INTERNATIONAL STANDARD

ISO/IEC 14443-4

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AMENDMENT 2
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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 size from 512 bytes to 4 096 bytes

Cartes d'identification — Cartes à circuit(s) intégré(s) sans contact — Cartes de proximité —

Partie 4: Protocole de transmission

AMENDEMENT 2: Débits binaires de fc/8, fc/4 et fc/2, activation de protocole de la PICC type A et taille de trame comprise entre 512 octets et 4 096 octets

Foreword

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The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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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, *Cards and personal identification*.

Identification cards — Contactless integrated circuit cards — Proximity cards —

Part 4:
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AMENDMENT 2: Bit rates of *fc*/8, *fc*/4 and *fc*/2, protocol activation of PICC Type A and frame size from 512 bytes to 4 096 bytes

Page 4, Clause 5

Replace the second, third and fourth dashes with the following:

"

— The SAK byte shall be checked to get information 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 e.g. no ISO/IEC 14443-4 protocol is used at PCD.
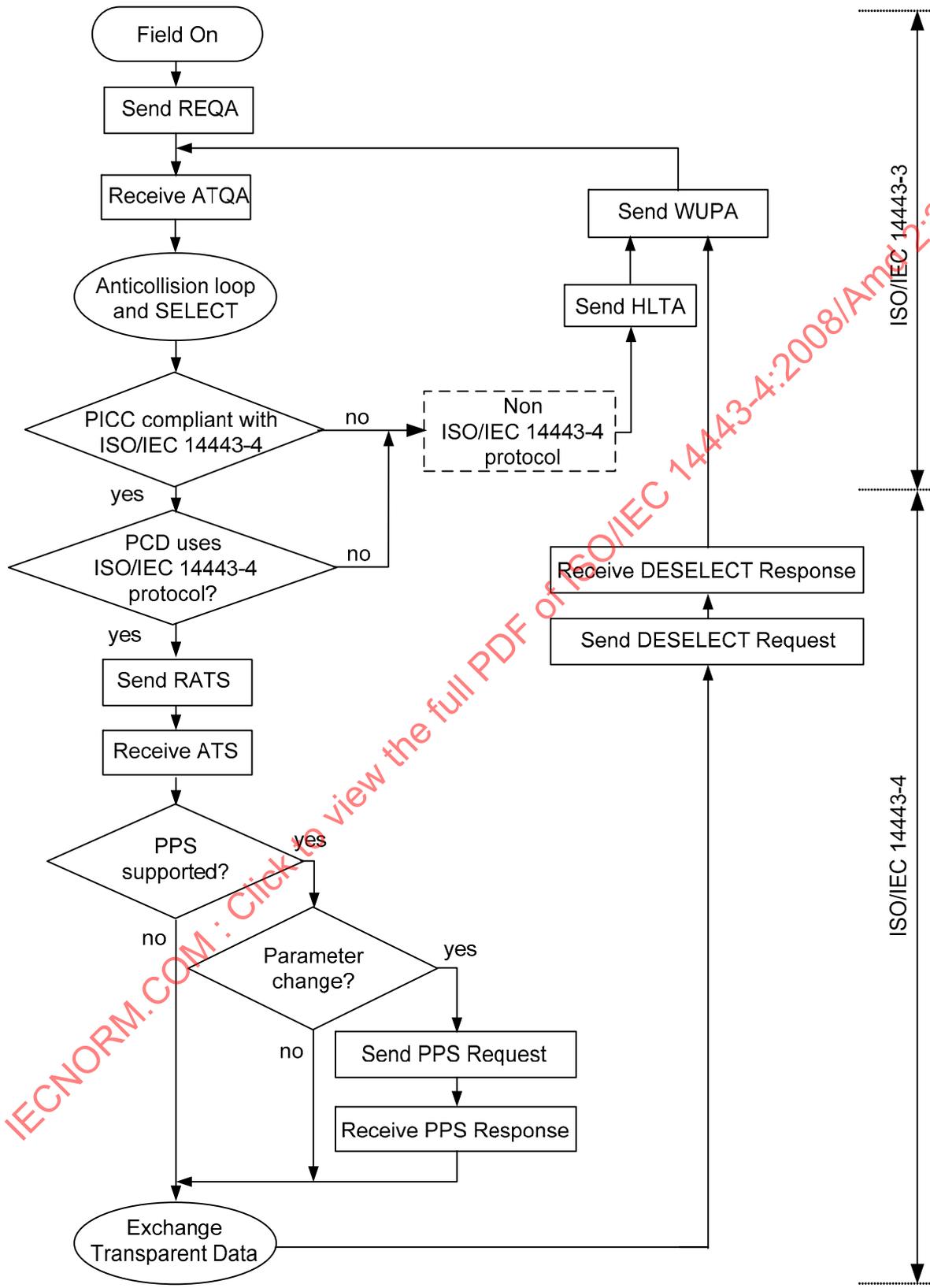
   NOTE   The PCD cannot continue the activation sequence in that case.

— 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, Figure 1

Replace Figure 1 with the following figure:

"

```
                    ┌─────────────┐
                    │   Field On  │
                    └──────┬──────┘
                           │
                    ┌──────┴──────┐
                    │  Send REQA  │
                    └──────┬──────┘
                           │
                    ┌──────┴──────┐                      ┌──────────────┐
                    │ Receive ATQA│                      │  Send WUPA   │
                    └──────┬──────┘                      └──────┬───────┘
                           │                                    │
                    ┌──────┴──────────┐              ┌──────────┴──────┐
                    │ Anticollision   │              │   Send HLTA     │
                    │ loop and SELECT │              └──────────┬──────┘
                    └──────┬──────────┘                         │
                           │                          ┌─────────┴────────┐
                    ╱──────┴──────╲        no          │      Non         │
                   ╱ PICC compliant ╲─────────────────▶│ ISO/IEC 14443-4  │
                   ╲ with ISO/IEC   ╱                  │    protocol      │
                    ╲  14443-4     ╱                   └──────────────────┘
                     ╲────┬───────╱
                       yes│
                    ╱─────┴──────╲         no           ┌──────────────────────────┐
                   ╱  PCD uses    ╲────────────────────▶│ Receive DESELECT Response│
                   ╲ ISO/IEC       ╱                     └──────────┬───────────────┘
                    ╲ 14443-4     ╱                      ┌──────────┴───────────────┐
                     ╲ protocol? ╱                       │ Send DESELECT Request    │
                      ╲───┬─────╱                        └──────────┬───────────────┘
                       yes│                                         │
                    ┌─────┴──────┐
                    │ Send RATS  │
                    └─────┬──────┘
                    ┌─────┴──────┐
                    │Receive ATS │
                    └─────┬──────┘
                     ╱────┴────╲        yes
                    ╱   PPS     ╲──────────────┐
                    ╲ supported?╱              │
                     ╲───┬─────╱          ╱────┴──────╲      yes
                       no│               ╱  Parameter  ╲──────────┐
                         │               ╲  change?    ╱          │
                         │                ╲────┬──────╱    ┌───────┴────────┐
                         │                  no │           │Send PPS Request│
                         │                     │           └───────┬────────┘
                         │                     │           ┌───────┴────────┐
                         │                     │           │Receive PPS     │
                         │                     │           │Response        │
                         │                     │           └───────┬────────┘
                    ┌────┴─────────────────────┴───────────────────┘
                    │
              ┌─────┴────────┐
              │  Exchange    │
              │ Transparent  │────────────────────────────────────▶
              │    Data      │
              └──────────────┘
```

"

Page 6, 5.1

Replace the second dash of 5.1 with the following:

"

— 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' (FSD = 4096 bytes).

NOTE   This PCD recommendation is added for PCD's compatibility with future PICCs when ISO/IEC defines the behavior for the RFU values of 'D' - 'F'.

"

Replace Table 1 with the following:

"

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 8, 5.2.3

Replace the fourth 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' (FSC = 4096 bytes).

NOTE   This PICC recommendation is added for PICC´s compatibility with future PCDs when ISO/IEC defines the behavior for the RFU values of 'D' - 'F'.

"

Page 24, after 8.2

Add a new Clause 9 as follows:

"

9   Activation of bit rates and framing options in the PROTOCOL state

S(PARAMETERS) blocks shall be used to negotiate bit rates and communication parameters when the PICC is in PROTOCOL state.

— The information field shall contain tags and values as defined in Tables 4 and 5 and Figures 23 and 24.

The following rules shall be applied to negotiate those parameters:

— The PCD shall send an S(PARAMETERS) block to request parameters.

— If the PICC supports S(PARAMETERS) blocks, the PICC shall respond with an S(PARAMETERS) block containing values for all supported parameters. If the PICC does not support S(PARAMETERS) it shall 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 PCD shall send an S(PARAMETERS) block to activate selected communication parameters.

— The PICC shall acknowledge the activated parameters with an S(PARAMETERS) block and then shall activate the negotiated parameters.

— The PCD shall activate the negotiated parameters.

NOTE 1   S(PARAMETERS) block is defined in ISO/IEC 14443-4:2008/Amd.1:2012.

Table 4 — S(PARAMETERS) tag definition

Tag (Hex)	Description	Length	Value
'A0'	S(PARAMETERS) block information	L	Function Tags Identifier (see Table 5)

NOTE 2   The length field is in accordance with the full range of BER-TLV (see ISO/IEC 7816-4:2005).

Table 5 — Function tags identifier definition

Tag (Hex)	Description	Length (Hex)	Value		
'A1'	Bit rates Request	'0'	—		
'A2'	Bit rates Indication	L	Tag (Hex)	Length (Hex)	Value
			'80'	'02'	supported bit rates from PCD to PICC 1st byte is specified in Figure 23 2nd byte set to '00', other values are RFU
			'81'	'02'	supported bit rates from PICC to PCD 1st byte is specified in Figure 23 2nd byte set to '00', other values are RFU
			'82'	'01'	supported framing options PICC to PCD (see Figure 24)
'A3'	Bit rates Activation	L	Tag (Hex)	Length (Hex)	Value
			'83'	'02'	selected bit rate from PCD to PICC[a] 1st byte is specified in Figure 23 2nd byte set to '00', other values are RFU
			'84'	'02'	selected bit rate from PICC to PCD[a] 1st byte is specified in Figure 23 2nd byte set to '00', other values are RFU
			'85'	'01'	selected framing options PICC to PCD (see Figure 24)[b]
'A4'	Bit rates Acknowledgement	'0'	—		

[a]   The PCD shall set only one bit. The PCD shall not activate simultaneously a bit rate higher than fc/16 for PCD to PICC communication and a bit rate of fc/128 for PICC to PCD communication in Type A.

[b]   The PCD shall not set both b1 (start bit and stop bit suppression) and b2 (SOF and EOF suppression).

When the PCD sets b1 (start bit and stop bit suppression):

— The PICC shall use a SOF low time of 10 etu and a SOF high time of 2 etu.

— The PICC shall use an EOF low time of 10 etu.

— The PICC shall apply no character separation.

NOTE 3   Only relevant objects should be sent. It is even possible to send an empty parent object with no children objects (i.e. 'A0 00'), although it is also possible to send an empty S(PARAMETERS) block (i.e. not even the parent object sent).