

Identification cards — Contactless integrated circuit card(s) — Proximity cards — Part 1: Physical characteristics

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO/IEC JTC1 shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 14443-1 was prepared by Joint Technical Committee ISO/IEC JTC1, *Information technology*, Subcommittee SC17, *Cards and personal identification*.

This second edition cancels and replaces the first edition (ISO/IEC 14443-1:2000).

ISO/IEC 14443 consists of the following parts, under the general title *Identification cards - Contactless integrated circuit(s) cards - Proximity cards*:

- *Part 1: Physical characteristics*
- *Part 2: Radio frequency power and signal interface*
- *Part 3: Initialization and anticollision*
- *Part 4: Transmission protocol*

Introduction

Contactless card standards encompass a variety of types as embodied in International Standards ISO/IEC 10536 (Close-coupled cards), ISO/IEC 14443 (Proximity cards) and ISO/IEC 15693 (Vicinity cards). These device types are intended, respectively, for operation when very near, nearby and at a longer distance from associated coupling devices.

ISO/IEC 14443 defines the technology-specific requirements for identification cards conforming to ISO/IEC 7810 and thin flexible cards conforming to ISO/IEC 15457-1 and the use of such cards to facilitate international interchange. However, it also recognises that the technology offers the possibility that proximity objects may be provided in forms other than that of the international standard card formats. Furthermore, it does not preclude the incorporation of other standard technologies on the card, such as those referenced in the informative Annex B.

ISO/IEC 14443 accommodates the operation of Proximity cards in the presence of other contactless cards conforming to ISO/IEC 10536 and ISO/IEC 15693 standards.

Identification cards — Contactless integrated circuit card(s) — Proximity cards — Part 1: Physical characteristics

1 Scope

This part of ISO/IEC 14443 describes the physical characteristics of proximity objects in the international standard card formats. It also gives the constraints on the physical characteristics of proximity objects not in those formats.

This part of ISO/IEC 14443 shall be used in conjunction with other parts of ISO/IEC 14443.

2 Normative reference(s)

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 7810, *Identification cards – Physical characteristics*.

ISO/IEC 15457-1, *Identification cards – Thin flexible cards – General characteristics*

ISO/IEC 10373, *Identification cards - Test methods*

ISO/IEC 15457-3, *Identification cards – Thin flexible cards – Test methods*.

3 Term(s) and definition(s)

For the purposes of this part of ISO/IEC 14443, the following definitions apply:

3.1

integrated circuit(s) (IC)

electronic component(s) designed to perform processing and/or memory functions

3.2

contactless

pertaining to the achievement of signal exchange with, and supply of power to, the card without the use of galvanic elements (i.e. without any conductive path between the external interfacing equipment and the integrated circuit(s) contained within the card)

3.3

contactless integrated circuit(s) card

card into which integrated circuit(s) and coupling means have been placed, such that communication to such integrated circuit(s) is done in a contactless manner

3.4

operates as intended

operates in the manner described by the manufacturer

3.5**proximity card (PICC)**

contactless integrated circuit card with which communication is done by inductive coupling in proximity of a coupling device

Note - This edition of ISO/IEC 14443-1 has extended the definition of PICC to include the form factor free option, i.e. objects other than cards.

3.6**proximity coupling device (PCD)**

reader/writer device that uses inductive coupling to provide power to the PICC and also to control the data exchange with the PICC

3.7**form factor free**

having a shape or physical format that does not conform to any international standard card format

4 Physical characteristics**4.1 General**

The PICC may be in the form of a card compliant with ISO/IEC 7810 or ISO/IEC 15457-1, or it may be “form factor free”.

A form factor free PICC may bear a clearly visible tactile indicator that shows the location on the object to be oriented towards the PCD for operation.

4.2 Antennae**4.2.1 Dimensions of antenna**

The dimensions of the PICC antenna shall not exceed the outline dimensions of an ID-1 card, specified in ISO/IEC 7810.

4.2.2 Optional additional requirements for PICC classes

It has been established that the use of a prescribed antenna within an industry sector can enhance interoperability within that sector. Optionally, therefore, the PICC may conform to the additional requirements given in Annex A for the appropriate class of antenna.

4.3 Alternating magnetic field

The PICC shall continue to operate as intended after continuous exposure to a magnetic field of an average level of 10 A/m rms at 13,56 MHz. The averaging time is 30 seconds and the maximum level of the magnetic field is limited to 12 A/m rms.

Annex A

(normative)

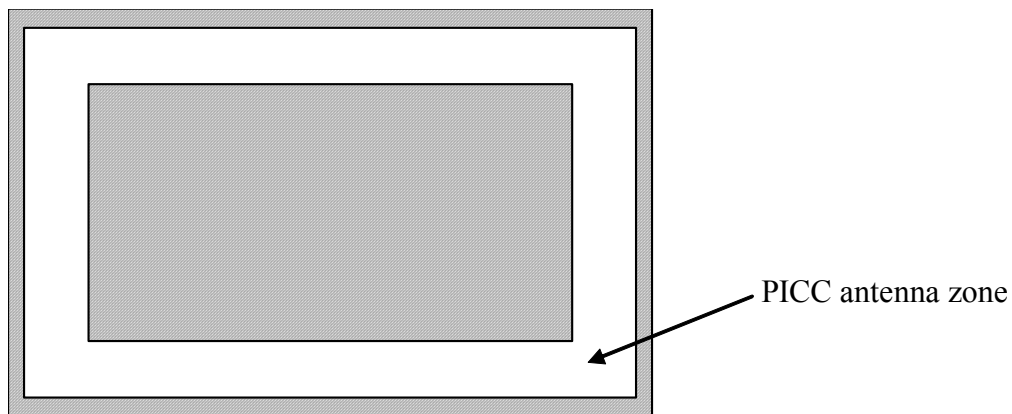
Antenna class definitions

A.1 Class 1 antenna

A.1.1 Location

The "Class 1" PICC antenna shall be entirely located within a zone defined by two rectangles:

- external rectangle: 81 mm x 49 mm, centred in ID1 (see ISO/IEC 7810)
- internal rectangle: 64 mm x 34 mm, centred in ID1, with 3 mm radius



A.1.2 Loading effect

The "Class 1" PICC shall also pass the "Class 1" PICC maximum loading effect test defined in ISO/IEC 10373-6:2001/AM4, 7.4.

Annex B

(informative)

Standards compatibility

This part of ISO/IEC 14443 does not preclude the addition of other existing card standards on the PICC, such as those listed as follows:

- ISO/IEC 7811, *Identification cards - Recording technique.*
- ISO/IEC 7812, *Identification cards - Identification of issuers.*
- ISO/IEC 7813, *Identification cards - Financial transaction cards.*
- ISO/IEC 7816, *Identification cards - Integrated circuit(s) cards with contacts.*
- ISO/IEC 10536, *Identification cards - Contactless integrated circuit(s) cards - Close-coupled cards.*
- ISO/IEC 15457, *Identification cards – Thin flexible cards*
- ISO/IEC 15693, *Identification cards - Contactless integrated circuit(s) cards - Vicinity cards.*

Note – restrictions may apply to embossing of PICCs (see ISO/IEC 7811-3).

Annex C

(informative)

Surface quality for printing

Where there is a requirement to customise the PICC after the manufacturing process by overprinting, care should be taken to ensure the areas used for printing are of sufficient quality appropriate to the printing technique or printer used.