

Identification cards — Contactless integrated circuit cards - Proximity cards — Part 4: Transmission protocol

Cartes d'identification — Cartes à circuit intégré - Cartes de proximité — Partie 4: Protocole de transmission

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AMENDMENT 2

Activation of bit rates up to *fc*, protocol activation of PICC Type A and increased frame size

AMENDEMENT 2

*Activation de débits binaires jusqu'à *fc*, activation de protocole pour PICC de Type A et taille de trame augmentée*

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Amendment 2 to ISO/IEC 14443-4:2010 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, Card and personal identification.

Identification cards — Contactless integrated circuit cards - Proximity cards — Part 4: Transmission protocol

Amendment 2: Activation of bit rates up to *fc*, protocol activation of PICC Type A and increased frame size

Page 4, 5

Replace the second, third and fourth dash of 5 with:

"

- The SAK byte shall be checked for availability of an ATS at PICC. The SAK byte is defined in ISO/IEC 14443-3.
- The PICC may be set to HALT state, using the HLTA command as defined in ISO/IEC 14443-3, if no ATS is available at PICC.
- The RATS may be sent by the PCD as next command after receiving the SAK if an ATS is available at PICC.

"

Add new dash after the end of fourth dash of 5 with following:

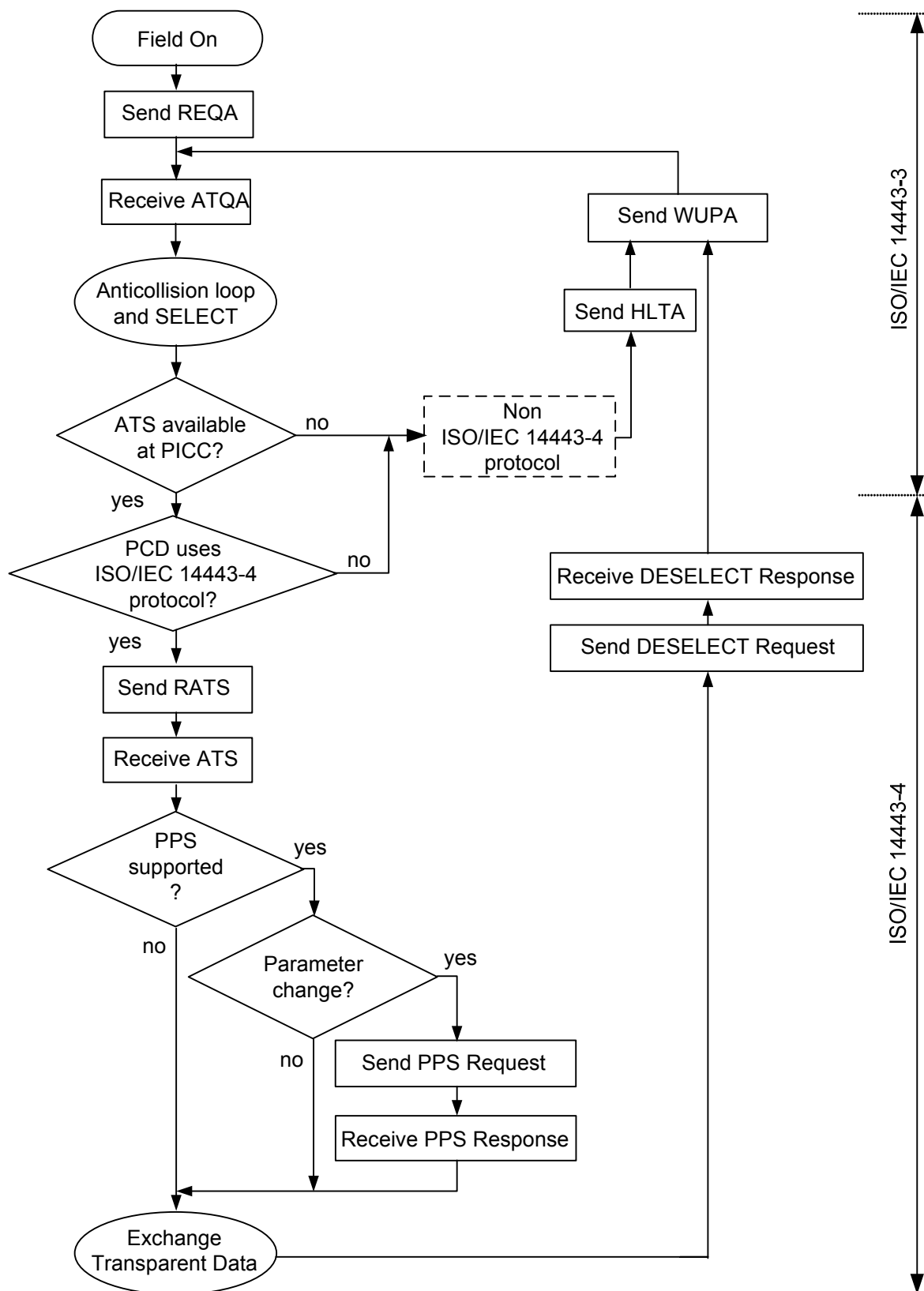
"

- The PICC may be set to HALT state, using the HLTA command as defined in ISO/IEC 14443-3, if no ISO/IEC 14443-4 protocol is used at PCD.

"

Replace Figure1 with the following figure:

"



Page 6, 5.1

Replace the second dash of 5.1 with:

"

- A PCD setting FSDI = 'D'-'F' is not compliant with this standard. A received value of FSDI = 'D'-'F' should be interpreted by the PICC as FSDI = 'C' (FSD = 4096 bytes)."

and replace Table 1 with:

"

Table 1 — FSDI to FSD conversion

FSDI	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'	'8'	'9'	'A'	'B'	'C'	'D' – 'F'
FSD (bytes)	16	24	32	40	48	64	96	128	256	512	1024	2048	4096	RFU

"

Page 7, 5.2.3

Replace the 3rd bullet with the following:

"

- A PICC setting FSCI = 'D'-'F' is not compliant with this standard. A received value of FSCI = 'D'-'F' should be interpreted by the PCD as FSCI = 'C' (FSC = 4096 bytes).

"

Page 24, after 8.2

Add a new clause 9 at the end with the following:

"

9 Activation of bit rates up to *fc*

S(PARAMETERS) blocks shall be used to negotiate bit rates and communication parameters. The following rules shall be applied to negotiate those parameters:

- The information field shall contain tags and values as defined in Tables A.1 – A.5.
- The PCD shall send a S(PARAMETERS) block to request parameters.
- If the PICC supports S(PARAMETERS) blocks, the PICC shall respond with an S(PARAMETERS) block containing a list of values for all supported parameters. To indicate supported bit rates the PICC shall list indicator pairs as defined in Table A.3, one pair for each supported PCD to PICC supported bit rate,

After the PICC has sent its response and has indicated its parameters the PCD may activate one bit rate for each communication direction with following rules:

- The information field shall contain tags and values as defined in Tables A.1 – A.5.
- The PCD shall send a S(PARAMETERS) block to activate desired communication parameters.

- The PICC shall acknowledge the activated parameters with a S(PARAMETERS) block and shall activate the negotiated parameters.
- The PCD shall activate the negotiated parameters.

Table A.1 — VHBR Tag definition

Tags (Hex)	Description	Length	Value
'A0'	VHBR	L	Function Tags Identifier (see Table A.2)

Table A.2 — Function Tags Identifier definition

Tags (Hex)	Description	Length	Value
'8A'	VHBR Request	0	
'AA'	VHBR Indication	L	01 list of supported bit rates from PCD to PICC together with the corresponding supported bit rates from PICC to PCD (see Table A.3). 02 supported framing options PICC to PCD (see Table A.5)
'AB'	VHBR Activation	L	01 selected bit rate from PCD to PICC together with selected bit rate from PICC to PCD (see Table A.3) 02 framing options PICC to PCD (see Table A.5)
'8B'	VHBR Acknowledgement	0	

The PICC shall indicate its supported bit rates with using tag 'AA' and listing pairs of BR indicator 1 and BR indicator 2, one pair for each supported bit rate from PCD to PICC communication together with corresponding supported bit rates for the PICC to PCD communication.

The PCD shall activate a bit rates for both communication directions with using tag 'AB' with one pair of BR indicator 1 (determining PCD to PICC bit rate) and BR indicator 2 (determining PICC to PCD bit rate by only one bit set).

Table A.3 — Indicator pairs for supported bit rates of PCD to PICC and corresponding bit rates PICC to PCD

PCD to PICC bit rate Identifier	Supported Bit rate PCD to PICC	etu	BR Indicator 1 Supported bit rate PCD to PICC	BR Indicator 2 Related bit rates PICC to PCD
$fc / 128$	$fc / 128$	$128 / fc$	'01'	See Table A.4
$fc / 64$	$fc / 64$	$128 / (2 fc)$	'02'	See Table A.4
$fc / 32$	$fc / 32$	$128 / (4 fc)$	'03'	See Table A.4
$fc / 16$	$fc / 16$	$128 / (8 fc)$	'04'	See Table A.4
2ASK8	$fc / 8$	$128 / (16 fc)$	'05'	See Table A.4
2ASK4	$fc / 4$	$128 / (32 fc)$	'06'	See Table A.4
2ASK2	$fc / 2$	$128 / (64 fc)$	'07'	See Table A.4
2PSK8	$fc / 8$	$128 / (16 fc)$	'08'	See Table A.4
2PSK4	$fc / 4$	$128 / (32 fc)$	'09'	See Table A.4
2PSK2	$fc / 2$	$128 / (64 fc)$	'0A'	See Table A.4
4PSK16	$fc / 8$	$128 / (8 fc)$	'0B'	See Table A.4
4PSK8	$fc / 4$	$128 / (16 fc)$	'0C'	See Table A.4
4PSK4	$fc / 2$	$128 / (32 fc)$	'0D'	See Table A.4
4PSK2	F_c	$128 / (64 fc)$	'0E'	See Table A.4
8PSK16	$fc / (16/3)$	$128 / (8 fc)$	'0F'	See Table A.4
8PSK8	$fc / (8/3)$	$128 / (16 fc)$	'10'	See Table A.4
8PSK4	$fc / (4/3)$	$128 / (32 fc)$	'11'	See Table A.4

16PSK16	$fc / 4$	$128 / (8 fc)$	'12'	See Table A.4
16PSK8	$fc / 2$	$128 / (16 fc)$	'13'	See Table A.4
			RFU	

Table A.4 — Supported bit rates PICC to PCD

b8	b7	b6	b5	b4	b3	b2	b1	Supported bit rates PICC to PCD
X	X	X	X	X	X	X	1	$fc / 128$
X	X	X	X	X	X	1	X	$fc / 64$
X	X	X	X	X	1	X	X	$fc / 32$
X	X	X	X	1	X	X	X	$fc / 16$
X	X	X	1	X	X	X	X	$fc / 8$
X	X	1	X	X	X	X	X	$fc / 4$
X	1	X	X	X	X	X	X	$fc / 2$
1	X	X	X	X	X	X	X	RFU

Table A.5 — Framing options

b8	b7	b6	b5	b4	b3	b2	b1	Framing options
X	X	X	X	X	X	X	1	Start Bit suppression from PICC to PCD
X	X	X	X	X	X	1	X	Stop Bit suppression from PICC to PCD
X	X	X	X	X	1	X	X	SOF suppression from PICC to PCD
X	X	X	X	1	X	X	X	EOF suppression from PICC to PCD
Other							RFU	

As an example the sequence for an activation of the bit rate

— 4PSK2 from PCD to PICC and

— $fc / 2$ for PICC to PCD

with a PICC indicating to support bit rates $fc / 128$, $fc / 16$ and 4PSK2 for PCD to PICC communication and for each PCD to PICC bit rate supporting bit rates $fc / 128$, $fc / 16$ and $fc / 2$ and indicating no framing options is illustrated in figure 1:

Step	PCD	PICC
1	S(PARAMETERS)('A0' '02' '8A' '00' <CRC>)	→
2	←	S(PARAMETERS) ('A0' '0D' 'AA' '0B' '01' '06' '01' (01001001)b '04' (01001001)b '0E' (01001001)b '02' '01' (00000000)b <CRC>)
3	S(PARAMETERS)('A0' '09' 'AB' '05' '01' '02' '0E' (01000000)b '02' '01' '00' <CRC>)	→
4	←	S(PARAMETERS)('A0' '02' '8B' '00' <CRC>)

Figure 1 — VHBR activation example

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