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Information technology — Telecommunications and information exchange between systems — NFCIP-2 test methods

Technologies de l'information — Téléinformatique — Méthodes d'essai NFCIP-2

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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.

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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

ISO/IEC 19369 was prepared by Ecma International (as ECMA-403) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

Introduction

This International Standard specifies test methods for ISO/IEC 21481 in addition to those specified in the referenced standards.

Information technology — Telecommunications and information exchange between systems — NFCIP-2 test methods

1 Scope

This International Standard specifies requirements to verify NFCIP-2 mode selection and initial communication in the selected modes. The Test Management Service Data Units and the interface over which they are exchanged are out of scope.

2 Conformance

Conforming implementations pass the tests in Clause 6 using the test environment and apparatus as specified in Clause 5.

3 Normative references

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

ISO/IEC 9646, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework*

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

ISO/IEC 10373-7, *Identification cards — Test methods — Part 7: Vicinity cards*

ISO/IEC 14443-3, *Identification cards — Contactless integrated circuit cards — Proximity cards — Part 3: Initialization and anticollision*

ISO/IEC 18092:2013, *Information technology — Telecommunications and information exchange between systems — Near Field Communication — Interface and Protocol (NFCIP-1)* (also published by Ecma as Standard ECMA-340)

ISO/IEC 21481:2012, *Information technology — Telecommunications and information exchange between systems — Near Field Communication Interface and Protocol -2 (NFCIP-2)* (also published by Ecma as Standard ECMA-352)

ISO/IEC 22536:2013, *Information technology — Telecommunications and information exchange between systems — Near Field Communication Interface and Protocol (NFCIP-1) — RF interface test methods* (also published by Ecma as Standard ECMA-356)

ISO/IEC 23917:2005, *Information technology — Telecommunications and information exchange between systems — NFCIP-1 — Protocol Test Methods* (also published by Ecma as Standard ECMA-362)

4 Acronyms

IUT	Implementation Under Test
LT	Lower Tester
TB-PDU	Transmission Block – Protocol Data Unit
TM-SDU	Test Management – Service Data Unit
UT	Upper Tester

5 Test environment and apparatus

The concepts and abstract model of ISO/IEC 9646 are used to verify the operation of an IUT compliant to ISO/IEC 21481.

NFCIP-2 test apparatus consists of an Upper Tester (UT) and a Lower Tester (LT) as illustrated in Figure 1.

To communicate with the IUT, e.g. to select modes on the IUT, the UT and IUT exchange TM-SDUs. The SDU definition and the interface between UT and IUT are out of scope of this International Standard.

The NFCIP-2 test apparatus implements the specified modes at its LT interface according to the requirements of the test scenarios specified in Clause 6.

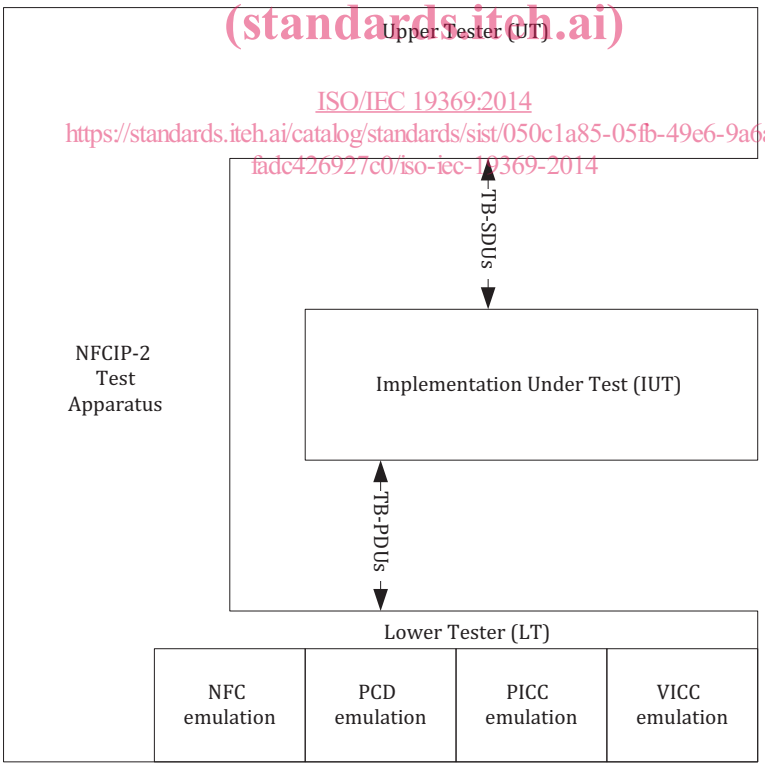

Figure 1 — Test configuration

6 Tests

6.1 Test External RF Field detection

To verify that the IUT does not switch on its RF field, configure the LT as test circuit and perform the test in 8 of ISO/IEC 21481 while using the term NFCIP-2 device instead of NFCIP-1 device.

6.2 Test Mode selection and switching

6.2.1 Test PICC mode

a) Select PICC mode on the IUT and place it into the operating volume of the LT

b) Select PCD mode on the LT, and let the LT send REQA of ISO/IEC 14443-3,

   1) If the IUT answers with ATQA of ISO/IEC 14443-3 within 1 ms and passes the PICC tests specified in ISO/IEC 10373-6, it passes the test, otherwise

   2) Let the LT send REQB of ISO/IEC 14443-3: if the IUT answers with ATQB of ISO/IEC 14443-3 within 1 ms and passes the PICC tests specified in ISO/IEC 10373-6, it passes the test otherwise it fails the test

NOTE The 1 ms limit accommodates NFCIP-2 implementations that alternate between Type A and Type B.

6.2.2 Test NFC mode, Target and Initiator

a) For NFC, VCD and PCD mode selected on the IUT, place it in the operating volume of the LT and let the LT switch its RF field off for at least 5,1 ms, and select Initiator for Active communication mode, on either fc/128, fc/64 or fc/32 on the LT, and let the LT send ATR_REQ of ISO/IEC 18092 (see 8.5.1 of ISO/IEC 23917).

b) To test step 3 of Clause 7 of ISO/IEC 21481, verify that the IUT responds with ATR_RES of ISO/IEC 18092 for all three selected modes.

c) The LT shall switch off its RF field and select NFC mode, Passive communication mode, as a Target on the LT.

d) Select NFC mode on the IUT and verify that the IUT executes one of the Initiator protocols for *fc*/128, *fc*/64 or *fc*/32 of ISO/IEC 18092 as selected (see 9 of ISO/IEC 23917).

6.2.3 Test PCD mode

Use ISO/IEC 10373-6 to verify that the IUT operates in PCD mode with the LT as PICC mode emulator.

6.2.4 Test VCD mode

Use ISO/IEC 10373-7 to verify that the IUT operates in VCD mode with the LT as VICC mode emulator.