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Second edition
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# Information technology — Automatic identification and data capture techniques —

## Part 19: Crypto suite RAMON security services for air interface communications

*Technologies de l'information — Techniques automatiques d'identification et de capture de données —*

*Partie 19: Services de sécurité par suite cryptographique RAMON pour communications par interface radio*

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# Foreword

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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) or the IEC list of patent declarations received (see http://patents.iec.ch).

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.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture*.

This second edition cancels and replaces the first edition (ISO/IEC 29167-19:2016), which has been technically revised.

The main changes compared to the previous edition are as follows:

— It was thought that the fixed RAMON key length (KE) of 1 024 bits for tag authentication, defined in the first edition of this document, would maybe not be sufficient for all future uses. The method proposed in this edition allows extending the length of the cryptographic RAMON key by discrete steps of 128 bits. Beyond the previously defined key length of 1 024 bits, key lengths of 1 152, 1 280, 1 408, 1 536, 1 664 bits and beyond become feasible. The current method does not limit the possible key length in any way. The key length only is limited by the ability to send the cryptographic authentication response, which is of equal length to the cryptographic key, back to the interrogator. Allowing extended key length makes sure that the RAMON encryption is future-proofed and security can be improved as needed.

— To support different key lengths in a generic approach, the mix function has been revised.

— To improve the readability and consistency of this document, the specification of the cipher and the description of the TLV record have been separated into independent subclauses.

— A new TLV-Structure, supporting data identifiers according to ASC MH 10, was added.

A list of all parts in the ISO 29167 series can be found on the ISO website.

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.

# Introduction

This document specifies the security services of a Rabin-Montgomery (RAMON) crypto suite. It is important to know that all security services are optional. The crypto suite provides Tag authentication security service.

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 Standard may involve the use of patents concerning radio-frequency identification technology given in the clauses identified below.

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# Information technology — Automatic identification and data capture techniques —

# Part 19: Crypto suite RAMON security services for air interface communications

## 1 Scope

This document defines the Rabin-Montgomery (RAMON) crypto suite for the ISO/IEC 18000 series of air interfaces standards for radio frequency identification (RFID) devices. Its purpose is to provide a common crypto suite for security for RFID devices that can be referred to by ISO/IEC for air interface standards and application standards.

This document specifies a crypto suite for Rabin-Montgomery (RAMON) for air interface for RFID systems. The crypto suite is defined in alignment with existing air interfaces.

This document defines various authentication methods and methods of use for the cipher. A Tag and an Interrogator can support one, a subset, or all of the specified options, clearly stating what is supported.

## 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 8825-1, *Information technology — ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER) — Part 1*

ISO/IEC 15962:2013, *Information technology — Radio frequency identification (RFID) for item management — Data protocol: data encoding rules and logical memory functions*

ISO/IEC 18000-3, *Information technology — Radio frequency identification for item management — Part 3: Parameters for air interface communications at 13,56 MHz*

ISO/IEC 18000-4, *Information technology — Radio frequency identification for item management — Part 4: Parameters for air interface communications at 2,45 GHz*

ISO/IEC 18000-63:2015, *Information technology — Radio frequency identification for item management — Part 63: Parameters for air interface communications at 860 MHz to 960 MHz Type C*

ISO/IEC 19762, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19762 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp