



**International  
Standard**

**ISO/IEC 19369**

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

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

**Second edition  
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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.

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](http://www.iso.org/directives) or [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs)).

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology, Subcommittee SC 6, Telecommunications and information exchange between systems*.

This second edition cancels and replaces the first edition (ISO/IEC 19369:2014), which has been technically revised.

The main changes are as follows:

- [Clause 3](#) was added;
- test methods were adapted to align with ISO/IEC 21481;
- [Annex A](#) was added.

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](http://www.iso.org/members.html) and [www.iec.ch/national-committees](http://www.iec.ch/national-committees).

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

## 1 Scope

This document specifies test methods for ISO/IEC 21481 in addition to applicable test methods specified in ISO/IEC 10373-6, ISO/IEC 10373-7 and ISO/IEC 23917.

## 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 9646 (all parts), *Information technology — Open Systems Interconnection — Conformance testing methodology and framework*

ISO/IEC 10373-6, *Cards and security devices for personal identification — Test methods — Part 6: Contactless proximity objects*

ISO/IEC 10373-7, *Cards and security devices for personal identification — Test methods — Part 7: Contactless vicinity objects*

ISO/IEC 14443-3, *Cards and security devices for personal identification — Contactless proximity objects — Part 3: Initialization and anticollision*

ISO/IEC 15693-2, *Cards and security devices for personal identification — Contactless vicinity objects — Part 2: Air interface and initialization*

ISO/IEC 15693-3, *Cards and security devices for personal identification — Contactless vicinity objects — Part 3: Anticollision and transmission protocol*

ISO/IEC 21481:2021, *Information technology — Telecommunications and information exchange between systems — Near field communication interface and protocol 2 (NFCIP-2)*

ISO/IEC 23917, *Telecommunications and information exchange between systems — Near Field Communication Interface and Protocol 1 (NFCIP-1) — Protocol test methods*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions 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

#### PICC mode emulator

functionality to behave as proximity card or object (PICC) mode

Note 1 to entry: PICC mode is specified in ISO/IEC 14443-2, ISO/IEC 14443-3 and ISO/IEC 14443-4.

### 3.2

#### **VICC mode emulator**

functionality to behave as vicinity card or object (VICC) mode

Note 1 to entry: VICC mode shall be compliant with the mandatory VICC requirements of ISO/IEC 15693-2 and ISO/IEC 15693-3.

## **4 Symbols and abbreviated terms**

|        |                                         |
|--------|-----------------------------------------|
| ATQA   | Answer To reQuest, type A               |
| ATQB   | Answer To ReQuest, type B               |
| IUT    | implementation under test               |
| PCD    | proximity coupling device               |
| PICC   | proximity card or object                |
| REQA   | REQuest command, type A                 |
| REQB   | REQuest command, type B                 |
| RF     | radio frequency                         |
| TB-PDU | transmission block – protocol data unit |
| TM-SDU | test management – service data unit     |
| UT     | upper tester                            |
| LT     | lower tester                            |
| VCD    | vicinity coupling device                |
| VICC   | vicinity card or object                 |

## **5 Test environment and apparatus**

The concepts and abstract model of the ISO/IEC 9646 series shall be used to verify the operation of an IUT in accordance with ISO/IEC 21481.

The NFCIP-2 test apparatus consists of a UT and an 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 document.

The NFCIP-2 test apparatus shall implement the specified modes at its LT interface in accordance with the requirements of the test scenarios specified in [Clause 6](#).

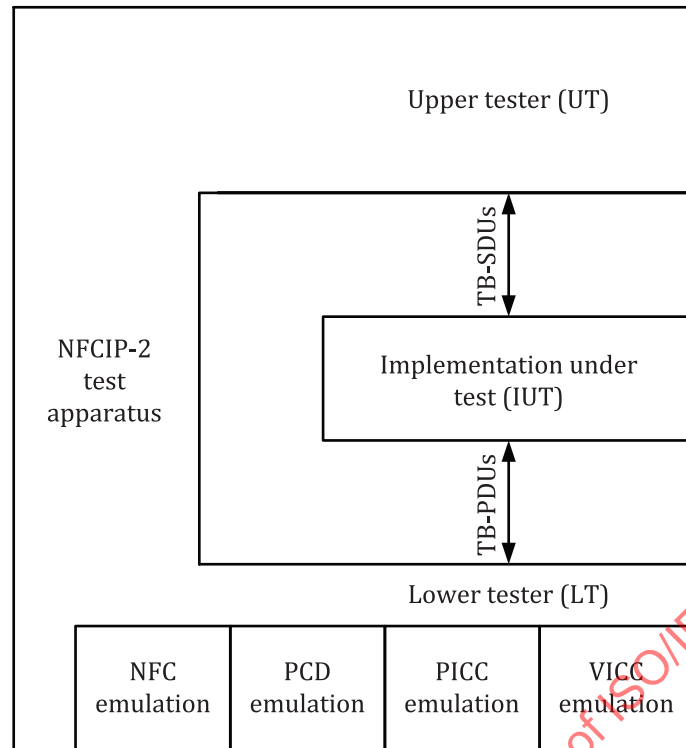


Figure 1 — Test configuration

## 6 Tests

### 6.1 Testing of external RF field detection and RF field generation

This test is to verify that the IUT, on which PCD mode or VCD or NFC initiator for passive communication mode is selected:

- does not switch on its RF field while detecting an external field;
- switches on its RF field when detecting no external field.

To carry this out, configure the LT as a test circuit and perform the following tests:

- a) place IUT in the operating volume of the LT;
- b) let the LT switch on its field;
- c) select VCD mode on IUT and verify that the IUT does not generate a field;
- d) select PCD mode on IUT and verify that the IUT does not generate a field;
- e) select NFC mode (initiator for passive communication mode) on IUT and verify that the IUT does not generate a field.

### 6.2 Testing of mode selection and switching

#### 6.2.1 General

The purpose of the test methods in this subclause is to verify that the behaviour of the IUT in conformity with the requirements for each mode when selecting a mode, i.e. PICC mode, PCD mode, VCD mode and NFC mode.

### 6.2.2 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 to answer with ATQA or ATQB of ISO/IEC 14443-3.

### 6.2.3 Test PCD mode

- a) Place LT in the operating volume of the IUT;
- b) Select PCD mode on the IUT;
- c) Select PICC mode on the LT and use ISO/IEC 10373-6 to verify that the IUT passes all test cases specified for PCD with the LT as PICC mode emulator.

### 6.2.4 Test VCD mode

- a) Place LT in the operating volume of the IUT;
- b) Select VCD mode on the IUT;
- c) Select VICC mode on the LT and use ISO/IEC 10373-7 to verify that the IUT passes all test cases specified for VCD with the LT as VICC mode emulator.

### 6.2.5 Test NFC mode — Target and initiator

- a) Place IUT in the operating volume of the LT;
- b) Select NFC mode on the IUT;
- c) Use ISO/IEC 23917 to verify that the IUT passes all test cases.

## 6.3 Capturing of test results

The test results shall be captured in the test report template as specified in [Annex A](#).



## Annex A

### (normative)

## Test report template

Test report and testing requirements shall be in accordance with ISO/IEC 21481:2021.

Supplier:

Product and sample information:

Number of passed tests versus the total number of tests:

Number of different samples:

Date of the tests:

| No | Test name and reference                                            | Expected result according to ISO/IEC 21481                                                                              | Clause in ISO/IEC 21481:2021 | Condition                                                           | Test results PASS/FAIL |
|----|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------|------------------------|
| 1  | 6.1 Testing of External RF Field detection and RF field generation | The test passes if the IUT does not switch on its field.                                                                | 7, 8                         | VCD mode selected on IUT                                            |                        |
|    |                                                                    |                                                                                                                         |                              | PCD mode selected on IUT                                            |                        |
|    |                                                                    |                                                                                                                         |                              | NFC mode (initiator for passive communication mode) selected on IUT |                        |
| 2  | 6.2.2 Test PICC mode                                               | The test passes if the IUT responds with ATQA/ATQB within 1 ms and passes the PICC tests specified in ISO/IEC 10373-6.  | 9                            | Type A                                                              |                        |
|    |                                                                    |                                                                                                                         |                              | Type B                                                              |                        |
| 3  | 6.2.3 Test PCD mode                                                | The test passes if the IUT passes all test cases in ISO/IEC 10373-6 specified for PCD with the LT as PICC mode emulator | 9                            |                                                                     |                        |
| 4  | 6.2.4 Test VCD mode                                                | The test passes if the IUT passes all test cases in ISO/IEC 10373-7 specified for VCD with the LT as VICC mode emulator | 9                            |                                                                     |                        |
| 5  | 6.2.5 Test NFC mode — Target and initiator                         | The test passes if the IUT passes all test cases in ISO/IEC 23917                                                       | 9                            | Initiator selected on IUT                                           |                        |
|    |                                                                    |                                                                                                                         |                              | Target selected on IUT                                              |                        |