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

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



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

This third edition cancels and replaces the second edition (ISO/IEC 18092:2013), which has been technically revised. It also incorporates ISO/IEC 18092:2013/Cor 1:2015.

The main changes are as follows:

- adoption of near field communication (NFC) security standard for the Target;
- harmonization with the NFC Forum Digital Protocol Technical Specification^[2] and Activity Technical Specification^[3].

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.

Introduction

This document specifies the interface and protocol for simple wireless communication between close coupled devices. These Near Field Communication (NFC) devices communicate with bit rates of 106, 212 and 424 kbit/s ($f_c/128$, $f_c/64$ and $f_c/32$).

This allows, but does not specify, applications in network products and consumer equipment.

The first edition of ISO/IEC 18092 was prepared by Ecma International (as ECMA-340) and was adopted, under a special “fast-track procedure”, by Joint Technical Committee ISO/IEC JTC 1/SC 6 in parallel with its approval by national bodies of ISO and IEC. The second edition of ISO/IEC 18092 was maintained by ISO/IEC JTC 1/SC 6 and Ecma International. This third edition of ISO/IEC 18092 is maintained by ISO/IEC JTC 1/SC 6 with the goal to be harmonized with the NFC Forum Digital Protocol Technical Specification^[2] and Activity Technical Specification^[3] maintaining backward compatibility, to enable the NFC security feature and to incorporate clarifications on timings of radio frequency (RF) field switched off.

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

1 Scope

This document defines:

- communication modes for Near Field Communication Interface and Protocol 1 (NFCIP-1) using inductive coupled devices operating at the centre frequency of 13,56 MHz for interconnection of computer peripherals;
- both the active and the passive communication modes of NFCIP-1 to realize a communication network using Near Field Communication (NFC) devices for networked products and for consumer equipment;
- a transport protocol including protocol activation and data exchange methods.

This document specifies:

- modulation schemes;
- codings;
- bit rates;
- frame format of the radio frequency (RF) interface;
- initialisation schemes and conditions required for data collision control during initialisation.

Information interchange between systems is based on agreement between the interchange parties upon the interchange codes and the data structure.

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 13157-1, *Information technology — Telecommunications and information exchange between systems — NFC Security — Part 1: NFC-SEC NFCIP-1 security services and protocol*

ISO/IEC 14443-2:2020, *Cards and security devices for personal identification — Contactless proximity objects — Part 2: Radio frequency power and signal interface*

ISO/IEC 14443-3:2018, *Cards and security devices for personal identification — Contactless proximity objects — Part 3: Initialization and anticollision*

ITU-T V.41:1988, *Code-independent error-control system*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 14443-2 and ISO/IEC 14443-3, and the following apply.