

INTERNATIONAL STANDARD

ISO/IEC 14443-4

Third edition
2016-06-01

Identification cards — Contactless integrated circuit cards — Proximity cards —

Part 4: Transmission protocol

*Cartes d'identification — Cartes à circuit intégré sans contact —
Cartes de proximité —*

Partie 4: Protocole de transmission

Withhold

Reference number
ISO/IEC 14443-4:2016(E)



Withdrawn



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, 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
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols and abbreviated terms	2
5 Protocol activation of PICC Type A	4
5.1 Request for answer to select.....	5
5.2 Answer to select.....	7
5.2.1 Structure of the bytes.....	7
5.2.2 Length byte.....	7
5.2.3 Format byte.....	7
5.2.4 Interface byte TA(1).....	8
5.2.5 Interface byte TB(1).....	9
5.2.6 Interface byte TC(1).....	9
5.2.7 Historical bytes.....	10
5.3 Protocol and parameter selection request.....	10
5.3.1 Start byte.....	10
5.3.2 Parameter 0.....	11
5.3.3 Parameter 1.....	11
5.4 Protocol and parameter selection response.....	11
5.5 Activation frame waiting time.....	12
5.6 Error detection and recovery.....	12
5.6.1 Handling of RATS and ATS.....	12
5.6.2 Handling of PPS request and PPS response.....	12
5.6.3 Handling of the CID during activation.....	13
6 Protocol activation of PICC Type B	13
7 Half-duplex block transmission protocol	13
7.1 Block format.....	14
7.1.1 Length field.....	15
7.1.2 Prologue field.....	15
7.1.3 Information field.....	18
7.1.4 Epilogue field.....	18
7.2 Frame waiting time.....	18
7.3 Frame waiting time extension.....	19
7.4 Power level indication.....	20
7.5 Protocol operation.....	20
7.5.1 S(PARAMETERS) blocks.....	20
7.5.2 Multi-Activation.....	21
7.5.3 Chaining.....	21
7.5.4 Block numbering rules.....	22
7.5.5 Block handling rules.....	23
7.5.6 PICC presence check.....	24
7.5.7 Error detection and recovery.....	24
8 Protocol deactivation of PICC Type A and Type B	25
8.1 Deactivation frame waiting time.....	25
8.2 Error detection and recovery.....	25
9 Activation of bit rates and framing options in the PROTOCOL state	25
10 Frame with error correction	29
Annex A (informative) Multi-Activation example	36

Annex B (informative) Protocol scenarios	37
Annex C (informative) Block and frame coding overview	46
Annex D (normative) Bit rates of $3fc/4$, fc, $3fc/2$ and $2fc$ from PCD to PICC	48
Annex E (informative) CRC₃₂ encoding	50
Annex F (informative) Frame with error correction	52
Annex G (informative) Framing options	54
Bibliography	55

Withdrawn

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

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](#)

The committee responsible for this document is ISO/IEC JTC 1, *Information technology, SC 17, Cards and personal identification*.

This third edition cancels and replaces the second edition (ISO/IEC 14443-4:2008), which has been technically revised. It also incorporates the Amendments ISO/IEC 14443-4:2008/Amd 1:2012, ISO/IEC 14443-4:2008/Amd 2:2012, ISO/IEC 14443-4:2008/Amd 3:2013 and ISO/IEC 14443-4:2008/Amd 4:2014.

ISO/IEC 14443 consists of the following parts, under the general title *Identification cards — Contactless integrated circuit cards — Proximity cards*:

- *Part 1: Physical characteristics*
- *Part 2: Radio frequency power and signal interface*
- *Part 3: Initialization and anticollision*
- *Part 4: Transmission protocol*

Introduction

ISO/IEC 14443 is one of a series of International Standards describing the parameters for identification cards as defined in ISO/IEC 7810, and the use of such cards for international interchange.

The protocol, as defined in this part of ISO/IEC 14443, is capable of transferring the application protocol data units as defined in ISO/IEC 7816-4. Thus, application protocol data units may be mapped as defined in ISO/IEC 7816-4 and application selection may be used as defined ISO/IEC 7816-5.

ISO/IEC 14443 is intended to allow operation of proximity cards in the presence of other contactless cards conforming to ISO/IEC 10536 and ISO/IEC 15693 and near field communication (NFC) devices conforming to ISO/IEC 18092 and ISO/IEC 21481.

The International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this International Standards may involve the use of patents.

Withdrawn

Identification cards — Contactless integrated circuit cards — Proximity cards —

Part 4: Transmission protocol

1 Scope

This part of ISO/IEC 14443 specifies a half-duplex block transmission protocol featuring the special needs of a contactless environment and defines the activation and deactivation sequence of the protocol.

This part of ISO/IEC 14443 is intended to be used in conjunction with other parts of ISO/IEC 14443 and is applicable to proximity cards or objects of Type A and Type B.

2 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 7816-3, *Identification cards — Integrated circuit cards — Part 3: Cards with contacts — Electrical interface and transmission protocols*

ISO/IEC 7816-4, *Identification cards — Integrated circuit cards — Part 4: Organization, security and commands for interchange*

ISO/IEC 14443-2, *Identification cards — Contactless integrated circuit cards — Proximity cards — Part 2: Radio frequency power and signal interface*

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