

---

---

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

*Télécommunications et échange d'information entre systèmes —  
Interface et protocole 1 de communication en champ proche  
(NFCIP-1) — Méthodes d'essai du protocole*



This document is a preview generated by EUS



**COPYRIGHT PROTECTED DOCUMENT**

© ISO/IEC 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

Foreword.....	v
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>1</b>
<b>3 Terms and definitions.....</b>	<b>1</b>
<b>4 Symbols and abbreviated terms.....</b>	<b>2</b>
<b>5 Notational conventions.....</b>	<b>4</b>
5.1 Representation of numbers.....	4
5.2 Names.....	4
5.3 Test report.....	4
<b>6 Conformance.....</b>	<b>4</b>
<b>7 Apparatus for testing.....</b>	<b>4</b>
7.1 General.....	4
7.2 Generating the I/O character timing in reception mode.....	4
7.3 Measuring and monitoring the RF I/O protocol.....	4
7.4 Test scenario and report.....	5
7.5 RFU bits.....	6
7.6 General rules.....	6
<b>8 Target test methods.....</b>	<b>6</b>
8.1 General.....	6
8.2 Apparatus for testing the Target (Target-test-apparatus).....	6
8.3 List of protocol test methods related to ISO/IEC 18092.....	6
8.4 Activation in Passive communication mode at $f_c/128$ .....	7
8.4.1 SDD for transport protocol activation.....	7
8.5 Activation in Passive communication mode at $f_c/64$ and $f_c/32$ .....	8
8.5.1 Activation time.....	8
8.5.2 Frame format.....	8
8.5.3 SDD timing.....	9
8.5.4 SDD for transport protocol activation.....	9
8.6 Activation in Active communication mode.....	10
8.6.1 RFCA.....	10
8.7 Logical operation of the Target Transport Protocol.....	11
8.7.1 Handling of ATR_REQ.....	11
8.7.2 Handling of PSL_REQ.....	12
8.7.3 Handling of DEP_REQ Information PDUs.....	13
8.7.4 Handling of DEP_REQ Information PDUs with chaining Initiator to Target and Target to Initiator.....	15
8.7.5 Handling of DEP_REQ supervisory PDUs with timeout bit set to ONE.....	17
8.7.6 Handling of DEP_REQ supervisory PDUs with timeout bit set to ZERO.....	19
8.7.7 Handling of DSL_REQ.....	20
8.7.8 Handling of RLS_REQ.....	21
8.7.9 Handling of WUP_REQ (Active communication mode only).....	22
<b>9 Initiator test methods.....</b>	<b>23</b>
9.1 Apparatus for testing the Initiator (Initiator-test-apparatus).....	23
9.1.1 Initiator-test-apparatus concept.....	23
9.1.2 Protocol activation procedure for Passive communication mode at $f_c/128$ .....	24
9.1.3 Protocol activation procedures for Passive communication mode at $f_c/64$ and $f_c/32$ .....	24
9.1.4 Protocol activation procedures for Active communication mode.....	24
9.2 List of protocol test methods for Initiators.....	24
9.3 Activation in Passive communication mode at $f_c/128$ .....	26
9.3.1 Initial RFCA.....	26

9.3.2	SDD for transport protocol activation .....	26
9.4	Activation in Passive communication mode at $f_c/64$ and $f_c/32$ .....	27
9.4.1	Initial RFCA .....	27
9.4.2	Frame format .....	27
9.4.3	SDD for transport protocol activation .....	28
9.5	Activation in Active communication mode .....	28
9.5.1	Initial RFCA .....	28
9.5.2	Response RFCA with time jitter $n=0$ .....	29
9.6	Logical operation of the Transport Protocol .....	29
9.6.1	Handling of ATR_RES .....	29
9.6.2	Handling of PSL_RES .....	30
9.6.3	Handling of DEP_RES Information PDUs .....	31
9.6.4	Handling of DEP_RES Information PDUs with chaining Initiator to Target and Target to Initiator .....	32
9.6.5	Handling of DEP_RES supervisory PDUs with timeout bit set to ONE .....	35
9.6.6	Handling of DEP_RES supervisory PDUs with timeout bit set to ZERO .....	36
9.6.7	Handling of DSL_RES .....	37
9.6.8	Handling of RLS_RES .....	38
9.6.9	Handling of WUP_RES (Active communication mode only) .....	39
<b>Annex A (normative) Test report template for Target tests .....</b>		<b>41</b>
<b>Annex B (normative) Test report template for Initiator tests .....</b>		<b>45</b>

## 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)).

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO and IEC had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents) and <https://patents.iec.ch>. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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](http://www.iso.org/iso/foreword.html). In the IEC, see [www.iec.ch/understanding-standards](http://www.iec.ch/understanding-standards).

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 23917:2005), which has been technically revised.

The main changes are as follows:

- alignment with the latest edition of ISO/IEC 18092 (the base standard);
- improvement on descriptions of test procedures;
- correction of test scenarios.

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).



# Telecommunications and information exchange between systems — Near Field Communication Interface and Protocol 1 (NFCIP-1) — Protocol test methods

## 1 Scope

This document specifies protocol test methods for Near Field Communication Interface and Protocol 1 (NFCIP-1), as defined in ISO/IEC 18092 (the base standard).

The radio frequency (RF) test methods for NFCIP-1 (also defined in ISO/IEC 18092) are specified in ISO/IEC 22536.

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

ISO/IEC 18092:2023, *Telecommunications and information exchange between systems — Near Field Communication Interface and Protocol (NFCIP-1)*

ISO/IEC 22536, *Information technology — Telecommunications and information exchange between systems — Near Field Communication Interface and Protocol (NFCIP-1) — RF interface test methods*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 18092 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

#### **activation in active communication mode**

flow to activate the device under test (DUT) in *active communication mode* (3.3), which includes initialisation and protocol activation

### 3.2

#### **activation in passive communication mode**

flow to activate the device under test (DUT) in *passive communication mode* (3.5), which includes initialisation and protocol activation

### 3.3

#### **active communication mode**

mode in which both the Initiator and the Target use their own radio frequency (RF) field to enable the communication

[SOURCE: ISO/IEC 18092:2023, 3.1]