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Cards and personal identification

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Secretariat ISO/IEC JTC1/SC17, APACS, Mercury House, Triton Court, 14 Finsbury Square, London EC2A 1LQ, England;
Telephone +44 (0)20 7711 6255; Fax: +44 (0)20 7711 6299; e-mail: chris.starr@ukpayments.org.uk

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Identification cards — Contactless integrated circuit(s) cards — Proximity cards — Part 2: Radio frequency power and signal interface

AMENDMENT 3: Limits of electromagnetic disturbance levels

Cartes d'identification — Cartes à circuit(s) intégré(s) sans contact — Cartes de proximité — Partie 2: Interface radio fréquence et des signaux de communication

AMENDEMENT 3: Limites de niveaux de perturbation électromagnétique

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Foreword

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Amendment 3 to ISO/IEC 14443-2:2009 was prepared by Technical Committee ISO/IEC/TC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

Introduction

Today's fast-growing worldwide market for contactless systems (e.g., ePassport, Contactless Payment) has created a significant demand for infrastructure (PCD) and Smart Card / Contactless Personal Document (PICC) interoperability. Practically all existing RF-Interface international standards (e.g., GSM, UMTS, Bluetooth) specify signal-to-noise ratios for their systems. No such definition is implemented in today's ISO/IEC 14443 standard series.

This amendment presents an appropriate signal-to-noise ratio definition for the specific demands of ISO/IEC 14443-compliant proximity coupled systems. Specifically, it proposes a definition for the maximum allowed Electro-Magnetic Disturbance (EMD) level in a contactless chip-card system, caused by the PICC before data transmission.

The EMD emitted by the PICC is a kind of unwanted load modulation that is caused by the dynamic load change generated by the switching operation of the PICC internal digital circuits, especially by the microcontroller cards with fast cryptographic calculations. Therefore, EMD is a result of the normal operation of the PICC. High disturbance levels will degenerate the load-modulation based communication from the PICC to the PCD.

Identification cards — Contactless integrated circuit(s) cards — Proximity cards — Part 2: Radio frequency power and signal interface

AMENDMENT 3: Limits of electromagnetic disturbance levels

Page 2, clause 3

Insert the following new definition 3.9 after definition 3.8:

Electromagnetic disturbance (EMD)
electromagnetic radiation which is emitted by electrical circuits carrying rapidly changing signals, as a by-product of their normal operation, and which causes unwanted signals to be induced in other circuits.

Page 5, clause 4

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

$V_{E,PICC}$ EMD limit, PICC

$V_{E,PCD}$ EMD limit, PCD

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Insert the following new clause 10 after clause 9:

10 Electromagnetic disturbance levels

10.1 PCD limits

The PCD shall not detect any load-modulation amplitude below $V_{E,PCD} = 2/3 + 3/H^2$ in mV (peak), when measured as described in ISO/IEC 10373-6/Amendment 8.

NOTE H is the (rms) value of magnetic field strength in A/m.

10.2 PICC limits

The EMD level before PICC data transmission shall be below $V_{E,PICC} = 2/3 + 3/H^2$ in mV (peak) for at least the duration of the low EMD time $t_{E,PICC}$, when measured as described in ISO/IEC 10373-6/Amendment 8.

During this low EMD time, the EMD level may exceed $V_{E,PICC}$ during one short period of $16/fc$ if it never exceeds 4 times $V_{E,PICC}$.

NOTE 1 H is the (rms) value of magnetic field strength in A/m.

NOTE 2 The low EMD time $t_{E,PICC}$ is defined in ISO/IEC 14443-3/Amendment 4.