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Cards and personal identification

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

AMENDMENT 4: Electromagnetic disturbance handling

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

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AMENDEMENT 4: Gestion de perturbation électromagnétique

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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 4 to ISO/IEC 14443-3:2009 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, Cards and personal identification.

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

AMENDMENT 4: Electromagnetic disturbance handling

Page 5, clause 4

Insert the following new symbols at the end of the clause:

EMD Electromagnetic disturbance as defined in ISO/IEC 14443-2/Amendment 3

$t_{E,PICC}$ Low EMD time, PICC

$t_{E,PCD}$ Low EMD time, PCD

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Insert the following new clause 8 after clause 7:

8 Electromagnetic disturbance handling

This clause enhances the robustness of the contactless communication between PCD and PICC against electromagnetic disturbance (EMD).

While the PCD is waiting for the PICC response, the PICC is processing the requested command. The PICC dynamic current consumption during execution time might cause an arbitrary load modulation effect on the magnetic field. In some cases the PCD might misinterpret EMD as data sent by the PICC and this might negatively impact proper reception of the PICC response.

The effect of the EMD on the PCD reception might depend on

— the PICC operation and speed,

— the PCD and PICC antenna geometries and relative distance (coupling factor),

— the sensitivity of PCD receiver channel.

This clause improves the robustness of the contactless communication from PICC to PCD by

— defining EMD handling timing constraints for PICC and for PCD,

— recommending a PCD algorithm for EMD handling.

8.1 EMD handling timing constraints

The low EMD time $t_{E,PICC}$ is the time period before the start of PICC data transmission, when the PICC shall not produce an EMD level higher than the EMD limit as defined in ISO/IEC 14443-2/Amendment 3.

This low EMD time $t_{E,PICC}$ has a value of F – 1024/*fc* with a maximum value of 1408/*fc* where F equals FDT for type A and TR0 for type B. The minimum value is 0/*fc* for TR0 ≤ 1024/*fc*.

The low EMD time $t_{E,PCD}$ is the time period to allow the PCD to recover from electromagnetic disturbances.

The PCD shall be ready to process a PICC frame no later than $t_{E,PCD}$ after the last time the EMD level was above the EMD limit as defined in ISO/IEC 14443-2/Amendment 3.

This low EMD time $t_{E,PCD}$ has a value of F – 1044/*fc* with a maximum value of 1388/*fc* where F equals FDT for type A and TR0 for type B. The minimum value is 0/*fc* for TR0 ≤ 1044/*fc*.

NOTE The minimum values of $t_{E,PICC}$ and $t_{E,PCD}$ 0/*fc* may only be reached when short TR0 is allowed by the PCD (see ISO/IEC 14443-3, 7.10.3.1).

The low EMD time for PCD and PICC are illustrated in Figure 33.

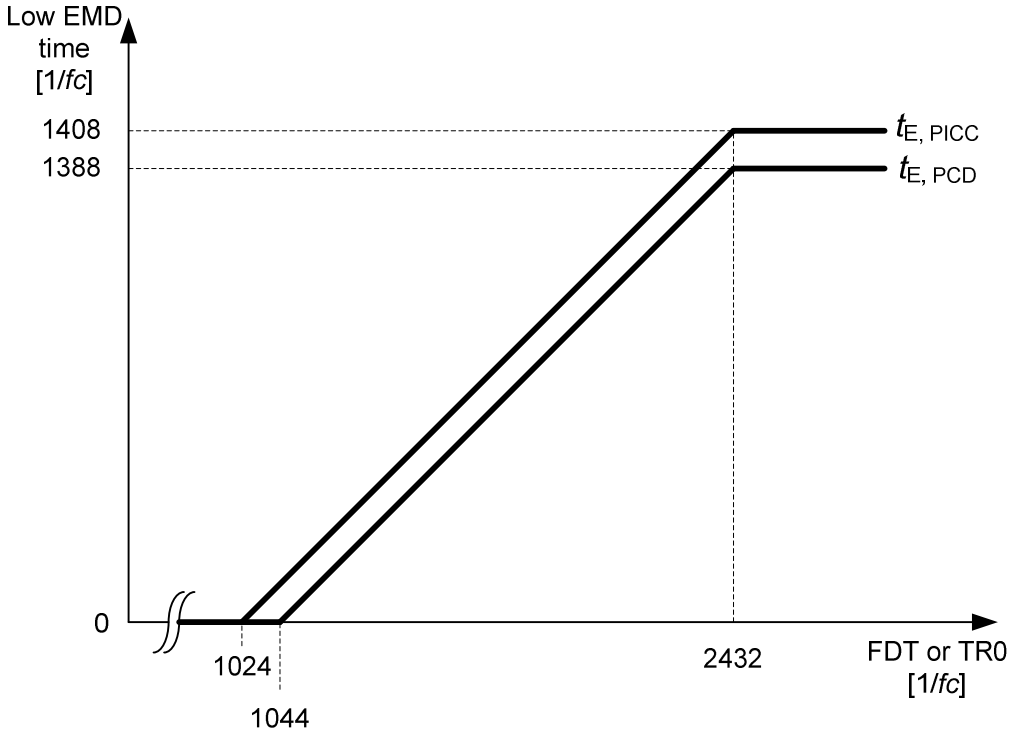

Figure 33 — Low EMD time

8.2 Recommendations for a PCD EMD handling algorithm

As it is important for a PCD to distinguish between EMD and frame reception errors, the following PCD recommendations are defined to maximize the EMD rejection while applying error detection and recovery as defined in 14443-4. They do not apply to anticollision procedure type A nor when a protocol different from ISO/IEC 14443-4 is used.

When the PCD is ready to start receiving the PICC frame it should continuously check for frame errors (SOF, Start and Stop bits, Parity bits, EOF). As soon as an error occurs:

— if the number of supposed received bytes is less than 3[1)] , the PCD should consider them as EMD and should restart its reception process;

— else the PCD should continue the reception process then apply the error detection and recovery when the whole frame has been received.

NOTE To avoid unnecessary reception of EMD, PCDs need not be ready to start receiving PICC frames less than 1044/*fc* after the end of their command frames (unless for type B when minimum TR0 has been reduced).

1) The condition that invalid packets of lengths less than 3 bytes should be qualified as EMD should be adapted for specific applications. Packet lengths of a few bits up to several bytes may be used as decision criteria to optimize performance.