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~~Information and documentation — RFID in libraries — Part 4: Encoding of RFID data elements based on rules from ISO/IEC 15962 in an RFID tag with partitioned memory~~

~~Information et documentation — RFID dans les bibliothèques — Partie 4: Encodage des éléments de données RFID fondé sur les règles de l'ISO/CEI 15962 ans une étiquette de RFID avec la mémoire divisée~~

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 ISO documentsdocument 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).

Field Code Changed

Attention is drawnISO draws attention to the possibility that some of the elementsimplementation of this document may beinvolve the subjectuse of (a) patent(s). ISO takes 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 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. ISO 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).

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For an explanation onof 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 the following URL: Foreword – Supplementary informationwww.iso.org/iso/foreword.html.

The committee responsible for thisThis document iswas prepared by Technical Committee ISO/TC 46, *Information and documentation,* Subcommittee SC 4, *Technical interoperability*.

This second edition cancels and replaces the first edition (ISO/TS 28560-4:2014), of which it constitutes a minor revision. A few updates are made and a paragraph about RFID Emblem is addedhas been technically revised.

The main changes are as follows:

— a few updates are made and a new clause (see Clause 11) about RFID Emblem has been added;

— Annexes B, C and D have been changed to informative.

A list of all parts in the ISO 28560 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.htmlwww.iso.org/members.html.

Introduction

Libraries are implementing radio frequency identification (RFID) as item identification to replace bar codes. RFID streamlines applications like user self-service, security, and materials handling. This standard data model for encoding information on RFID tags increases the cost-effectiveness of the technology within libraries particularly through greater interoperability of RFID tags and equipment, and enhance support for resource sharing between libraries.

A standard data model, taking into account the lessons learned from the national schemes and vendor solutions was developed with ISO 28560-1, which defines the set of mandatory and optional data elements. ISO 28560-2 and ISO 28560-3 define encoding rules for those libraries that choose to use High Frequency RFID technology operating at 13,56 MHz.

This ~~part of ISO 28560~~document defines encoding rules for those libraries that choose to use UHF RFID technology operating at 860 MHz to 960 MHz, with the interrogators (readers) set to conform to local radio regulations that specify only part of this spectrum. The UHF tags can function efficiently in any of the radio regulated regions. This ~~part of ISO 28560~~document uses encoding rules that are specified in ISO/IEC 15962, as does ISO 28560-2. Some of the encoding rules are different because of the nature of the different RFID technology, but a number of rules are similar if not identical.

~~Information and documentation — RFID in libraries — Part 4: Encoding of RFID data elements based on rules from ISO/IEC 15962 in an RFID tag with partitioned memory~~

Information and documentation — RFID in libraries — Part 4: Encoding of data elements based on rules from ISO/IEC 15962 in an RFID tag with partitioned memory

1 Scope

This ~~part of ISO 28560~~document defines rules for ISO 28560-1 data elements to be encoded in radio frequency identification (RFID) tags with a memory structure that is partitioned into four memory banks. This primarily applies to ISO/IEC 18000-63 (previously known as ISO/IEC 18000-6 Type C) operating in the UHF frequency, but not necessarily restricted to this technology.

The rules for encoding a subset of data elements taken from the total set of data elements defined in ISO 28560-1 are based on ISO/IEC 15962, which uses an object identifier structure to identify data elements. This ~~part of ISO 28560~~document defines the rules for encoding a unique item identifier in a specific memory bank, known as MB 01, taking into account different requirements for privacy. It also defines the rules for encoding other relevant data in a separate memory bank, known as MB 11. Each of these memory banks is addressable using different command set of the appropriate RFID technology.

As with other parts of ISO 28560, this ~~part of ISO 28560~~document is appropriate for the needs of all types of libraries (including academic, public, corporate, special, and school libraries).

This ~~part of ISO 28560~~document provides essential standards-based information about RFID in libraries. A source of additional information about implementation issues is provided in Annex A.

2 Normative references

The following documents~~,~~ are referred to in ~~whole~~the text in such a way that some or ~~in part, are normatively referenced in~~all of their content constitutes requirements of 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 15961-1, *Information technology — Radio frequency identification (RFID) for item management: Data protocol — Part 1: Application interface*

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

ISO/IEC 18000-63, *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 18046-1, *Information technology — Radio frequency identification device performance test methods — Part 1: Test methods for system performance*

ISO/IEC 18046-2, *Information technology — Radio frequency identification device performance test methods — Part 2: Test methods for interrogator performance*

ISO/IEC 18046-3, *Information technology — Radio frequency identification device performance test methods — Part 3: Test methods for tag performance*

ISO/IEC 18047-6, *Information technology — Radio frequency identification device conformance test methods — Part 6: Test methods for air interface communications at 860 MHz to 960 MHz*

ISO 28560-1, *Information and documentation — RFID in libraries — Part 1: Data elements and general guidelines for implementation*

~~ISO/IEC 29160, *Information technology — Radio frequency identification for item management — RFID Emblem*~~

43 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
access method
component of the *DSFID* (3.8) that is responsible for declaring the ISO/IEC 15962 compaction and encoding rules on an RFID tag

Note 1 to entry: ~~For~~In this ~~part of ISO 28560~~document, the term is only relevant to Memory Bank 11, containing optional data elements.

3.2
air interface protocol
rules of communication between an RFID interrogator and the RFID tag of a particular type, covering frequency, modulation, bit encoding, and command sets

3.3
application command
instruction issued from the application to the ISO/IEC 15962 data protocol processor in order to initiate an action or operation with the RFID tag(s) through the interrogator

3.4
application family identifier
AFI
mechanism used in the data protocol and the *air interface protocol* (3.2) to select a class of RFID tags relevant to an application or aspect of an application, and to ignore further communications with other classes of RFID tags with different identifiers

Note 1 to entry: ~~For~~In this ~~part of ISO 28560~~document, the term is only relevant to Memory Bank 01, containing the data elements comprising the UII.

3.5
arc
specific branch of an object identifier tree, with new arcs added as required to define a particular object

Note 1 to entry: The top three arcs of all object identifiers are compliant with ISO/IEC 9834-1 ensuring uniqueness.

3.6
data format
component of the *DSFID* (3.8) that is a mechanism used in the data protocol to identify how *object identifiers* (3.12) are encoded on the RFID tag, and (where possible) identify a particular data dictionary for the set of relevant object identifiers for that application

Note 1 to entry: ~~For~~In this ~~part of ISO 28560~~document, the term is only relevant to Memory Bank 11, containing optional data elements. The data format declares the *Root-OID* (3.14) in an efficient manner, so that a complete object identifier can be reconstructed for external communications.

3.7
data protocol processor
implementation of the processes defined in ISO/IEC 15962, including data compaction, formatting, support of the command/response unit, and an interface to the tag driver

3.8
data storage format identifier
DSFID
code that consists of, at least, the *access method* (3.1) and *data format* (3.6)

Note 1 to entry: ~~For~~In this ~~part of ISO 28560~~document, the term is only relevant to Memory Bank 11, containing optional data elements.

3.9
digital vandalism
unauthorized modification of data on an RFID tag that either renders it unusable or falsely represents another identifier

3.10
Memory Bank
MB
designated name of a *segmented memory structure* (3.15)

Note 1 to entry: ~~For~~In this ~~part of ISO 28560~~document, the Memory Banks 00, 01, 10, and 11 are using binary notation.

3.11
metadata
type of data or information about data

Note 1 to entry: In the context of this ~~part of ISO 28560~~document, metadata can be the *Relative-OID* (3.13) in relation to the data, the precursor in relation to the compacted and encoded bytes, or the *AFI* (3.4) and *DSFID* (3.8) in relation to the data.

3.12
object identifier
value (distinguishable from all other such values), which is associated with an object

3.13