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

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Email of secretary: chris.starr@ukpayments.org.uk

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

AMENDMENT 2

Bit rates of $fc/8$, $fc/4$ and $fc/2$, protocol activation of PICC Type A and frame sizes from 512 to 4096 bytes

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

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AMENDEMENT 2

Débits binaires de $fc/8$, $fc/4$ et $fc/2$, activation de protocole pour PICC de Type A et taille de trame de 512 à 4096 octets

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Amendment 2 to ISO/IEC 14443-4:2008 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: Bit rates of $fc/8$, $fc/4$ and $fc/2$, protocol activation of PICC Type A and frame sizes from 512 bytes to 4096 bytes

Page 4, Clause 5

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

"

- The SAK byte shall be checked if the PICC is compliant with ISO/IEC 14443-4. 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 the PICC is compliant to ISO/IEC 14443-4, the RATS may be sent by the PCD as next command after receiving the SAK "

"

Page 5, Clause 5

Replace in Figure 1 the text in the ellipse "Anticollision Loop" with "Anticollision Loop and SELECT"

Page 6, 5.1

Replace the second dash of 5.1 with:

"

- A PCD setting FSDI = 'D'-'F' is not compliant with this standard. Until the RFU values 'D' - 'F' are assigned by ISO/IEC, a PICC receiving value of FSDI = 'D' - 'F' should interpret it as FSDI = 'C' (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 4th dash with the following:

- "
- A PICC setting FSCI = 'D'-'F' is not compliant with this standard. Until the RFU values 'D' - 'F' are assigned by ISO/IEC, a PCD receiving value of FSCI = 'D' - 'F' should interpret it as FSCI = 'C' (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/2***
- 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 4, 5, 6, 7 and 8.
 - The PCD shall send a S(PARAMETERS) block to request parameters.
 - If the PICC supports S(PARAMETERS) blocks, the PICC shall respond with a S(PARAMETERS) block containing values for all supported parameters. If the PICC does not support S(PARAMETERS) it may interpret the S(PARAMETERS) as S(DESELECT) or stay mute.

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 4, 5, 6, 7 and 8.
- The PCD shall send a S(PARAMETERS) block to activate selected communication parameters.
- The PICC shall acknowledge the activated parameters with a S(PARAMETERS) block and then shall activate the negotiated parameters.
- The PCD shall activate the negotiated parameters.

NOTE S(PARAMETERS) block is defined in ISO/IEC 14443-4/Amd 1

Table 4 — VHBR Tag definition

Tags (Hex)	Description	Length	Value
'A0'	VHBR	L	Function Tags Identifier (see Table 5)

NOTE The length field is in accordance with the full range of BER-TLV (see ISO/IEC 7816-4:2005, 5.32)

Table 5 — Function Tags Identifier definition

Tags (Hex)	Description	Length	Value		
'8A'	VHBR Request	0			
'AA'	VHBR Indication	L	Tags	Length	Value
			01	L	supported bit rates from PCD to PICC (see Table 6)
			02	L	supported bit rates from PICC to PCD (see Table 7)
			03	L	supported framing options PICC to PCD (see Table 8)
'AB'	VHBR Activation	L	Tags	Length	Value
			01	L	selected bit rates from PCD to PICC (see Table 6)
			02	L	selected bit rates from PICC to PCD (see Table 7)
			03	L	selected framing options PICC to PCD (see Table 8)
'8B'	VHBR Acknowledgement	0			

The PICC shall indicate its supported bit rates for each communication direction and its supported framing options using tag 'AA'.

The PCD shall select and activate one bit rate for each communication direction and the framing options using tag 'AB'.

Table 6 — Supported bit rates PCD to PICC

2 nd byte								1 st byte								Supported bit rates PCD to PICC
b8	b7	b6	b5	b4	b3	b2	b1	b8	b7	b6	b5	b4	b3	b2	b1	
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	1	$fc / 128$
x	x	x	x	x	x	r	x	x	x	x	x	x	x	1	x	$fc / 64$
x	x	x	x	x	x	x	x	x	x	x	x	x	1	x	x	$fc / 32$
x	x	x	x	x	x	x	x	x	x	x	x	1	x	x	x	$fc / 16$
x	x	x	x	x	x	x	x	x	x	x	1	x	x	x	x	$fc / 8$
x	x	x	x	x	x	x	x	x	x	1	x	x	x	x	x	$fc / 4$
x	x	x	x	x	x	x	x	x	1	x	x	x	x	x	x	$fc / 2$
Other															RFU	

Table 7 — 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 8 — 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
x	x	x	1	x	x	x	x	Indication and activation of PICC Type A training sequence for PICC to PCD communication at bit rates of $fc/8$, $fc/4$ and $fc/2$ (see ISO/IEC 14443-2/Amd 3, 8.2.5.2)
Other								RFU

NOTE When no framing option is used then the framing option tag shall be omitted

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

— $fc/8$ from PCD to PICC and

— $fc/2$ from PICC to PCD

with a PICC indicating to support bit rates $fc/128$, $fc/16$ and $fc/8$ for PCD to PICC communication and supporting bit rates $fc/128$, $fc/16$ and $fc/2$ and indicating no framing options is illustrated in Figure 23:

Step	PCD	PICC
1	S(PARAMETERS)('A0 02 8A 00' CRC)	→
2		← S(PARAMETERS) ('A0 09' 'AA 07' '01 02' (0000000000011001)b '02 01' (01001001)b CRC)
3	S(PARAMETERS) ('A0 09' 'AB 07' '01 02' (0000000000010000)b '02 01' (01000000)b CRC)	→
4		← S(PARAMETERS)('A0 02 8B 00' CRC)

Figure 23— VHBR activation example

"