INTERNATIONAL STANDARD

ISO/IEC 10373-6

Second edition
2011-01-15

AMENDMENT 2
2012-10-15

Identification cards — Test methods —

Part 6:
Proximity cards

AMENDMENT 2: Test methods for electromagnetic disturbance

Cartes d'identification — Méthodes d'essai —

Partie 6: Cartes de proximité

AMENDEMENT 2: Méthodes d'essai des perturbations électromagnétiques

Reference number
ISO/IEC 10373-6:2011/Amd.2:2012(E)

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Full document details: ISO_IEC 10373-6_2011_AMD2_2012

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Published in Switzerland

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Foreword

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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.

Amendment 2 to ISO/IEC 10373-6:2011 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

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Identification cards — Test methods —

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AMENDMENT 2: Test methods for electromagnetic disturbance

Page 5, 3.2

Add the following symbol between TM-PDU and $UIDTX_I$:

t_{START} Start of PICC transmission

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Insert the following new subclause 5.5 before Clause 6:

5.5 EMD test setup

5.5.1 General description

The EMD test setup contains:

— a signal generator with low phase noise, which is used to synthesize both an EMD test pattern and PCD test commands sent to the PICC under test;

— the Test PCD assembly;

— a signal amplitude analyzing device:

  — either a signal acquiring device (e.g. oscilloscope) and appropriate computation software,

  — or a spectrum analyzer (see additional constraints in 5.5.2).

The signal amplitude analyzing device shall be able to carry out power versus time measurements with fixed frequency, fixed bandwidth, high dynamic range, low measurement uncertainty and high time resolution.

NOTE The PICC EMD tests may be performed using the RF output signal of a commercial PCD. The PCD EMD test may use a PICC emulator to generate the EMD test pattern.

5.5.2 Computation of power versus time

The beginning of the captured signal shall be windowed by a Bartlett window of exactly two subcarrier cycles. Fourier transformation of these windowed samples produces one power value. By shifting the Bartlett window by steps of 1/*fc* from the beginning to the end of the captured signal, the desired power versus time result is finally computed.

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NOTE The resulting 3 dB-bandwidth of the above described window is 531 kHz and its noise equivalent bandwidth amounts to 843 kHz.

The computation of the power versus time shall be performed at *fc* + *fs* and *fc* − *fs*, using a scaling such that a pure sinusoidal signal results in its peak magnitude. An example of computation is provided in Annex J.

In case of using a spectrum analyzer, the analyzer shall have at least an equivalent analysis bandwidth. It shall pass the noise floor precondition test, as defined in 5.5.3, and there shall be some additional margin of 10/*fc* on $t_{E,PICC}$ requirement and no spikes above the EMD limit.

5.5.3 Noise floor precondition test

In order to ensure a high dynamic range and sufficient sensitivity, a noise floor measurement shall be performed and passed successfully by the EMD test setup. The aim of this precondition test is to verify that the test apparatus used for EMD level measurement satisfies a minimum noise requirement.

The noise floor test is passed if the noise standard deviation is at least three times smaller than the EMD limit $V_{E,PICC}$, when measured as described in 5.5.3.1.

The noise standard deviation is determined by calculating the root-mean-square value of the results of the Fourier transformation, as described in 5.5.2.

NOTE This noise floor can be obtained either with a 14-bit digitizer at a sampling rate of 100 million samples per second or with an 8-bit digital oscilloscope at sampling rate of 1000 million samples per second.

5.5.3.1 Test procedure

Perform the following steps to assess the noise floor at least at H_{min} and H_{max}.

a) Tune the Reference PICC to 13,56 MHz.

b) Adjust the RF power delivered by the signal generator to the Test PCD antenna to the required field strength as measured by the calibration coil.

c) Place the Reference PICC into the DUT position on the Test PCD assembly, set jumper J1 to position 'b' and adjust R2 to obtain a voltage of 6 V (DC) at CON3. Alternatively, jumper J1 may be set to position 'c' and the applied voltage on CON2 is adjusted to obtain a voltage of 6 V (DC) at CON3. In both cases the operating field condition shall be verified by monitoring the voltage in the calibration coil and adjusted if necessary.

d) Record the signal of the sense coils for a time period of at least 250 µs.

e) Compute the noise standard deviations at fc + fs and fc − fs using suitable computer software, as e.g. the one given in Annex J. Check if these noise standard deviations are three times smaller than VE,PICC.

5.5.3.2 Test report

The test report shall state the noise standard deviations at *fc* + *fs* and *fc* – *fs* and shall state whether the requirements have been fulfilled.

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Insert the following new subclauses 7.1.6 and 7.1.7 before 7.2:

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