INTERNATIONAL STANDARD

ISO/IEC 14443-1

Second edition
2008-06-15

Identification cards — Contactless integrated circuit cards — Proximity cards —

Part 1: Physical characteristics

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

Partie 1: Caractéristiques physiques

Reference number
ISO/IEC 14443-1:2008(E)

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

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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.

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

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

This second edition cancels and replaces the first edition (ISO/IEC 14443-1:2000), which has been technically revised.

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

— *Part 1: Physical characteristics*

— *Part 2: Radio frequency power and signal interface*

— *Part 3: Initialization and anticollision*

— *Part 4: Transmission protocol*

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Introduction

Contactless card standards encompass a variety of types as embodied in 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.

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Identification cards — Contactless integrated circuit cards — Proximity cards —

Part 1: Physical characteristics

1 Scope

This part of ISO/IEC 14443 defines the physical characteristics of proximity cards (PICCs).

It is to be used in conjunction with other parts of ISO/IEC 14443.

2 Normative references

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 10373-6, *Identification cards — Test methods — Part 6: Proximity cards*

ISO/IEC 15457-1, *Identification cards — Thin flexible cards — Part 1: Physical characteristics*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 7810, ISO/IEC 15457-1 and the following apply.

3.1
integrated circuit
IC
electronic component 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. the absence of an ohmic path from the external interfacing equipment to the integrated circuit(s) contained within the card)

3.3
contactless integrated circuit card
card into which integrated circuit and coupling means have been placed, such that communication to such integrated circuit is done in a contactless manner

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3.4
operate as intended
operates in the manner described by the manufacturer's specification in accordance with ISO/IEC 14443

3.5
PICC
contactless integrated circuit card or other object with which communication and power transfer are done by inductive coupling in proximity of a coupling device

NOTE Commonly called a proximity card.

3.6
PICC class
combination of antenna dimension and loading effect

NOTE See Annex A.

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 an object of any other dimension.

4.2 Antenna

If the PICC dimensions are not compliant with ISO/IEC 7810 or ISO/IEC 15457-1, the dimensions of the PICC antenna shall not exceed 86 mm × 54 mm × 3 mm.

NOTE This antenna size restriction stems from the fact that the radio frequency power and signal interface defined in ISO/IEC 14443-2 and its test methods in ISO/IEC 10373-6 are based on ID-1 cards.

4.3 Additional requirements for PICC classes

It has been established that the use of a prescribed PICC class within an industry sector may enhance interoperability within that sector. The use of a PICC class is optional. If used, PICCs shall comply with the requirements given in Annex A.

4.4 Alternating magnetic field

The PICC, whichever form the PICC has according to 4.1, 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.

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Annex A
(normative)

PICC class definitions

A.1 "Class 1"

A "Class 1" PICC shall fulfil the requirements in A.1.1 and A.1.2.

A.1.1 Antenna location

The antenna of a "Class 1" PICC shall be located within a zone defined by two rectangles, as shown in Figure A.1:

— external rectangle: 81 mm × 49 mm;

— internal rectangle: 64 mm × 34 mm, centred in the external rectangle, with 3 mm corner radii, except for the connections to the ends of the antenna coil, with a maximum area of 300 mm^2.

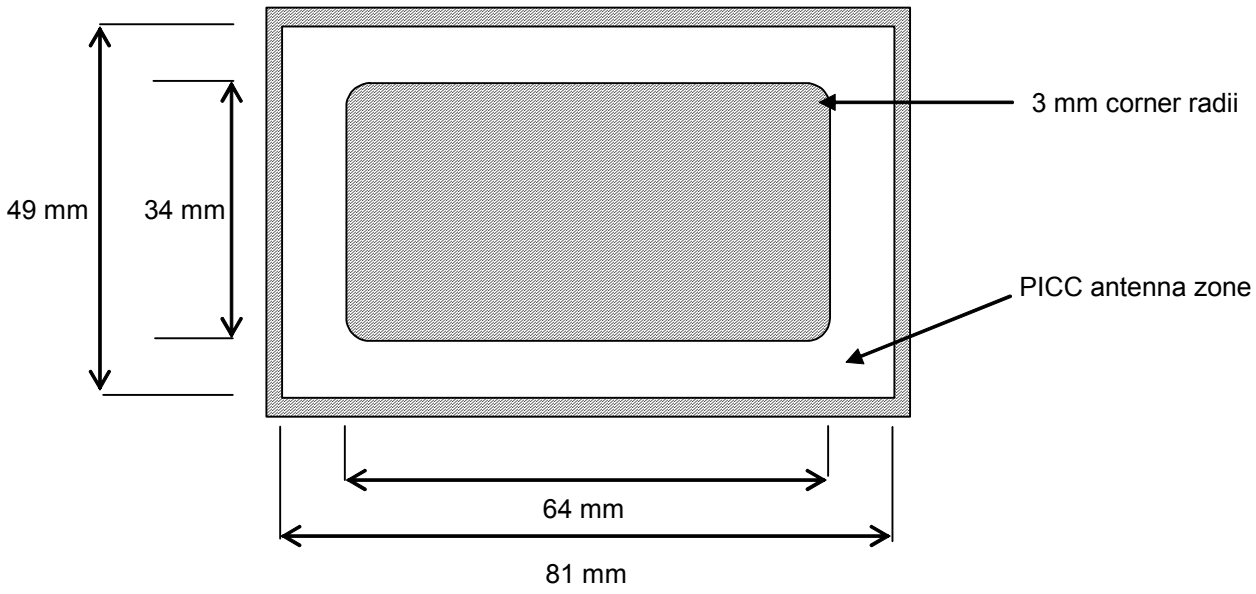

Figure A.1 — Location of the antenna of the "Class 1" PICC

A.1.2 Electrical requirement

The "Class 1" PICC shall also be testably functional after subjecting the PICC to maximum loading effect as defined in ISO/IEC 10373-6.

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Annex B
(informative)

Standards compatibility

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

— ISO/IEC 7811 (all parts), *Identification cards — Recording technique*

— ISO/IEC 7812 (all parts), *Identification cards — Identification of issuers*

— ISO/IEC 7813, *Information technology — Identification cards — Financial transaction cards*

— ISO/IEC 7816 (all parts), *Identification cards — Integrated circuit cards*

— ISO/IEC 10536 (all parts), *Identification cards — Contactless integrated circuit(s) cards — Close-coupled cards*

— ISO/IEC 15457 (all parts), *Identification cards — Thin flexible cards*

— ISO/IEC 15693 (all parts), *Identification cards — Contactless integrated circuit cards — Vicinity cards*

NOTE Restrictions may apply to embossing of PICCs (see ISO/IEC 7811-3).

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