

Proposed Working Draft for amendment to ISO/IEC 14443-1:2000

Contactless integrated circuits(s) card-Proximity Limited Use cards –

1 Scope

This part of the ISO/IEC 14443 specifies the physical characteristics of proximity cards (PICCs). It applies to the identification cards of card type ID-1 with a modified thickness and construction including that of the materials. The application of card format(s) defined by ISO/IEC 15457 is adopted when applicable.

1A Purpose

The revision to Part-1 provides for the standardization of PICCs that are classed as Limited Use. These PICC's are designed to satisfy the need for a minimal cost smart card media that have limited features and lifecycle expectations. This class of card may be applied to Public Transit Systems requiring electronic ticketing, Building Security Access Systems as well as many other applications.

2 Normative references

The following normative documents contain provisions that, through reference in this text, constitute provisions of this part of ISO/IEC 14443-1. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 14443-1 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For updated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 15457 –1 and 3, (Thin flexible cards)

3 Terms and definitions

Add: LU ---- Limited Use

3.3 Contactless integrated circuit(s) card

A card of the card type ID-1 (as specified in ISO/IEC 7810) as well as ID-1 with modified card body thickness and material construction per section four (4) of this document.

3.4 Proximity Card (PICC)

A PICC of the card type ID-1 or ID-1 with thickness and construction material modifications into which integrated circuit(s) and coupling means have been placed and in which

communication to such integrated circuit(s) is done by inductive coupling in proximity of a coupling device.

Proposed Working Draft for amendment to ISO/IEC 14443-1:2000

Contactless integrated circuits(s) card-Proximity Limited Use cards –

4 Physical characteristics

(Changes to sections: 4.1, 4.2 and 4.3.X)

4.1 General

The PICC shall have physical characteristics according to the requirements for the card ID-1 or Thin Flexible Cards specified in ISO/IEC 7810 and ISO/IEC 15457 of ID-1 format with thickness and construction material modifications per section 4.2.1 for Limited Use. Materials used to construct Limited Use PICCs are extended to beyond that of plastic materials.

4.2 Dimensions

The nominal dimensions of the PICC shall be as for the ID-1 specified in ISO/IEC 7810 for all PICC types other than that of Limited Use type. The Limited Use card type shall have the nominal dimensions of an ID-1 with modified thickness per section 4.2.1.

4.2.1 Physical Specification

The Limited Use PICC shall have physical characteristics according to the requirements of the card type ID-1 with modifications to the thickness and construction materials specification. This specification in all cases uses the ID-1 “X” and “Y” dimensions of approximately 85mm x 54mm with ISO 7810 specified tolerances of +/- 3mm. In addition, the thickness shall adopt the ISO/IEC 15457-1 & 3 Thin Flexible Card specifications were applicable. The modified thickness specification recognizes and classifies two distinct types (See Figures 1a, 1b, 1c and 1d also see Table 5):

LU_ID-1M (Identification Card Modified) with a thickness (z) of:
400um (0.40mm) +/- 20um (0.02mm)

LU_TFC.1 (Thin Flexible Card) with a thickness of:
270um (0.27 mm) +/- 20um (0.02mm)

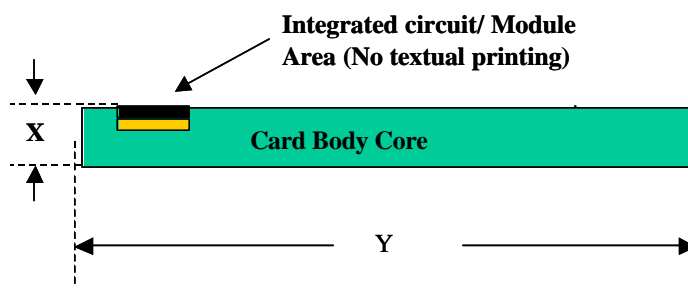


Figure 1a (LU_ID-1M card format)

Proposed Working Draft for amendment to ISO/IEC 14443-1:2000
Contactless integrated circuits(s) card-Proximity Limited Use cards –

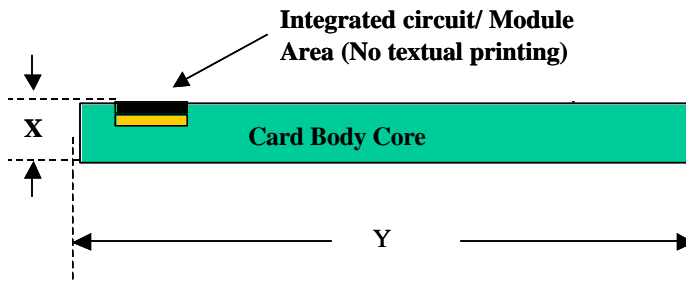


Figure 1b (LU_TFC.1 card format)

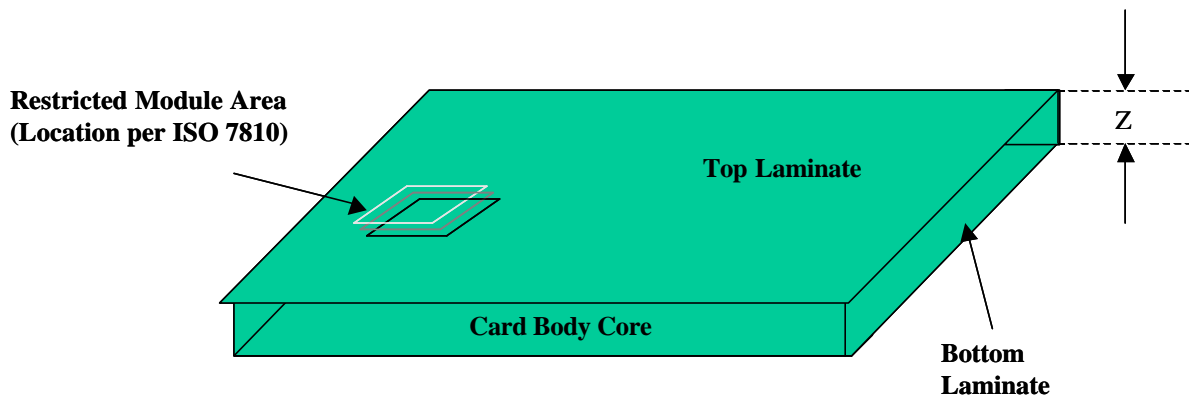


Figure 1c (LU_ID-1M card format)

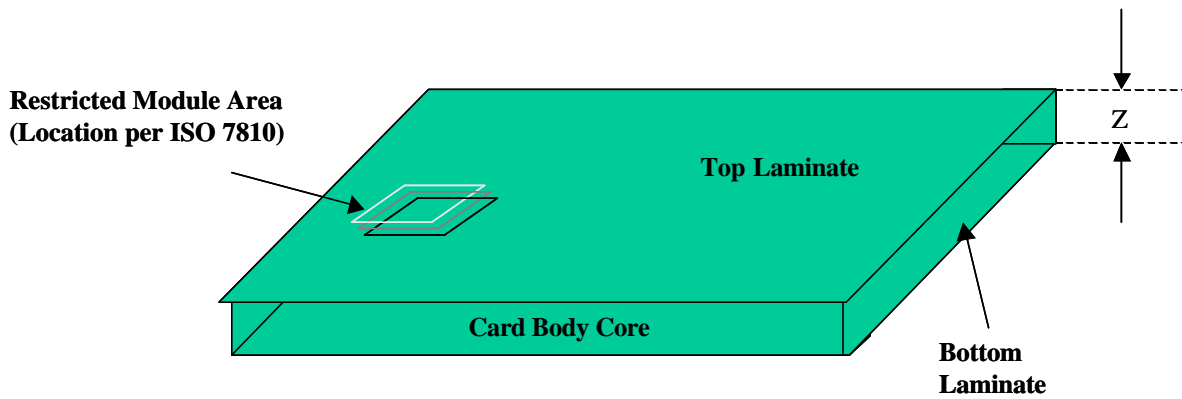


Figure 1d (LU_TFC.1 card format)

Proposed Working Draft for amendment to ISO/IEC 14443-1:2000

Contactless integrated circuits(s) card-Proximity Limited Use cards –

4.2.2 Limited Use Card Materials

Limited Use card materials shall be extended to include other than generically referred to plastic. The expected lifecycle of the PICC will need to be taken into account in the selection of these card materials. Post printing of the PICC shall be accommodated if required by the application usage excluding the PICCs Restricted Module Area as defined by the card manufacturer. (See Table 3 – Permitted materials)

Table 3--- Permitted Materials (um)

Type	Paper	Composite	Plastic
*LU_TFC.1 (Size)	270um +/- 20um	270um +/- 20um	270um +/- 20um
LU_ID-1M (Size)	400 um +/- 25um	400 um +/- 25um	400um +/- 25um

Note: Table entries refer to the nominal thickness of the material plus tolerance.

4.2.2.1 Antenna material

Materials used for the construction of the antenna must be consistent with the required electrical and physical stress specifications of this document (See Annex C)

4.3 Additional characteristics

4.3.1 Ultra-Violet light

(No-Changes)

4.3.2 X-rays

(No Changes)

4.3.2.1 Irradiation

The PICC shall continue to operate as intended after testing in accordance with the test methods described in ISO/IEC 10373-6 when exposed to an irradiation beam dosage of 56kGy. No visual packaging or printing discoloration shall occur.

4.3.3 Dynamic bending stress

The PICC shall continue to operate as intended after testing in accordance with the test methods described in ISO/IEC 10373-6 where the maximum deflections about the long card axe (X or h_wA) and the short card axes (Y or h_wB) are h, A=26mm and h, B=12mm.

Proposed Working Draft for amendment to ISO/IEC 14443-1:2000

Contactless integrated circuits(s) card-Proximity Limited Use cards –

4.3.4 Dynamic torsional stress

The PICC shall continue to operate as intended after testing in accordance with the test methods described in ISO/IEC 10373 where the maximum angle of rotation is extended to a Angle= 20°.

4.3.5 Alternating magnetic fields

(No Changes)

4.3.6 Alternating electric fields

(No Changes)

4.3.7 Static electricity

The PICC shall continue to operate as intended after testing in accordance with the test methods described in ISO/IEC 10373 (referring to IEC 61000 4-4-2:1995), where the test voltage is 6.0KV. A provision for an extended voltage of up to 10.0KV is allowed if required by the application use.

4.3.8 Static magnetic field

(No Changes)

4.3.9 Operating Temperatures and Packaging

Note: Under different conditions, certain characteristics will change significantly, including dimensions (width (X), height (Y), thickness (Z), weight, flatness and many of the physical parameters listed in Table 4. At the extremes of the operating environment these changes can be substantial, and should be taken into account in the design of the both the LU_ID-1M and LU_TFC.1 handling devices. (*Table 2 and 3 of ISO/IEC 15457-1 sections 4.72 and 4.73 are aligned with Tables-4 and 5 below where applicable.*)

4.3.9.1 Storage environment and packaging

The PICC shall maintain physical appearance as intended if stored in a non-operative manner over ambient temperatures per Table 4.

Table 4 ---- Storage conditions

Card type	Temperature °C	Relative humidity %
LU_TFC.1	0 to 60	30 to 65 non-condensing
LU_ID-1M	0 to 60	30 to 85 non-condensing

Proposed Working Draft for amendment to ISO/IEC 14443-1:2000

Contactless integrated circuits(s) card-Proximity Limited Use cards –

4.3.9.2 Operating environment and packaging

The PICC shall maintain physical appearance and functionality described in ISO/IEC 10373-6 in an operative manner over ambient temperatures per Table 5.

Table-5 ---- Operating conditions

Card type	Temperature °C	Relative humidity %
LU_TFC.1	-20 to 60	15 to 85 non-condensing
LU_ID-1M	-20 to 60	15 to 95 non-condensing

In some applications, the temperature range can be limited by the cold crack temperature (See ISO/IEC 15457 Annex C for applicability)

4.3.9.3 Outline Geometry

Table 6 shows, for each card type (format), the values of the outline geometry.

Table 6 ---- Quantity values for outline geometry (mm)

Card type	Quantity symbol	LU_TFC.1	LU_ID-1M
Width	x	85.6mm +/- 3.0mm	85.6mm +/-3.0mm
Height	y	53.98mm +/-3.0mm	53.98mm +/-3.0mm
Thickness	z	See Table 1	See Table 1
Edge Straightness	N/A	+/- 0.05mm	+/- 0.05mm
Flatness	N/A	<2.1mm	<2.1mm
Transverse curl	N/A	<1.1mm	<1.1mm
Twist	N/A	<1.1mm	<1.1mm
Coefficient of friction Paper/Stainless steel (machine and cross directions) ISO 15457-3	N/A	0.23 +/- 0.05	0.23 +/- 0.05

4.3.9.4 Reel Dimensions

Reference ISO/IEC 15457-1 sections 6.2, 6.2.1 and 6.2.2. Substitute related dimensions in section 6.2 Table 5 reference with dimensions in Table 6 above.

4.3.9.5 Fan Fold Pack

Reference ISO 15457-1 sections 6.3, 6.3.1 and 6.3.1.1 substituting the (a) and (b) dimensions in Figure-9 (Perforated line card using beveled card as an example) with Table-6 above were x=b and y=a. Substituting section 6.3.1.1 Figure 10 (Bridge joined card using beveled card as an example) dimensions f=y and g=x and all other dimensions per Figure 10.

Proposed Working Draft for amendment to ISO/IEC 14443-1:2000

Contactless integrated circuits(s) card-Proximity Limited Use cards –

4.3.9.6 Quality of Limited Use cards

(See ISO/IEC 15457 section 4.4)

4.3.10 Operating Limited Use Lifecycle

The PICC shall operate as intended after testing in accordance with the test methods described in ISO/IEC 10373-6 for a lifecycle period per Table 7.

Table 7 – Operational Limited Use Lifecycle categories

Category type	Lifecycle period days	Environment
A	5-10	Less than 90% humidity
B	5-35	Less than 95% humidity
C	5-100	Less than 95% humidity

Note: Where type “A” could be paper and type “C” could be plastic or a composite material. Further, The PICC lifecycle values for card “Category type” (A, B and C), in Table 5 are determined by an expected “Average Use Factor” (AUF) of 4.5 uses or transactions per day over a period of “Lifecycle period days”. These uses are defined as a complete transaction containing either reads and or writes of the PICC data or any modification thereof. A user presents the PICC to the PCD active field and allows it to remain in the field until the transaction has completed. The duration of user handling of the card (Card remains in users hand) is 15 minutes between transactions with an ambient environment per Table 5.

4.3.11 Limited Use Embossing

There shall be no provision for embossing a Limited Use PICC.

4.3.12 Limited Use data user memory

The Limited Use PICC memory will be no greater than 1K byte of usable space.

Note: Memory limitation is applied to maintain the intended purpose and reasonable application of the product to remain as a low cost, limited use application and limited lifecycle product for a special class of PICC

Annex A

(No Changes)

Annex B

Surface quality for printing

Proposed Working Draft for amendment to ISO/IEC 14443-1:2000

Contactless integrated circuits(s) card-Proximity Limited Use cards –

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

Where there is a requirement to customize the PICC to accommodate post-printing of textual or graphical information, care should be taken to allow the thermal printing onto the card surface during the actual user's transactions.

The print contrast signal of a machine readable printed mark is defined as:

$$PCS = \frac{R_w - R_p}{R_w}$$

Note: Also reference ISO/IEC 15457-1 section 3.5.

Annex C

Material Reference

Suggested Limited Use Antenna materials:

Silver, Aluminum, Aluminum-alloy, conductive composites and Copper-alloy

Suggested Card Body Surface Materials:

Triplex: Poly/Paper/Poly

Paper with Poly protective coating

Poly on Poly

Paper

- Notes:
- *Poly could be either PVC or PET material composition*
 - *Paper must be 100% chemical pulp, containing no ground wood*
 - *This reference is provided as a non-exhausted guide for materials that should be considered in the construction of Limited Use PICCs.*