any applicative information (e.g. error code)."

*Page 23, before subclause 7.5.5 "Error detection and recovery"*

Add a new subclause "7.5.5 PICC presence check"

"The following methods may be used to check the presence of a PICC at any time out of chaining (including before any I-block exchange):

#### 7.5.5.1 Method 1

The PCD may send an empty I-block and expect to receive an I-block from the PICC.

#### 7.5.5.2 Method 2

Before the first I-block exchange, the PCD may send an R(NAK) block (with block number 0) and expect to receive an R(ACK) block from the PICC (rule 12).

After the first I-block exchange, the PCD:

- a) either may send an R(NAK) block (with current block number) and expect to receive an R(ACK) block from the PICC (rule 12); in this case the PCD should not retransmit its last I-block as mentioned in the note in rule 6;
- b) or may toggle its block number then send an R(NAK) block and expect to receive the last I-block from the PICC (rule 11).

*Page 23, subclause 7.5.5 "Error detection and recovery"*

Renumber the clause to 7.5.6

Add subclause title "7.5.6.1 Errors detected by the PCD"

Delete "The following errors shall be detected by the PCD"

Change subclause a) text as follows:

"

- a) Transmission error (Frame error or EDC error) or FWT time-out

The PCD shall attempt error recovery by the following techniques in the order shown:

- Application of PCD rules (see 7.5.4.2),
- Optionally apply PCD rules (see 7.5.4.2) once more
- Use of S(DESELECT) request,
- Optionally Use of S(DESELECT) request once more (as specified in clause 8.2),
- Ignore the PICC."

Add subclause title "7.5.6.2 Errors detected by the PICD"

Delete "The following errors shall be detected by the PICC:"

Page 27, Just before Clause B.3

Add a new clause B2.5

"B.2.5 PICC Presence check

PICC presence check, method 1

	Comment	Block No. (0)	PCD		PICC	Block No. (1)	Comment
1.	rule 1, method 1		I(0) <sub>0</sub>	==>		0	rule D
2	rule B	1		<==	I(0) <sub>0</sub>		rule 10 note

PICC presence check, method 2-a

	Comment	Block No. (0)	PCD		PICC	Block No. (1)	Comment
1.	rule 1, method 2-a		R(NACK) <sub>0</sub>	==>			rule E note
2				<==	R(ACK) <sub>1</sub>		rule 12
3	rule 6 note, method 2-a		R(NACK) <sub>0</sub>	==>			rule E note
4				<==	R(ACK) <sub>1</sub>		rule 12
5	rule 6 note		I(0) <sub>0</sub>	==>		0	rule D
6	rule B	1		<==	I(0) <sub>0</sub>		rule 10

PICC presence check, method 2-a

	Comment	Block No. (0)	PCD		PICC	Block No. (1)	Comment
1.	rule 1		I(0) <sub>0</sub>	==>		0	rule D
2	rule B	1		<==	I(0) <sub>0</sub>		rule 10
3	method 2-a		R(NACK) <sub>1</sub>	==>			rule E note
4				<==	R(ACK) <sub>0</sub>		rule 12
5	rule 6 note		I(0) <sub>1</sub>	==>		1	rule D

6	0	<===	I(0) <sub>1</sub>	rule 10
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PICC presence check, method 2-b

	Comment	Block No. (0)	PCD		PICC	Block No. (1)	Comment
1.	rule 1		I(0) <sub>0</sub>	==>		0	rule D
2	rule B	1		<===	I(0) <sub>0</sub>		rule 10
3	method 2-b	0	R(NACK) <sub>0</sub>	==>			
4	rule B	1		<===	I(0) <sub>0</sub>		rule 11
5	rule 6 note		I(0) <sub>1</sub>	==>		1	rule D
6	rule B	0		<===	I(0) <sub>1</sub>		rule 10

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"