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

AMENDMENT 2
Bit rates higher than *fc* / 16 up to *fc* and increased frame size

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

AMENDEMENT 2
Débits binaires supérieurs à fc / 16 jusqu'à fc et taille de trame augmentée

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Foreword

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Amendment 2 to ISO/IEC 14443-3:2010 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 higher than *fc* / 16 up to *fc* and increased frame size

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 rate			
		1 bit / etu	2 bits / etu	3 bits / etu	4 bits / etu
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)	*fc* / 8 (~ 1,7 Mbit/s)	*fc* / 16/3 (~ 2,54 Mbit/s)	*fc* / 4 (~ 3,39 Mbit/s)
16 (optional)	128 / (16 *fc*) (~ 0,6 µs)	*fc* / 8 (~ 1,7 Mbit/s)	*fc* / 4 (~ 3,39 Mbit/s)	*fc* / 8/3 (~ 5,09 Mbit/s)	*fc* / 2 (~ 6,78 Mbit/s)
32 (optional)	128 / (32 *fc*) (~0,3 µs)	*fc* / 4 (~ 3,39 Mbit/s)	*fc* / 2 (~ 6,78 Mbit/s)	*fc* / 4/3 (~ 10,17 Mbit/s)	
64 (optional)	128 / (64 *fc*) (~0,15 µs)	*fc* / 2 (~ 6,78 Mbit/s)	*fc* (~ 13,56 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* / 16/3 or *fc* / 4 or *fc* / 8/3 or *fc* / 2 or *fc* / 4/3 or fc	*fc* / 64 or *fc* / 32 or *fc* / 16 or *fc* / 8 or *fc* / 4 or *fc* / 2	Not applicable	≥ 1116 / *fc*	≥ 1116 / *fc*

"

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 24, 7.1.1

Add the following paragraph below Figure 13:

"The start and stop bits are omitted for PSK modulation from PCD to PICC."

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, 7.1.3

Add the following paragraph below Figure 14:

"The SOF and EOF for PSK modulation from PCD to PICC are defined in ISO/IEC 14443-2:2010/Amd.1."

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, 7.1.4

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 2 — 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, 7.9.4.6

Add after last paragraph:

"NOTE Bit rates higher than *fc* / 16 are negotiated by S(PARAMETERS) blocks."

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 Bit rates higher than *fc* / 16 are negotiated by S(PARAMETERS) blocks."

Replace last paragraph with:

"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)."