INTERNATIONAL STANDARD

ISO/IEC 18328-2

Second edition
2021-11

Identification cards — ICC-managed devices —

Part 2: Physical characteristics and test methods for cards with devices

Cartes d'identification — Dispositifs contrôlés par carte à circuit intégré (ICC) —

Partie 2: Caractéristiques physiques et méthodes d'essai des cartes avec les dispositifs

Reference number
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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and security devices for personal identification*.

This second edition cancels and replaces the first edition (ISO/IEC 18328-2:2015), which has been technically revised.

The main changes are as follows:

— updated Annex A and changed status to normative: ID-T size card;

— added a new normative Annex B: ID-B size card;

— added a new informative Annex C: Applicability of ISO/IEC 10373-1 test methods for ID-T and ID-B size cards;

— added a new informative Annex D: Further test methods.

A list of all parts in the ISO 18328 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

Identification cards — ICC-managed devices —

Part 2: Physical characteristics and test methods for cards with devices

1 Scope

This document defines physical characteristics and test methods for cards with devices, including but not limited to, power supplying devices, displays, sensors, microphones, loudspeakers, buttons or keypads. This document also covers aspects of coexistence of technologies of devices on the card and other machine-readable card technologies.

Additional requirements related to biometric capture devices are defined in ISO/IEC 17839-2. Such requirements can be applied in addition to the ones defined in this document. ISO/IEC 17839-2 defines a type S2 card; the physical dimensions of the type S2 card are specified in Annex A.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 7816-1, *Identification cards — Integrated circuit cards — Part 1: Cards with contacts — Physical characteristics*

ISO/IEC 10373-1, *Cards and security devices for personal identification — Test methods — Part 1: General characteristics*

ISO/IEC 14443-1, *Cards and security devices for personal identification — Contactless proximity objects — Part 1: Physical characteristics*

ISO/IEC 18328-1, *Identification cards — ICC-managed devices — Part 1: General framework*

ISO/IEC 18745-1:2018, *Test methods for machine readable travel documents (MRTD) and associated devices — Part 1: Physical test methods for passport books (durability)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 7810, ISO/IEC 18328-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
active display area
area of the display that has active dots or segments

3.2
ID-B
nominally 85,60 mm (3.370 in) wide by 53,98 mm (2.125 in) high with a thickness between 0,84 mm and 2,25 mm (between 0.033 in and 0.089 in)

3.3
ID-T
nominally 85,60 mm (3.370 in) wide by 53,98 mm (2.125 in) high with a thickness between 2,25 mm and 3,25 mm (between 0.089 in and 0.128 in)

3.4
machine-readable zone
MRZ
fixed dimensional area located on an identity card, containing mandatory and optional data formatted for machine reading using optical character recognition (OCR) methods

3.5
new device
device to be integrated in the card, except for existing technology, e.g. displays, sensors, microphones, loudspeaker, buttons and keypads

3.6
total display area
total area of the ICC related to the display

Note 1 to entry: The total display area typically extends beyond the *active display area* (3.1).

3.7
zone 1
<zones of a display> *total display area* (3.6) excluding the *active display area* (3.1)

3.8
zone 2
<zones of a display> *active display area* (3.1)

4 Abbreviated terms

ICC integrated circuit card

LED light-emitting diode

MSA mechanically sensitive area

OLED organic light-emitting diode

5 Requirements

5.1 General requirements

5.1.1 Integrated circuit cards (ICCs)

ICCs with integrated devices shall be in accordance with the requirements defined for ID-1 cards as specified in ISO/IEC 7810. Note that for ID-T cards the requirements specified differently from ISO/IEC 7810 in Annex A and for ID-B cards the requirements specified differently from ISO/IEC 7810 in Annex B shall apply. Annex C summarizes the applicability of test methods for characteristics of identification cards specified in ISO/IEC 10373-1 for ID-T and ID-B size cards.

Annex D provides additional test methods for ICCs with integrated devices employed by various card industry experts, based upon field experience for specific applications and card technologies.

Guidance about the co-existence of different technologies on such cards is given in Annex E. A description of different display and input element technologies is provided in Annex F.

5.1.2 ICCs with contacts

ICCs with contacts shall in addition meet the requirements specified in ISO/IEC 7816-1.

5.1.3 Contactless ICCs

Contactless ICCs shall in addition meet the requirement specified in ISO/IEC 14443-1. Note that for ID-T cards the requirements specified differently from ISO/IEC 7810 in Annex A and for ID-B cards the requirements specified differently from ISO/IEC 7810 in Annex B shall apply.

5.2 Requirements for ICCs containing displays

5.2.1 General requirements

The requirements specified in 5.2.2 and 5.2.3 apply to ICCs containing electronic displays.

NOTE 1 The requirements described in this document are preliminary. The detailed requirements for ICCs containing electronic displays depend on the specific use-case.

NOTE 2 Readability and contrast: An observer's ability to perceive the information from an electronic display depends on two major factors. These are (a) size and font of the displayed information in relationship to the viewing position and (b) the optical contrast of the displayed information to the surrounding environment. Optical contrast is the comparison of the brightness or sterance of the display to the brightness of the surrounding environment. High readability results by optimizing specific contrast ratios.

5.2.2 Requirements for matrix displays

In addition to the test requirements in 5.2.1, for ICCs with matrix displays, it is required that not less than a defined percentage of all pixels remain functional after the test, as specified by the application.

5.2.3 Requirements for segmented displays

In addition to the test requirements in 5.2.1, for ICCs with segmented displays, no segment failure (dead segment) is allowed, i.e. after the test all segments should be working in both directions from white to black and from black to white.

— Dead spots in zone 1 (i.e. outside the active display area) can be accepted.

— Dead spots in zone 2 (i.e. within the active display area) can be accepted if their size and number are lower than values specified by the application.

5.3 Requirements for cards containing biometric capture devices

ICCs that embed a biometric capture device can be required to conform to requirements in ISO/IEC 17839-2, in addition to the mandatory requirements of this document. Annex A and Annex B specify the physical characteristics of two alternative card sizes.

Annex A
(normative)

ID-T size card

A.1 General

ID-T size cards are the same length and width as a normal ID-1 size card but are thicker. The additional thickness typically is used to accommodate electronic card components used for biometric capture devices. This card format is intended to accommodate certain restrictions of the current manufacturing technology.

ID-T size cards are not intended for use with any type of insertion reader typically used with an ID-1 size card such as for magnetic stripes or ICC contact readers. ID-T size cards typically only support contactless interfaces as specified in ISO/IEC 14443-1.

This annex specifies physical characteristics for a thicker card if it is used.

A.2 Conformance

ID-T size cards shall meet all requirements given in ISO/IEC 7810 for ID-1 size cards except as noted in this annex.

NOTE Dynamic bending stress and dynamic torsional stress in ISO/IEC 10373-1 apply only to ID-T size cards complying with ISO/IEC 7810 bending stiffness of ID-1 size cards, see also Annex C.

A.3 Dimensions

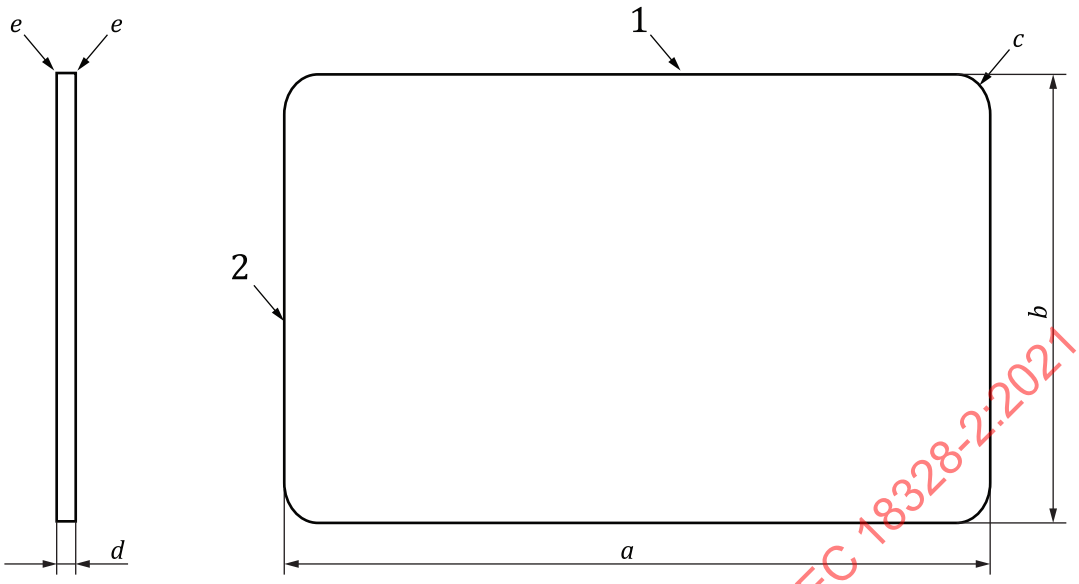
— Dimensions *a*, *b* and *c* (see Figure A.1) shall be as defined for an ID-1 size card, however, with an extended tolerance of ±0,5 mm, i.e. dimension *a* shall be between 85,10 mm and 86,10 mm and dimension *b* shall be between 53,48 mm and 54,48 mm.

— Dimension *d* shall be between 2,25 mm (0.089 in) and 3,25 mm (0.128 in).

— Dimension *e* (optional radius all around the perimeter of the card).

— Edge burrs shall not exceed 0,08 mm (0.003 in) above the card surface.

The addition of an optional 0,3 mm ± 0,1 mm radius, *e*, is recommended. Adding such a radius will make it easier to slide this thicker card into a wallet card holder.



Key

1 top reference edge

2 left edge

Figure A.1 — ID-T size card dimensions

A.4 Bending stiffness

The bending stiffness of ID-T size cards shall be such that deformations in normal use (bends not creases) can be removed by the recording or printing device without impairing the function of the card. The deformation which occurs when the card is subjected to the test load as described in ISO/IEC 10373-1 shall be 35 mm (1.378 in) maximum. The card shall return to within 1,5 mm (0.06 in) of its original flat condition within one minute after the load is removed.

A.5 Overall card warpage

The maximum distance from a flat rigid plate to any portion of the surface of an ID-T size card shall not be greater than the card thickness d + 1,5 mm (d + 0.059 in).

Annex B
(normative)

ID-B size card

B.1 General

ID-B size cards have the same length and width as a normal ID-1 size card with a thickness between that of an ID-1 card and an ID-T card. The additional thickness relative to that of an ID-1 card typically is used to accommodate electronic card components used for biometric capture devices. This card format is intended to accommodate certain restrictions of current manufacturing technology.

ID-B size cards are not intended for use with any type of insertion reader typically used with an ID-1 size card such as for magnetic stripe or ICC contact readers and shall not support interfaces such as magnetic stripes or contact IC cards. ID-B size cards typically only support contactless interfaces as specified in ISO/IEC 14443-1.

ID-B cards, which are cards containing functionality specified in this document, with the width and height of an ID-1 card and a thickness between 0,84 mm and 2,25 mm, shall not be issued into applications that include any card reading devices other than contactless readers that do not require insertion of the card, or into applications where such cards could be easily mistaken for a card intended for such card reading devices. ID-B cards are intended only for environments where there is a low risk of inserting a card into a card reader intended for ID-1 sized cards.

NOTE Manufacturers, personalizers, and issuers are encouraged to inform the users of ID-B cards of the above risks and restrictions.

This annex specifies physical characteristics for such a thicker card if it is used.

B.2 Conformance

ID-B size cards shall meet all requirements given in ISO/IEC 7810 for ID-1 size cards except as noted in this annex.

NOTE Dynamic bending stress and dynamic torsional stress in ISO/IEC 10373-1 apply only to ID-B size cards complying with ISO/IEC 7810 bending stiffness of ID-1 size cards, see also Annex C.

B.3 Dimensions

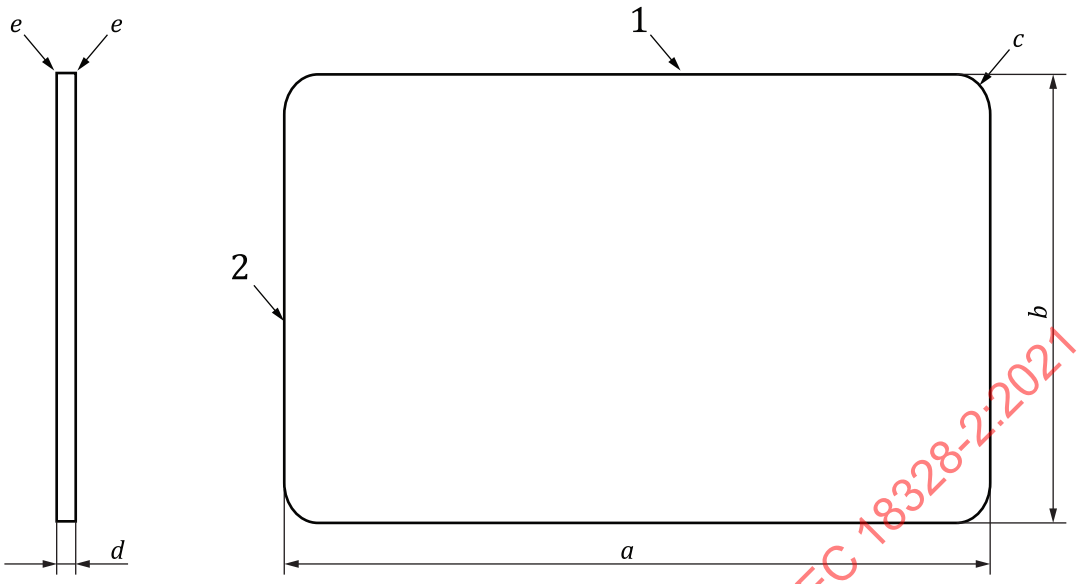
— Dimensions *a*, *b* and *c* (see Figure B.1) shall be as defined for an ID-1 size card, however, with an extended tolerance of ±0,5 mm, i.e. dimension *a* shall be between 85,10 mm and 86,10 mm and dimension *b* shall be between 53,48 mm and 54,48 mm.

— Dimension *d* shall be between 0,84 mm (0.033 in) and 2,25 mm (0.089 in), non-inclusive.

— Dimension *e* (optional radius all around the perimeter of the card).

— Edge burrs shall not exceed 0,08 mm (0.003 in) above the card surface.

The addition of an optional 0,3 mm ± 0,1 mm radius, *e*, is recommended. Adding such a radius will make it easier to slide this thicker card into a wallet card holder.



Key

1 top reference edge

2 left edge

Figure B.1 — ID-B size card dimensions

B.4 Bending stiffness

The bending stiffness of ID-B size cards shall be such that deformations in normal use (bends not creases) can be removed by the recording or printing device without impairing the function of the card. The deformation which occurs when the card is subjected to the test load as described in ISO/IEC 10373-1 shall be 35 mm (1.378 in) maximum. The card shall return to within 1,5 mm (0.06 in) of its original flat condition within one minute after the load is removed.

B.5 Overall card warpage

The maximum distance from a flat rigid plate to any portion of the surface of an ID-B size card shall not be greater than the card thickness d + 1,5 mm (d + 0.059 in).

Annex C
(informative)

Applicability of ISO/IEC 10373-1 test methods for ID-T and ID-B size cards

Table C.1 summarizes the applicability of test methods for characteristics of identification cards specified in ISO/IEC 10373-1 for ID-T and ID-B size cards.

Table C.1 — Tests for ID-T and ID-B size cards

ISO/IEC 10373-1:2020 sub-clause	Test	Applicability
5.1	Card warpage	see A.5 (ID-T) or B.5 (ID-B)
5.2	Dimensions of cards	see A.3 (ID-T) or B.3 (ID-B)
5.3	Peel strength	typically n.a. for displays, buttons, keypads
5.4	Peel strength including the edge of the card	typically n.a. for displays, buttons, keypads
5.5	Resistance to chemicals	applicable
5.6	Card dimensional stability and warpage with temperature and humidity	applicable
5.7	Adhesion or blocking	applicable
5.8	Bending stiffness	see A.4 (ID-T) or B.4 (ID-B)
5.9	Dynamic bending stress	applicable only to cards that comply with the ID-1 bending stiffness requirement
5.10	Dynamic torsional stress	applicable only to cards that comply with the ID-1 bending stiffness requirement
5.11	Opacity	applicable
5.12	X-rays	applicable
5.13	Embossing relief height of characters	applicable
5.14	Resistance to heat	applicable
5.15	Surface distortions, raised areas and de-pressed areas	applicable
6.6	ESS - Electrostatic stress for PICC and VICC	applicable
6.9	ICC - Mechanical strength: 3 wheel test for ICCs with contacts	applicable only to cards that comply with the ID-1 bending stiffness requirement

Annex D
(informative)

Further test methods

D.1 Impact stress

This stress method applies a certain forced impact to the card to simulate mechanical stress. The test method is a variant of the "impact stress method" specified in ISO/IEC 18745-1:2018, 8.5, where repeated overlapping stamping is applied.

Test parameters include:

— mass *M* of the stamp/weight;

— nominal height *H* (mm) from which an impact stamp/weight is dropped onto the card, thereby defining an impact velocity according to the formula for acceleration of inert bodies under earth gravitation;

— dimensions of the impact area of the stamp, e.g. its diameter.

The stamping test shall be conducted on both sides of the card with an apparatus as described in ISO/IEC 18745-1:2018, 8.5. The impact stamp of mass *M* is dropped from a height *H* at predefined locations of the card, moving from first to last location progressing from left to right and from top to bottom.

The locations shall be defined such that the impact areas overlap and all areas of the card are stamped. If the fragile area of the card is obvious it is acceptable to limit drops to this area.

D.2 Advanced 3-wheel test

D.2.1 Overview

The purpose of this test is to determine the mechanical robustness of an ICC by moving the ICC cyclically between three steel wheels rolling over mechanically sensitive areas (MSAs) such as areas containing a display, an IC or ISO/IEC 7816-2 contacts. This test is only applicable to cards that comply with the ID-1 bending stiffness requirement.

NOTE This test can be irrelevant for MSAs with an area of less than 4 mm^2.

D.2.2 Default requirement

Every MSA on an ICC shall be robust against local mechanical stress as it typically occurs during processing, personalization, and normal use of the card.

To ensure this, every MSA on the card shall pass the following requirement, unless a different force is specified by the corresponding requirement or specification:

— 3-wheel test with 8 N force for 2 × 50 cycles, horizontally and vertically.

D.2.3 Test locations and directions

The test shall be carried out over every MSA. MSAs shall at least include:

— every display;

— every integrated circuit inside the card with an area of more than 4 mm^2;

— ISO/IEC 7816-2 contact areas.

The test shall be conducted in horizontal and vertical directions.

The plane through the centres of the three wheels shall coincide with the horizontal or vertical centreline of the MSA, depending on the direction of the test.

D.2.4 Apparatus

The principle of the apparatus is shown in Figure D.1. The principle comprises three wheels, one above and two below the ICC. The ICC is moved cyclically between the three wheels, so that the MSA is repeatedly exposed to the forces exerted by the wheels.

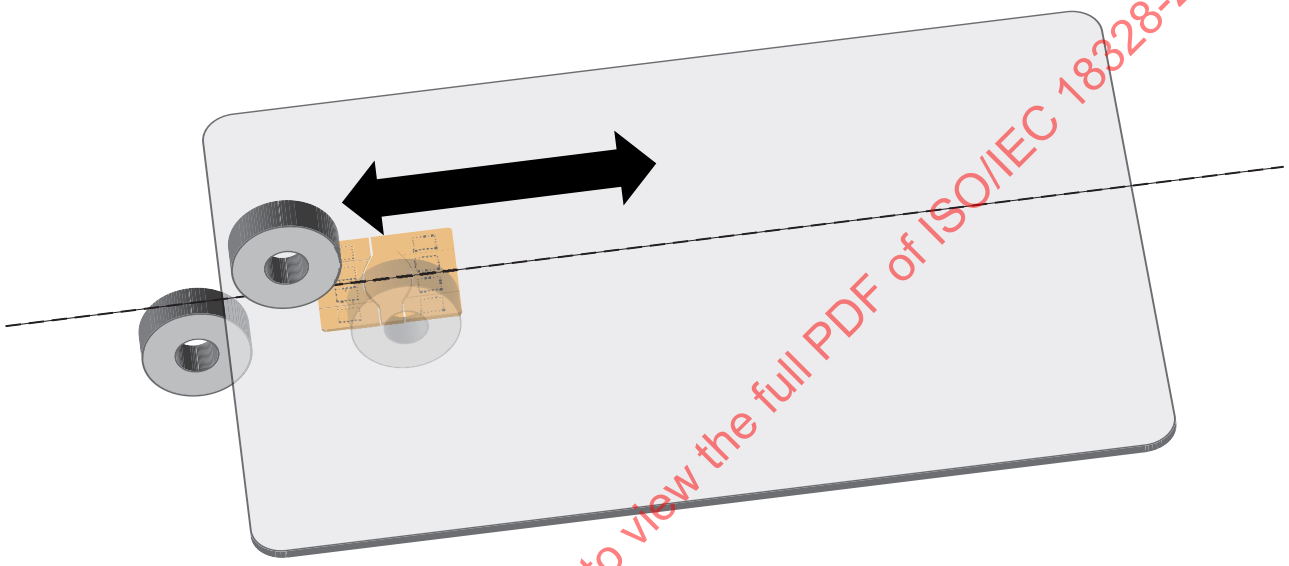
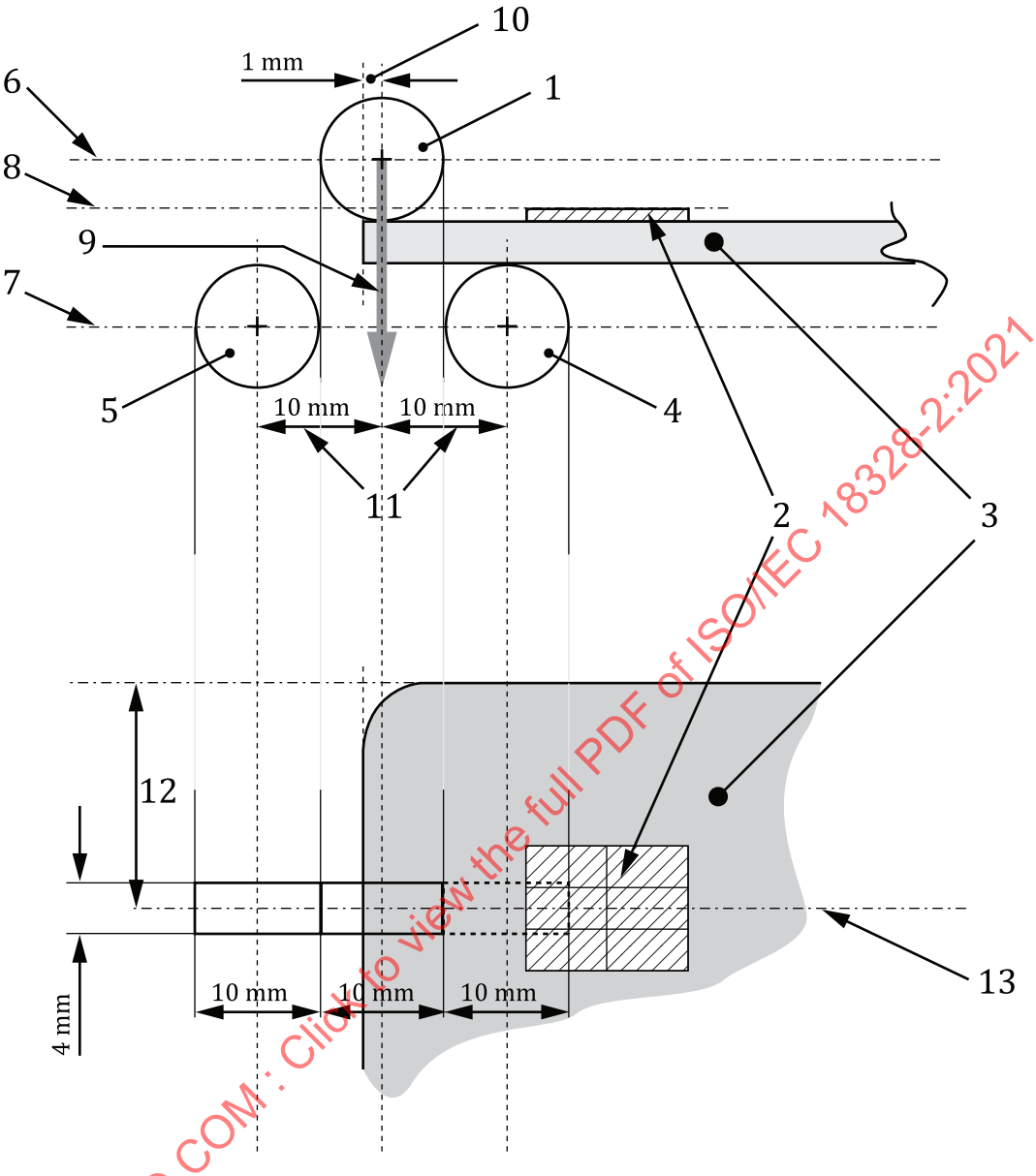


Figure D.1 — 3-wheel test principle

NOTE Figure not to scale.

The apparatus shall comprise three wheels mounted as shown in Figure D.2. Wheels W2 and W3 are fixed. Wheel W1 can move in the direction perpendicular to the surface of the ICC with a maximum error of ± 5° and applies a force FW1 in the direction shown in Figure D.2 to the surface of the ICC. The force F_{W1} shall be applied by means of a static weight (in contrast to the dynamic stress that would be applied by a spring, stepper motor or pneumatic cylinder) fixed above wheel W1 such that the force direction shall pass through the axis of wheel W1. The resulting downward movement of wheel W1 shall be limited, so that the minimum distance between axis B in Figure D.2 and the surface of wheel W1 is between 4,0 mm and 4,5 mm.

The magnitude of the force F_{W1} shall be as defined by the requirement or, if the requirement does not define a value, 8,0 N ± 0,5 N.



Key

1 wheel W1
2 MSA
3 ICC
4 wheel W2
5 wheel W3
6 axis A
7 axis B
8 axis C
9 force F_{W1}
10 $d_{initial}$
11 d_{min}
12 $d_{perpendicular}$
13 axis A, B, C

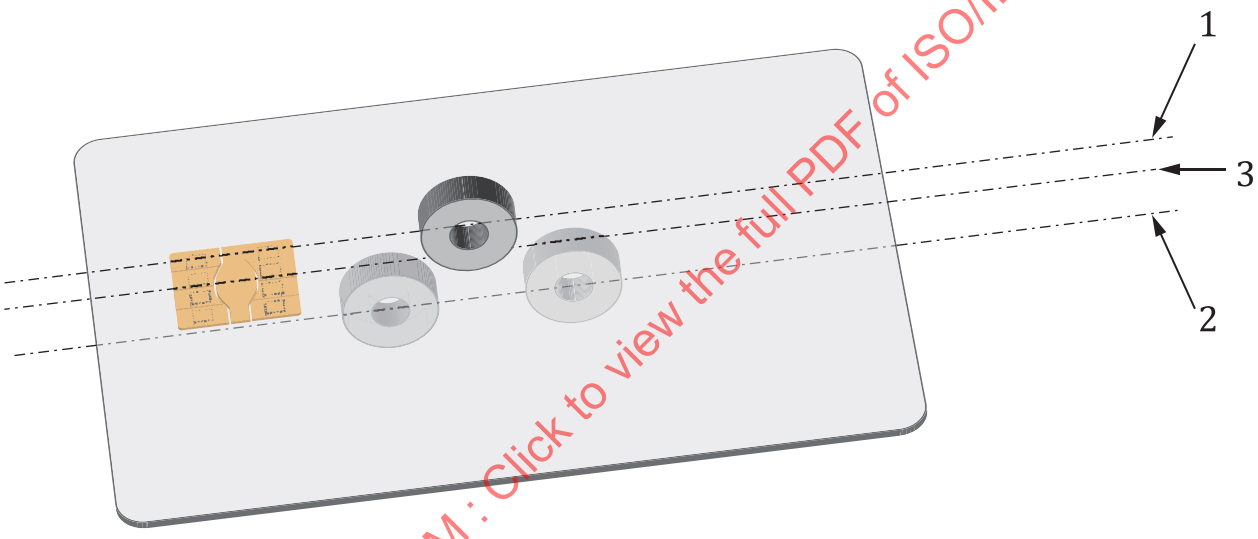
Figure D.2 — Location of the wheels and initial position of the ICC

The method by which the ICC is held in position shall be such that it does not prevent deformation of the ICC during testing around the MSA. To achieve this, the distance between the area of the ICC touched by the wheel W1 during testing, and any device holding the card during the test shall be at least 20 mm in the direction of axis A and 10 mm perpendicular to the direction of axis A.

The wheels shall have a standard chamfer and run on low-friction bearings, e.g. ball bearings. The part of the ICC moving over W2 shall be free to bend.

Dimension d_{initial}, defined in Figure D.2, shall be such that the distance between the edge of the MSA closest to wheel W1, and the area where wheel W1 touches the surface of the ICC in the initial position, is at least 10 mm, provided that the wheel W1 remains on the ICC's surface. Should the wheel W1 leave the ICC's surface when positioned at a distance d_{initial} from the edge of the MSA, then d_{initial} shall be adjusted such that the initial position of wheel W1 is at the distance d_{min} from the edge of the ICC. Distance d_{min} shall be 1 mm ± 1 mm.

The dimension $d_{\text{perpendicular}}$, which is the distance between the edge of the card and the plane through the centres of the three wheels, defined by the axes A and B (see Figure D.3), shall not differ from the distance between the ICC's edge and the geometric centre of the MSA by more than 1,0 mm during the test.

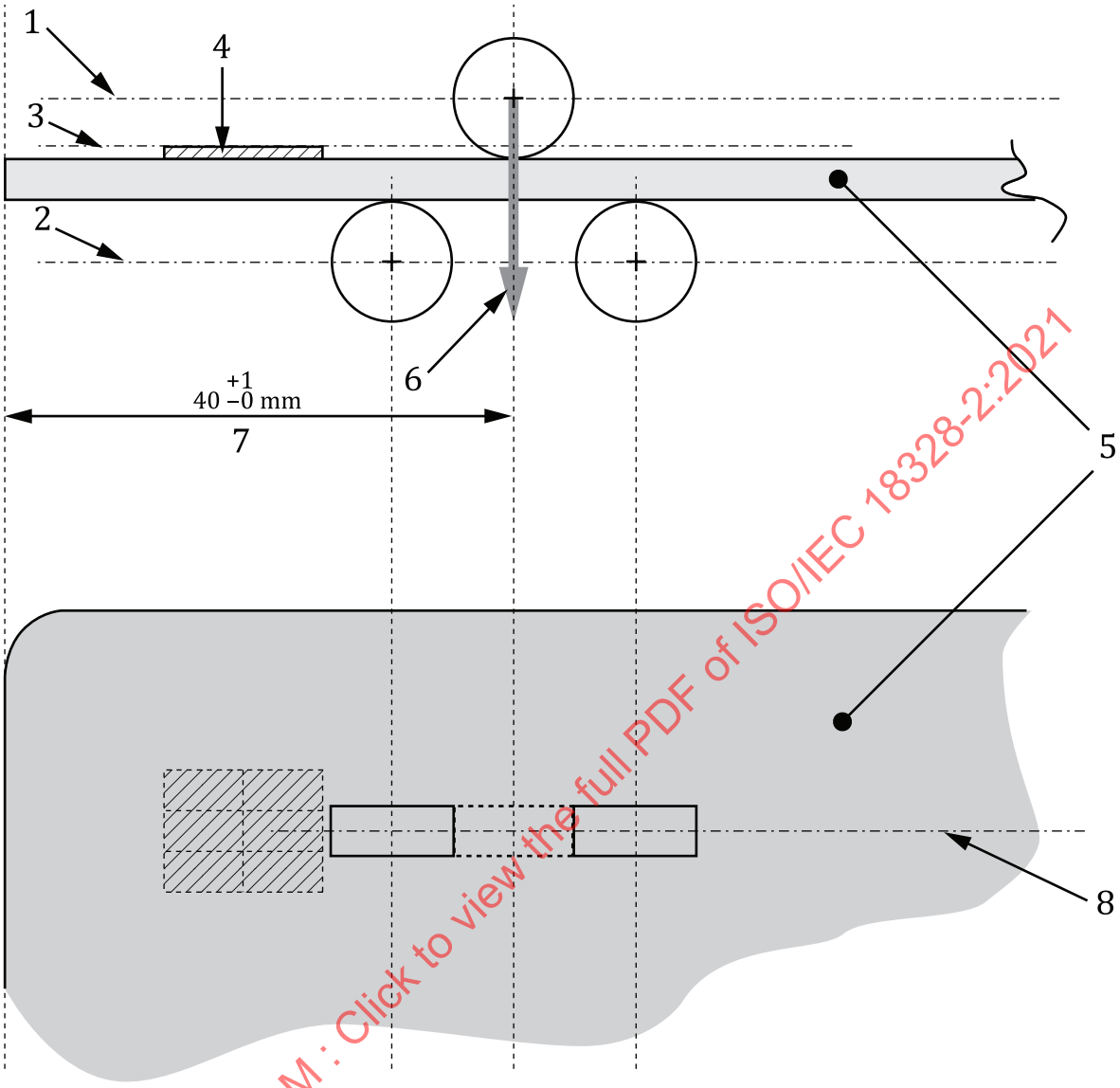


Key

1 axis A
2 axis B
3 axis C

Figure D.3 — Location of axes A, B, and C

NOTE Figure not to scale.



Key

1 axis A
2 axis B
3 axis C
4 MSA
5 ICC
6 force F_{W1}
7 $d_{inserted}$
8 axis A, B, C

Figure D.4 — ICC in fully inserted position

Dimension $d_{inserted}$, defined in Figure D.4, shall be such that the distance between the edge of the MSA closest to wheel W1, and the area where wheel W1 touches the surface of the ICC in the initial position, is at least 10 mm, provided that the wheel W1 remains on the ICC's surface. Should the wheel W1 leave the ICC's surface when positioned at a distance $d_{inserted}$ from the edge of the MSA, then $d_{inserted}$ shall be adjusted such that the initial position of wheel W1 is at the distance d_{min} from the edge of the ICC. Distance d_{min} shall be 1 mm ± 1 mm.

The stroke of the apparatus shall be adjusted such that it moves the card between the wheels such that at the initial position the wheel W1 touches the surface of the ICC at a distance $d_{initial}$ from the inner edge of the MSA and at the fully inserted position at a distance $d_{inserted}$ from the outer edge of the MSA. Hence the stroke of the apparatus shall be

$$d_{initial} + b_{MSA} + d_{inserted}$$

where b_{MSA} denotes the width of the MSA.

NOTE The 'inner edge of the MSA' is the edge that gets inserted first into the wheel arrangement; the 'outer edge' is the edge that gets inserted last into the wheel arrangement.

For performing the test, it is not recommended to clamp the ICC but to use an ICC holding geometry as specified in Figures D.5 and D.6. The holding geometry shall overlap the card 5 mm from the edges in all four corners (see Figure D.5), provide a space of about 2 mm above and below the card surface (see Figure D.6), and a space of about 0,2 mm from the edges in case of a maximum sized new ID-1 card (see Figure D.5).

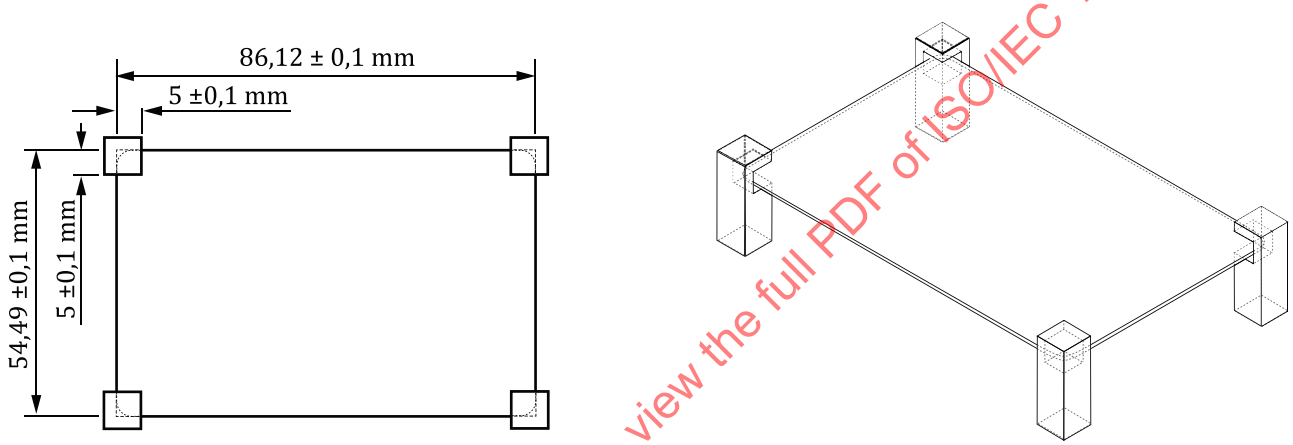


Figure D.5 — ICC holding geometry with ICC (top view and 3D view)

Figure D.6 — ICC holding geometry detail

D.2.5 Test positions

Determine the MSAs of the ICC. The MSAs shall include:

— display;

— each IC with an area of more than 4 mm^2.

For each MSA, determine the geometrical centre:

— for an MSA visible on the surface, determine the geometrical centre of the visible part of the MSA;

— for an MSA not visible on the surface, determine the geometrical centre of the component from the specification.

Determine the two axes C for each MSA:

— the horizontal axis through the geometrical centre of the MSA;

— the vertical axis through the geometrical centre of the MSA.

D.2.6 Procedure

During all movements inside the apparatus as described below, the speed of the ICC shall not exceed 100 mm/s.

During all movements the angle between axis C and the plane defined by axis A and axis B shall not exceed 2°.

For each MSA and axis C of the MSA, conduct the following procedure:

a) Pre-condition the sample ICC.

b) Verify that the ICC is fully functional.

c) Insert the ICC into the apparatus in the initial position with the MSA facing upwards as shown in Figure D.2.

d) Move the ICC within the apparatus into the inserted position as shown in Figure D.4.

e) Withdraw the ICC to the initial position.

NOTE Steps c) to e) are defined as one cycle.

f) Repeat c) to e) for a total number of cycles defined by the requirement with a frequency of 0,5 Hz ± 0,2 Hz. or, if the requirement does not define the number of cycles, for 50 cycles.

g) Insert the ICC into the apparatus in the initial position, but with the contacts facing downwards. Note that the apparatus typically requires re-adjustment so that the axes A and B, and axis C are in the same plane after the ICC is turned over.

h) Move the ICC within the apparatus into the inserted position.

i) Withdraw the ICC to the initial position.

j) Repeat g) to i) with a frequency of 0,5 Hz ± 0,2 Hz for a total number of cycles defined by the base standard; or, if the base standard does not define the number of cycles, for 50 cycles.

k) Check if the ICC remains fully functional as intended and if the MSA shows any visible indication of damage and note the result.

D.2.7 Test report

The report shall state if the ICC remains fully functional as intended.

D.3 Resistance of a display to local impact

D.3.1 General

An ICC containing a display shall remain fully functional after exposure to the test method specified in this subclause.

D.3.2 Overview

The purpose of this test is to determine the mechanical robustness of a display inside an ICC by dropping a steel ball with a defined impact energy onto the display and checking the display for damages.

D.3.3 Default requirements

Every display visible on the surface of the card shall resist a local impact with a kinetic energy of 10 mJ by a steel ball of a diameter of 10 mm.

D.3.4 Apparatus

D.3.4.1 Rigid level base plate, with at least the size of an ICC.

D.3.4.2 Steel ball, with a diameter of 10 mm.

The steel ball is dropped onto the centre of the MSA from a height defined in the requirement.

The kinetic energy of the steel ball at the moment of impact onto the surface of the MSA surface depends on the drop height and is approximately as shown in Table D.1.

Table D.1 — Kinetic energy of the steel ball at the moment of impact onto the surface of the MSA

Impact height [m]	Kinetic energy [mJ]
0,05	2,03
0,1	4,06
0,15	6,09
0,2	8,12
0,25	10,15
0,3	12,17

D.3.5 Procedure

Place the card on the rigid level base plate.

Drop the steel ball three times, from a height defined in the requirement, onto the geometrical centre of each MSA. Then check if the ICC remains fully functional and check the MSA for visual damage, e.g.:

— On displays: cracks, black spots.

D.3.6 Test report

The following should be contained in the test report:

— the exact weight of the steel ball;

— the height from which the steel ball is dropped;

— if the ICC remains fully functional after the impact, including ability of any contained display to show all relevant characters;

— for each MSA, if any defects, e.g. black spots or cracks, are visible and if they are, document them adequately, e.g. through photographs.

Annex E
(informative)

Coexistence of new devices with existing technologies

E.1 General

This annex defines the conditions under which new devices can coexist with other machine-readable card technologies.

E.2 General structure

E.2.1 Technology combinations

E.2.1.1 General

This document provides details to assist ICC manufacturers and issuers in achieving a coexistence of new devices and existing machine-readable technologies on the surface or within the structure of ICCs complying with the requirements of ISO/IEC 18328 (all parts).

Numerous combinations of technology are possible. This annex describes the combination of new devices with the following:

— embossing;

— magnetic stripe;

— contacts for ICC;

— antenna for contactless ICC;

— optical memory area;

— biometric capture device;

— machine-readable zone (MRZ).

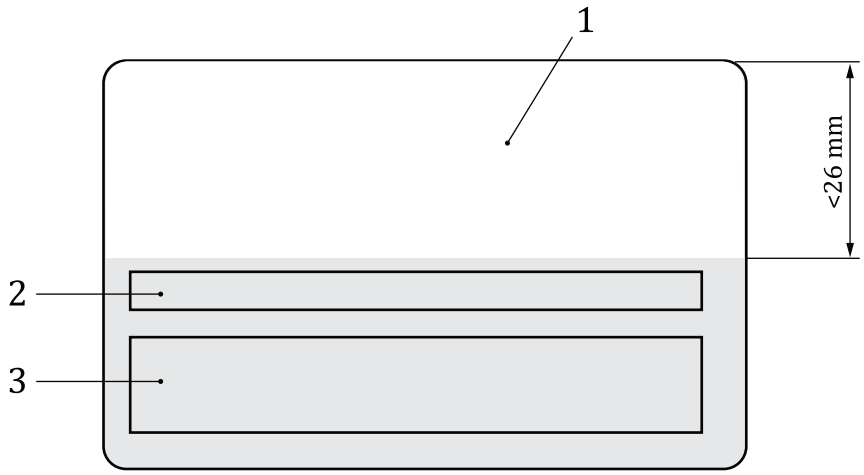
Each assigned location of each technology in relation to new devices is defined. In all cases, each technology should be located according to its own applicable standards.

E.2.1.2 Embossing

When a new device is combined with embossing, the layout of the card should be as shown in Figure E.1.

The location and dimensions of the embossing should be in accordance with ISO/IEC 7811-1.

When the technology used to form the raised areas causes a physical deformation of the card such as mechanical embossing, then special care should be taken that such deformation of the card does not adversely affect the required characteristics of the contained components for new devices. A minimum distance of 3 mm between the contained new devices and any deformed part of the card is recommended.



Key

1 recommended position
2 identification number line
3 name and address area

NOTE Refer to ISO/IEC 7811-1 for details.

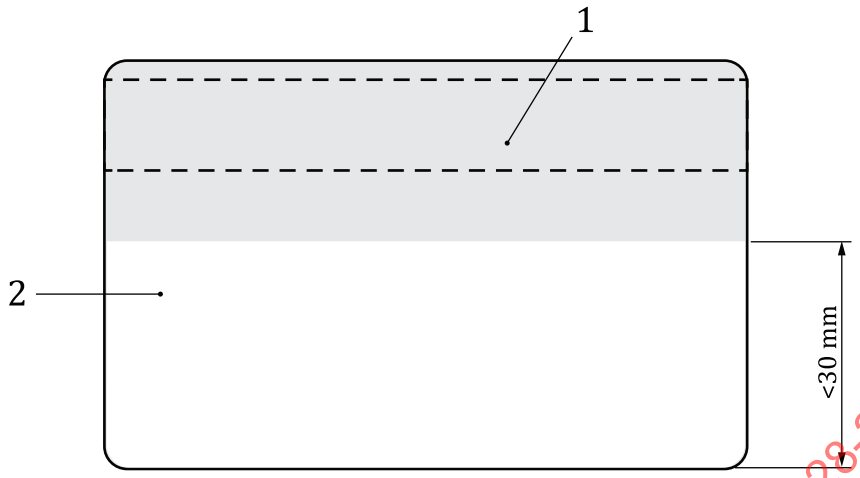
Figure E.1 — Coexistence of new technologies with embossing

E.2.1.3 Magnetic stripe

When a new device is combined with a magnetic stripe, the layout of the card should be as shown in Figure E.2.

The location and dimensions of the magnetic stripe should be in accordance with ISO/IEC 7811-2, ISO/IEC 7811-6, ISO/IEC 7811-7 and ISO/IEC 7811-8.

It is possible to position the device on the opposite side of the magnetic stripe (i.e. the front surface). In this case, the device should not affect reading or writing of the magnetic data. The device should satisfy the surface profile, warpage, and surface distortion requirements as defined in the respective parts of ISO/IEC 7811.



Key

1 magnetic stripe (on reverse side)

2 recommended position

NOTE Refer to ISO/IEC 7811-2, ISO/IEC 7811-6, ISO/IEC 7811-7, and ISO/IEC 7811-8 for details.

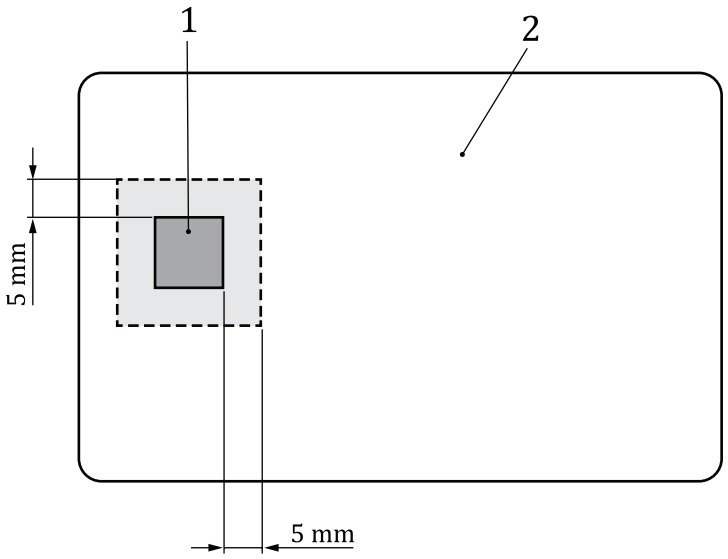
Figure E.2 — Coexistence of new technologies with magnetic stripe

E.2.1.4 Contacts for ICC

When a new device is combined with an ICC with contacts, the layout of the card should be as shown in Figure E.3. A minimum distance of, e.g. 5 mm, between the new device and the contact area is recommended.

The location of the contacts should be in accordance with ISO/IEC 7816-2.

It is possible to position the device opposite side of the contacts (i.e. the back surface). In this case, the device should not affect the physical and electrical characteristics of the contacts.



Key

1 contact area

2 recommended position

NOTE Refer to ISO/IEC 7816-1 and ISO/IEC 7816-2 for details.

Figure E.3 — Coexistence of new technologies with contacts for ICC

E.2.1.5 Antenna for contactless ICC

When a new device is combined with a contactless ICC, the new device should not affect the electrical and electromagnetic coupling characteristics of the antenna. The antenna location varies; refer to ISO/IEC 14443-1 and ISO/IEC 15693-1 for details.

E.2.1.6 Optical memory area

When a new device is combined with an optical memory, the new device should not affect the optical memory area. The optical memory area varies; refer to ISO/IEC 11693-1, ISO/IEC 11693-2, ISO/IEC 11694-2, and ISO/IEC 11695-2 for details.

E.2.1.7 Biometric capture device

When a new device is combined with a biometric capture device, the layout of the card should be as shown in Figure E.4.

The location of the biometrics capture device should be in accordance with ISO/IEC 17839-2. The position of the capture devices is subject to ergonomic requirements and other reserved areas of the card body for active components.