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Identification cards — Contactless integrated circuit cards - Proximity cards — Part 3: Initialization and anticollision

AMENDMENT 2
Bit rates of *fc*/8, *fc*/4 and *fc*/2 and frame size from 512 to 4096 bytes

Cartes d´identification — Cartes à circuit intégré sans contact - Cartes de proximité — Partie 3: Initialisation et anticollision

AMENDEMENT 2
Débits binaires de fc/8, fc/4 et fc/2 et taille de trame de 512 à 4096 octets

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Foreword

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Amendment 2 to ISO/IEC 14443-3:2011 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

Identification cards — Contactless integrated circuit cards - Proximity cards — Part 3: Initialization and anticollision

Amendment 2: Bit rates of *fc*/8, *fc*/4 and *fc*/2 and frame size from 512 to 4096 bytes

Page 5, 6.1

Replace the subclause with the following:

"Communication between PCD and PICC can be achieved with different bit rates.

Bit rates other than *fc/128* are optional and may be independently supported by PCD and PICC in each communication direction and calculated as defined in Table 1. If a bit rate higher than *fc*/16 is selected for PCD to PICC communication, then a bit rate higher than *fc*/128 shall be selected for PICC to PCD communication.

Table 1 — Bit rates

Divisor D	etu	Bit rates
1	128/*fc* (~ 9,4 µs)	*fc*/128 (~ 106 kbit/s)
2 (optional)	128/2*fc* (~ 4,7 µs)	*fc*/64 (~ 212 kbit/s)
4 (optional)	128/4*fc* (~ 2,4 µs)	*fc*/32 (~ 424 kbit/s)
8 (optional)	128/8*fc* (~ 1,2 µs)	*fc*/16 (~ 848 kbit/s)
16 (optional)	128/16*fc* (~ 0,6 µs)	*fc*/8 (~ 1,7 Mbit/s)
32 (optional)	128/32*fc* (~0,3 µs)	*fc*/4 (~ 3,39 Mbit/s)
64 (optional)	128/64*fc* (~0,2 µs)	*fc*/2 (~ 6,78 Mbit/s)

"

NOTE The initial bit rate is *fc*/128. This applies for the whole initialization and anticollision sequence.

"

Page 7, 6.2.1.1

Replace the row before the last row of Table 2 with the following:

"

fc/128 or *fc*/64 or *fc*/32 or *fc*/16 or *fc*/8 or *fc*/4 or *fc*/2	*fc*/64 or *fc*/32 or *fc*/16 or *fc*/8 or *fc*/4 or *fc*/2	Not applicable	$\geq$ 1116/*fc*	$\geq$ 1116/*fc*

"

Page 8, 6.2.3

Add the following after the last dash:

"

— PCD standard frames for bit rates of *fc*/8, *fc*/4 and *fc*/2."

Page 9, 6.2.3.2

Replace the 3rd paragraph with the following:

"As an exception the last parity bit of a PICC standard frame shall be inverted if this frame is transmitted with bit rate higher than *fc*/128. PICC standard frames are illustrated in Figure 4."

Page 9, 6.2.3.2, Figure 4

Replace the 2nd caption with the following:

"PICC standard frames for bit rates higher than *fc*/128"

Page 10, 6.2.3.3

Add a new subclause 6.2.3.4:

"6.2.3.4 PCD standard frames for bit rates of fc/8, fc/4 and fc/2

The character transmission format and character separation as defined in 7.1.1 and 7.1.2, respectively, shall be used.

The frame format is defined in 7.1.3."

Page 24, 7.1.1

Add the following paragraph below Table 13:

"For bit rates higher than *fc*/16 bit boundaries shall occur at nominal bit positions."

Page 25, 7.1.4

In Table 17 replace "*fc*/16" with:

"> *fc*/32"

Page 26, 7.1.4

In Table 18 replace "*fc*/16" with:

"> *fc*/32"

Page 26, 7.1.5

In Table 20 replace "*fc*/16" with:

"> *fc*/32"

Page 27, 7.1.6

Replace 3rd paragraph including list with:

"The maximum value of TR0 is:

— 4096/*fc* (~ 302 µs) for ATQB;

— 65536/*fc* (~ 4,8 ms) for S(DESELECT) and S(PARAMETERS) blocks (see ISO/IEC 14443-4, 8.1);

— (4096/*fc*) x 2^{FWI} – TR1 for all other frames (see 7.9.4.3)."

Page 27, 7.1.6

Replace 2nd sentence of last paragraph with:

*"*PCDs shall accept minimal and maximal values of TR0 with a margin of 16/*fc* and of TR1 with a margin of 1/*fs."*

Page 40, 7.9.4.4

Replace Table 27 with the following:

"

b3	b2	Minimum TR2
0	0	10 etu + 512/*fc*
0	1	10 etu + 2048/*fc*
1	0	10 etu + 4096/*fc*
1	1	10 etu + 8192/*fc*

"

Page 41, 7.9.4.5

Replace the subclause with the following:

"**7.9.4.5 Max_Frame_Size**

Table 28 defines the maximum frame size.

Table 28 — Maximum frame size

Maximum Frame Size Code in ATQB	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'	'8'	'9'	'A'	'B'	'C'	'D' – 'F'
Maximum Frame Size (bytes)	16	24	32	40	48	64	96	128	256	512	1024	2048	4096	RFU > 4096

A PICC setting Maximum Frame Size Code = 'D' - 'F' is not compliant with this standard.

Until the RFU values 'D' - 'F' are assigned by ISO/IEC, a PCD receiving Maximum Frame Size Code = 'D' - 'F' should interpret it as Maximum Frame Size Code = 'C' (4096 bytes)."

Page 41, 7.9.4.5

Rename NOTE to NOTE 1 and add a note at the end:

"NOTE 2: CRC_B efficiency decreases when the frame size increases. Improved optional error detection and correction methods may be defined in future.

"

Page 41, 7.9.4.6

Add after last paragraph:

"NOTE S(PARAMETERS), as defined in ISO/IEC 14443-4:2008/Amd 2 is the only way to negotiate bit rates higher than *fc*/16 and may also be used to negotiate any specified bit rate".

Page 43, 7.10.3.1

Replace Table 30 with the following:

"

b8	b7	Minimum TR0 for a PCD to PICC bit rate of	
		***fc*/128**	**> *fc*/128**
0	0	1024/*fc*	1024/*fc*
0	1	768/*fc*	512/*fc*
1	0	256/*fc*	256/*fc*
1	1	RFU	RFU

"

Page 44, 7.10.3.2

Replace Table 31 with the following

"

b6	b5	Minimum TR1 for a PICC to PCD bit rate of	
		***fc*/128**	**> *fc*/128**
0	0	80/*fs*	80/*fs*
0	1	64/*fs*	32/*fs*
1	0	16/*fs*	8/*fs*
1	1	RFU	RFU

"

Page 44, 7.10.3.3

Replace last sentence of last paragraph with:

"For bit rates higher than *fc*/128 (~ 106 kbit/s) up to *fc*/16 (~ 848 kbit/s) the PICC shall always provide SOF and EOF."

Page 45, 7.10.4

Replace Table 34 with following table:

"

Maximum Frame Size Code in ATTRIB	**'0'**	**'1'**	**'2'**	**'3'**	**'4'**	**'5'**	**'6'**	**'7'**	**'8'**	**'9'**	**'A'**	**'B'**	**'C'**	**'D' – 'F'**
Maximum Frame Size (bytes)	16	24	32	40	48	64	96	128	256	512	1024	2048	4096	RFU > 4096

"

Add below Table 36:

"NOTE S(PARAMETERS), as defined in ISO/IEC 14443-4:2008/Amd 2 is the only way to negotiate bit rates higher than *fc*/16 and may also be used to negotiate any specified bit rate."

Replace last two paragraphs with:

"A PCD setting Maximum Frame Size Code = 'D' - 'F' is not compliant with this standard.

Until the RFU values 'D' - 'F' are assigned by ISO/IEC, a PICC receiving Maximum Frame Size Code = 'D' - 'F' should interpret it as Maximum Frame Size Code = 'C' (4096 bytes)."