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## Identification cards — Contactless integrated circuit(s) cards - Proximity cards — Part 3: Initialization and anticollision

### AMENDMENT 3

#### Handling of reserved fields and values

*Cartes d'identification Élément introductif — Carte à circuit(s) intégré(s) sans contacts - Carte de proximité — Partie 3: Initialisation et anticollision*

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### AMENDEMENT 3

#### Manipulation des champs et des valeurs réservés

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## Foreword

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Amendment 3 to ISO/IEC 14443-3:2001 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 3: Initialization and anticollision

### AMENDMENT 3

#### Handling of reserved fields and values

*Page ~4, sub clause 4 Symbols and abbreviated terms*

Add the following abbreviation after the SELECT line

SFGI        Start-up Frame Guard time Integer

SFGT        Start-up Frame Guard Time

*Page ~11, subclause 6.2.3 (appropriately renumbered) "READY State"*

Replace first sentence as follows:

"In the READY State, ~~apply~~ the bit frame anticollision method ~~shall be applied~~."

*Page ~11, subclause 6.2.6 (appropriately renumbered) "READY\* State"*

Replace first sentence as follows:

"The READY\* State is similar to the READY State. The bit frame anticollision method shall be applied."

*Page ~12, subclause 6.3.1 (renumbered to 6.4.1) "REQA and WUPA commands"*

Add the following paragraph below Table 2 "Coding of Short Frame", as the last paragraph in the subclause:

~~"A PICC receiving RFU values in the short frame shall ignore the short frame shall not change state and shall not send any response. A PCD sending a short frame containing an RFU value is not compliant with this standard. A PICC receiving a short frame containing an RFU value, sending any response to such short frame is not compliant with this standard."~~

"A PCD sending RFU value is not compliant with this standard. A PICC receiving an RFU value shall ignore the short frame. A PICC not ignoringsuch short frame and/or sending any response is not compliant with this standard."

~~Page 14, Figure 8 (renumbered to Figure 9) "Initialization and anticollision flowchart for PCD"~~

~~Change the figure as follows:~~

~~Remove the left branch of the flow diagram, remove the note "proprietary anticollision", remove the "Check ATQA" if block and connect the exit of "Receive ATQA" box directly to the input of "Select cascade level 1" box.~~

~~Page 15, subclause 6.4.2.1 (renumbered to 6.5.2.1) "Coding of ATQA"~~

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

~~"A PCD receiving (b8,b7) = (1,1)<sub>b</sub> or any of (b16 to b13, b6) <> (0000)<sub>b</sub> shall ignore the values and shall commence with the first step of the anticollision loop (see clause 6.4.3.1 renumbered to 6.5.3.1). A PCD detecting a collision in any bit of (b16 to b1) shall commence with the first step of the anticollision loop (see clause 6.4.3.1 renumbered to 6.5.3.1). A PICC sending an ATQA with (b8,b7) = (1,1)<sub>b</sub> or any of (b16 to b13, b6) <> (0000)<sub>b</sub> is not compliant with this standard. A PCD receiving an ATQA with (b8,b7) = (1,1)<sub>b</sub> or any of (b16 to b13, b6) <> (0000)<sub>b</sub> and not commencing with the first step of the anticollision loop (see clause 6.4.3.1) is not compliant with this standard. A PCD receiving any value in RFU proprietary field b9 to b12 and not commencing with the first step of the anticollision loop is not compliant with this standard. A PICC setting b12 <> 0 is not compliant with this standard" (This change was not discussed at TF2, but is needed for coherence with the high bit rates amendment).~~

~~Page 18, subclause 6.4.3.2 (renumbered to 6.5.3.2) "Coding of SEL (select code)"~~

~~Add the following paragraph below Table 6 (renumbered to table 10) "Coding of SEL", as the last paragraph in the subclause, before the note:~~

~~"A PICC shall not respond to any coding of SEL command except '93', '95' and '97' and additionally except '92' the ATQA was returned with HB0 set to 1 and additionally except '94' if the ATQA was returned with HB1 set to 1 and additionally except '98' if the ATQA was returned with HB2 set to 1. When the PICC should not respond it shall return to IDLE state according to Figure 6 (renumbered to Figure 7). A PICC not returning to IDLE state according to Figure 6 (renumbered to Figure 7) under these conditions is not compliant with this standard. A PCD sending a SEL command with any value other than '93', '95' and '97' or '92', '94', '98' when the corresponding HB0, HB1 and HB2 were not set in the ATQA returned by the PICC is not compliant with this standard."~~

~~Page 19, subclause 6.4.3.3 (renumbered to 6.5.3.3) "Coding of NVB (Number of Valid Bits)"~~

~~Add the following paragraph below Table 7 (renumbered to table 11) "Coding of NVB", as the last paragraph in the subclause:~~

~~"A PCD using any value not defined in the table is not compliant with this standard."~~

*Page ~18, subclause 6.4.3.4 (renumbered to 6.5.3.4) "Coding of SAK (Select acknowledge)"*

Add the following paragraph below Table 8 (*renumbered to table 12*) "Coding of SAK", as the last paragraph in the subclause:

"The interpretation of b3 and/or b6 of the SAK by the PCD shall not be affected by other bits defined as 'x'. A PCD whose interpretation of b3 or b6 is affected by other bits defined as 'x' is not compliant with this standard.

NOTE: 'x' in this table means the bit can be set to zero or one."

*Page ~19, subclause 6.4.4 (renumbered to 6.5.4) "UID contents and cascade levels"*

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

"During the anticollision, the PCD shall regard uid0 with RFU or proprietary values as a regular uid0. A PICC sending uid0 with RFU value is not compliant with this standard. A PICC sending a proprietary number shall otherwise be compliant with the anticollision sequence including CT or ~~else~~ ~~otherwise~~ such PICC is not compliant with this standard. A PCD not regarding a uid0 with proprietary or RFU value as a regular number is not compliant with this standard."

*Page ~21, subclause 7.1.3 "Frame Format"*

Remove the last sentence "See 7.10.3 for exceptions"

*Page ~29, subclause 7.7.3 "Coding of AFI"*

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

"A PICC shall not respond to any RFU AFI value. A PICC responding to AFI set to RFU is not compliant with this standard. A PCD sending a REQB/WUPB command with AFI field set to an RFU value is not compliant with this standard."

Page ~29, subclause 7.7.3 "Coding of AFI", Table 12 – AFI coding

Replace the last row in Table 12 "AFI coding" as follows:

'9','D' 'E'	'0',Y '0',Y	RFU Machine Readable Travel Documents (MRTDs)	Y=1 <del>eMRP</del> Passport Y=2 <del>eMRV</del> Visa Other Y values RFU
'F'	'0',Y	RFU	

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

"A PICC shall not respond to any RFU AFI value. A PICC responding to AFI set to RFU is not compliant with this standard. A PCD sending a REQB/WUPB command with AFI field set to an RFU value is not compliant with this standard."

*Page ~29, subclause 7.7.4 "Coding of PARAM"*

Replace figure 21 by the following figure

b8	b7	b6	b5	b4	b3	b2	b1
RFU			Extended ATQB supported	REQB / WUPB	N (Number of slots)		

All RFU bits shall be set to 0.

**Figure 21 — Coding of PARAM**

Replace definition before Table 13 by the following:

"b4 = 0 defines REQB : PICCs in Idle state or Ready state shall process this command  
b4 = 1 defines WUPB : PICCs in Idle state or Ready state or HALT state shall process this command  
b1, b2 and b3 are used to code the number of slots N according to Table 13.  
b5 indicates the PCD capability to support extended ATQB response from the PICC. The use of extended ATQB is optional for the PICC. The coding of b5 is as follows:

b5 = 0 defines : extended ATQB defined in subclause 7.9.4.7 is not supported by the PCD

b5 = 1 defines : extended ATQB defined in subclause 7.9.4.7 is supported by the PCD."

Add the following paragraph as the last paragraph in the subclause before Table 13:

"The PICC shall ignore (b8 to ~~b7~~,b6) and its interpretation of any other field of the whole frame shall not change. A PICC changing its interpretation of any other field when (b8 to ~~b7~~,b6) are other than (0,0,0) is not compliant with this standard. A PCD sending a REQB/WUPB command with (b8 to ~~b7~~,b6) other than (0,0,0) is not compliant with this standard."

*Page ~3029, subclause 7.7.4 "Coding of PARAM"*

Add the following paragraph after Table 13 (renumbered to Table 17) "Coding of N":

"A received value of (b3 to b2, b1) = (1,0,1)b or (1,1,x)b shall be treated by the PICC as (1,0,0)b. A PICC not treating (b3 to b2, b1) = (1,0,1)b or (1,1,x)b as (1,0,0)b is not compliant with this standard. A PCD sending (b3 to b2, b1) = (1,0,1)b or (1,1,x)b is not compliant with this standard."

Page ~32, subclause 7.9.4. Protocol Info

Replace figure 25 by the following figure

1 <sup>st</sup> byte	2 <sup>nd</sup> byte		3 <sup>rd</sup> byte			4 <sup>th</sup> byte (optional) Extended ATQB	
Bit_Rate_capability (8 bits)	Max_Frame_Size (4 bits)	Protocol_Type (4 bits)	FWI (4 bits)	ADC (2 bits)	FO (2 bits)	SFGI (4 bits)	RFU (4 bits)
MSB    LSB	MSB    LSB	MSB    LSB	MSB    LSB	MSB    LSB	MSB    LSB	MSB    LSB	MSB    LSB

All RFU bits shall be set to 0.

Figure 25 — Protocol info format

Page ~32, subclause 7.9.4.2 "ADC"

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

" A PICC setting (b4,b3) other than (0,0)b or (0,1)b is not compliant with this standard."

Page ~32, subclause 7.9.4.3 "FWI"

Add the following paragraph after FWI definitions-:

"In case of: extended ATQB supported by PICC and PCD, FWT ~~apply~~ applies after the Answer to ATTRIB command response made by PICC.

The waiting time for the Answer to ATTRIB command is a fixed value given by the following formula:

$$\text{Answer to ATTRIB waiting time} = (256 \times 16 / f_c) \times 2^4 \quad (\sim 4,8 \text{ ms})$$

Add a note:

"Note: It is strongly recommended to use a FWT as low as possible to protect communications speed when retry occurs."

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

"A received value of FWI = 15 shall be treated by the PCD as FWI = 14. A PCD not treating FWI = 15 as FWI = 14 is not compliant with this standard. A PICC setting FWI = 15 is not compliant with this standard."

*Page ~33, subclause 7.9.4.4 "Protocol\_Type"*

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

"A received value of (b4, b3, b2, to b1) <> (0, 0, 0, 0) or (0, 0, 0, 1) shall be treated by the PCD as (0, 0, 0, 1). A PCD not treating RFU values as (0, 0, 0, 1) is not compliant with this standard. A PICC setting (b4, to b3, b2, b1) <> (0, 0, 0, 0) or (0, 0, 0, 1) is not compliant with this standard. Future PICC setting (b4, b3, b2, to b1) <> (0, 0, 0, 0) or (0, 0, 0, 1) shall be compliant with ISO/IEC 14443-4."

*Page ~33, subclause 7.9.4.5 "Max\_Frame\_size"*

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

"A received value of Maximum \_Frame \_Size Code = '9'-F' shall be treated by the PCD as '8' (256 bytes). A PCD not treating Maximum \_Frame \_Size Code = '9'-F' as '8' (256 bytes) is not compliant with this standard. A PICC setting Maximum Frame Size Code = '9'-F' is not compliant with this standard."

*Page ~33, subclause 7.9.4.6 "Bit\_Rate\_Capability"*

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

"A received value of Bbit\_Rrates\_capability with b4 = 1 shall be treated as b1 to b8 = 0 (~106 kbit/s in both directions). A PCD not treating b4 = 1 as b1 to b8 = 0 (~106 kbit/s in both directions) is not compliant with this standard. A PICC setting b4 = 1 is not compliant with this standard."

*Page ~33, Add subclause 7.9.4.7 Extended ATQB (optional)*

"- The least significant half byte b4 to b1 are RFU and shall be set to (0000)b.

-The most significant half byte b8 to b5 define the Start-up Frame Guard time Integer (4 bits).

SFGI codes an integer value used to define the SFGT. (Start-up Frame Guard Time)

The SFGT defines a specific guard time needed by the PICC before it is ready to receive the next frame after it has sent the Answer to Attrib command. SFGI is coded in the range from 0 to 14. The value of 15 is RFU. The value of 0 indicates no SFGT needed and the values in the range from 1 to 14 are used to calculate the SFGT with the formula given below. The default value of SFGI is 0.

$$\text{SFGT} = (256 \times 16 / f_c) \times 2^{\text{SFGI}}$$

For SFGI = 0, SFGT is minimal (~ 302 μs) ;

For SFGI = 14, SFGT is maximal (~ 4949 ms).

The PCD shall ignore (b4, ~~b3, b2, to~~ b1) and its interpretation of any other field of the whole frame shall not change. A PCD changing its interpretation of any other field when (b4, ~~b3, b2, to~~ b1) are other than (0,0,0,0)b is not compliant with this standard. A PICC sending a ATQB response with (b4, ~~b3, b2, to~~ b1) other than (0,0,0,0)b is not compliant with this standard.

A PICC shall answer to a REQB/WUPB command with bit b5 set to 0 (no extended ATQB supported) without optional 4<sup>th</sup> byte in his ATQB response. A PICC sending an extended ATQB response in that case is not compliant with this standard."

*Page ~34, subclause 7.10.3 "Coding of Param 1"*

~~In Figure 27, delete the EOF and SOF fields in bits b4 and b3. Make one RFU field on bits b4..b1.~~

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

"A PICC shall ignore any value (b4..~~b1~~b2, b1) and the interpretation of any other field of the whole frame shall not change. A PICC not ignoring (b1, ~~b2~~b2, b1) is not compliant with this standard. A PCD shall set (b4b2..b1) = (~~00~~00)b. A PCD setting (b~~2~~4..b1) <> (00~~00~~)b is not compliant with this standard."

*Page ~34, subclause 7.10.3.1 "Minimum TR0"*

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

"A value of (b8, b7) = (1, 1)b send to a PICC shall be treated by the PICC as (0, 0)b default value. A PICC not treating (b7, b8) = (1, 1)b as (0, 0)b is not compliant with this standard. A PCD setting (b8, b7) = (1, 1)b is not compliant with this standard."

*Page ~34, subclause 7.10.3.2 "Minimum TR1"*

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

"A value of (b6, b5) = (1, 1)b send to a PICC shall be treated by the PICC as (0, 0)b default value. A PICC not treating (b6, b5) = (1, 1)b as (0, 0)b is not compliant with this standard. A PCD setting (b6, b5) = (1, 1)b is not compliant with this standard."

*Page ~35, subclause 7.10.3.3 "EOF/SOF"*

Add the following paragraph as the last paragraph in the subclause after Table 23:

"SOF/EOF suppression applies only for communications at  $f_c/128$  (~106kbit/s). For bit rates higher than  $f_c/128$  (~106kbit/s) the PICC shall always provide SOF and EOF."

~~Remove this subclause.~~

~~Note: Anyway, this will be a must for the high bit rates. For similarity it was suggested to require the same for 106kbps which is the current standard. Alternatively we can put a two year period for readers who use these bits as documented.~~

*Page ~35, subclause 7.10.4 "Coding of Param 2"*

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

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

*Page ~35, subclause 7.10.5 "Coding of Param 3"*

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

"A PICC shall ignore and not answer the ATTRIB command when (b8 to b5) <> (0000)b and shall not change its interpretation of other fields. A PICC not ignoring and/or answering an ATTRIB command when (b8 to b5) <> (0000)b is not compliant with this standard. A PCD setting (b8 to b5) <> (0000)b is not compliant with this standard. There will be no test of the PICC side."

*Page ~36, subclause 7.10.6 "Coding of Param 4"*

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

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

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

A PICC shall ignore (b8 to b5) and shall not change its interpretation of other fields. A PICC not ignoring (b8 to b5) is not compliant with this standard. A PCD setting (b8 to b5) <> (0000)b is not compliant with this standard."