INTERNATIONAL STANDARD

ISO/IEC 14443-4

First edition
2001-02-01
AMENDMENT 1
2006-03-15

Identification cards — Contactless integrated circuit(s) cards — Proximity cards —

Part 4:
Transmission protocol

AMENDMENT 1: Handling of reserved fields and values

Cartes d'identification — Cartes à circuit(s) intégré(s) sans contact — Cartes de proximité —

Partie 4: Protocole de transmission

AMENDEMENT 1: Maniement de champs et valeurs réservés

Foreword

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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 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*.

As part of maintaining ISO/IEC 14443-4:2001, a need was raised to better clarify the handling of fields and values reserved by ISO/IEC for future use. This Amendment addresses the required document enhancements.

ISO/IEC 14443-4:2001 defines certain fields and values as Reserved for Future Use (RFU) by new ISO/IEC rules that may be added in later versions. This Amendment includes clarification that products in conformity with ISO/IEC 14443-4:2001 shall not improperly use RFU fields and values, plus documentation of product behaviour that, when followed by PICC and PCD designs commenced after publication of ISO/IEC 14443-4:2001, should assist with backward compatibility and interoperability for future definition by ISO of RFU fields and values. Consequently, many of the references to "should" may be changed into a definitive "shall" in the second edition of ISO/IEC 14443-4:2001; thus, it is recommended to implement them at this time.

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Part 4:
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AMENDMENT 1: Handling of reserved fields and values

Page 3, Clause 4 "Symbols and abbreviated terms"

Replace the definition of RFU with the following: "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 PCD setting FSDI = '9'-'F' is not compliant with this standard.

A received value of FSDI = '9'-'F' should be interpreted by the PICC as FSDI = '8' (FSD = 256 bytes).

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

For PICC behaviour see 5.6.1.2 (c)."

Page 7, Subclause 5.2.3 "Format byte"

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

"A PICC setting FSCI = '9'-'F' is not compliant with this standard.

A received value of FSCI = '9'-'F' should be interpreted by the PCD as FSCI = '8' (FSC = 256 bytes).

A PICC not setting b8 to 0 is not compliant with this standard.

The PCD should ignore b8 and its interpretation of any other field of the whole frame shall not change."

Page 8, Subclause 5.2.4 "Interface byte TA(1)"

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

"A PICC setting b4 = 1 is not compliant with this standard.

A received value of TA(1) with b4 = 1 should be interpreted by the PCD as (b8 to b1) = (00000000)b (only ~106 kbit/s in both directions)."

Page 9, Subclause 5.2.5 "Interface byte TB(1)"

     1

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

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

Until the RFU value 15 is assigned by ISO, a PCD receiving SFGI = 15 should interpret it as SFGI = 0.

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

Until the RFU value 15 is assigned by ISO, a PCD receiving FWI = 15 should interpret it as FWI = 4."

Page 9, Subclause 5.2.6 "Interface byte TC(1)"

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

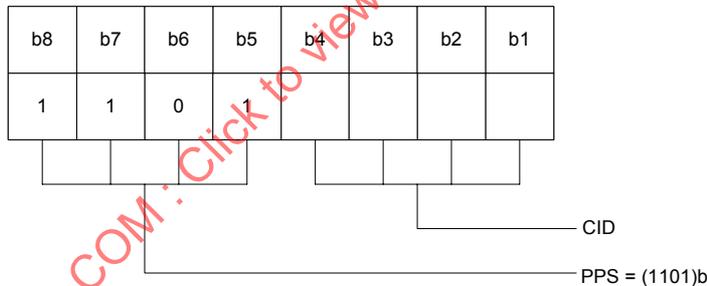"A PICC setting (b8 to b3) <> (000000)b is not compliant with this standard.

The PCD should ignore (b8 to b3) and its interpretation of (b2,b1) or of any other field of the whole frame shall not change."

Page 10, Subclause 5.3.1 "Start byte"

Replace the first list item with the following:

"
⎯ 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:

b8	b7	b6	b5	b4	b3	b2	b1
1	1	0	1				

CID

PPS = (1101)b

Page 11, Subclause 5.3.2 "Parameter 0"

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

"A PCD setting (b4 to b1) <> (0001)b and/or setting (b8 to b6) <> (000)b is not compliant with this standard.

A PICC receiving (b4 to b1) <> (0001)b and/or receiving (b8 to b6) <> (000)b shall apply 5.6.2.2 (b)."

Page 11, Subclause 5.3.3 "Parameter 1"

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

"A PCD setting (b8 to b5) <> (0000)b is not compliant with this standard.

A PICC receiving (b8 to b5) <> (0000)b shall apply 5.6.2.2 (b)."

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 that changes the bit rate when the PPS response is missing or invalid or when the PPSS returned by the PICC is not identical with the PPSS sent by the PCD is not compliant with this standard."

Page 12, Subclause 5.6.1.2 "PICC rules" item b)

Replace item 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 or RATS with RFU value:

—   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 paragraphs as the last paragraphs in the subclause:

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

A PICC or PCD setting b2 <> 1 of an R-block is not compliant with this standard.

A PICC or PCD setting (b2,b1) <> (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 paragraphs as the last paragraphs in the second list item starting "The bits b6 and b5 ...":

"A PICC or PCD setting (b6,b5) <> (00)b is not compliant with this standard.

(b6,b5) <> (00)b shall be treated as a protocol error."

Page 17, Subclause 7.1.1.3 "Node address field"

Add the following paragraphs after the first paragraph starting "The NAD in the prologue ...":

"A PICC or PCD setting b8 <> 0 and/or b4 <> 0 is not compliant with this standard.

b8 <> 0 and/or b4 <> 0 shall be treated as a protocol error."

Page 18, Subclause 7.2 "Frame waiting time"

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

"The PICC shall not set FWI to the RFU value of 15.

Until the RFU value 15 is assigned by ISO, a PCD receiving FWI = 15 should interpret it as FWI = 4.

NOTE   This clause is added for PCD's compatibility with future PICCs when ISO defines the RFU value 15."

Page 19, Subclause 7.3 "Frame waiting time extension"

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

"A PCD not setting (b8,b7) = (00)b is not compliant with this standard.

The PICC shall treat (b8,b7) <> (00)b as protocol error."

Page 19, Subclause 7.3 "Frame waiting time extension"

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

"A PICC setting WTXM = 0 or WTXM = 60-63 is not compliant with this standard.

When receiving WTXM = 0 or WTXM = 60-63 the PCD shall treat it as a protocol error."

Page 21, Subclause 7.5.3.2 "PICC rules"

Add a note after rule D:

"NOTE   In accordance with 7.5.5, the PICC neither toggles its internal block number nor sends a response block, when an error is detected."

Page 21, Subclause 7.5.3.2 "PICC rules"

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 an R(ACK) block in other cases is not defined."

Page 22, Subclause 7.5.4.2 "PCD rules"

Add a note after rule 6:

"NOTE   The last I-block re-transmission is not required out of PCD chaining. The PCD may determine the presence of a PICC by sending R(NAK) blocks at any time out of chaining (including before sending any I-block) and receiving R(ACK) from the PICC if present."

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 22, 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 may either

a)   send an R(NAK) block (with current block number) and expect to receive an R(ACK) block from the PICC (rule 12), in which case the PCD should not retransmit its last I-block as mentioned in the note in rule 6; or

b)   toggle its block number then send an R(NAK) block and expect to receive the last I-block from the PICC (rule 11).
"