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Information technology — Radio frequency identification for item management — Unique identification for RF tags

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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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.

ISO/IEC 15963 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*.

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Introduction

ISO/IEC 15963 is one of a series of International Standards and Technical Reports developed by ISO/IEC JTC 1/SC 31 for the identification of items (Item Management) using radio frequency identification (RFID) technology.

ISO/IEC 15963 describes numbering systems for the unique identification of RF tags.

It is intended to be used in conjunction with other International Standards developed by SC 31 for "RFID for item management" such as ISO/IEC 18000 and ISO/IEC 15962.

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Information technology — Radio frequency identification for item management — Unique identification for RF tags

1 Scope

ISO/IEC 15963 describes numbering systems that are available for the identification of RF tags.

A unique ID is required as part of the write operation to RFID tags. The unique ID guarantees that the information written to a tag is unambiguously written to the correct data carrier (tag). A unique ID is also required in many read situations where the contents of the tag are tied to a specific item and that item needs to be unambiguously identified. Further discussion and explanation are given in Clause 5.

The unique ID may also be used

— for the traceability of the integrated circuit itself for quality control in their manufacturing process,

— for the traceability of the RF tag during its manufacturing process and along its lifetime,

— for the completion of the reading in a multi-antenna configuration,

— by the anti-collision mechanism to inventory multiple tags in the reader's field of view,

— for the traceability of the item to which the RF tag is attached.

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2 Normative references

The following referenced documents are indispensable for the application 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 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 6346, *Freight containers — Coding, identification and marking*

ISO/IEC 7816-6, *Identification cards — Integrated circuit cards — Part 6: Interindustry data elements for interchange*

ISO/TS 14816, *Road transport and traffic telematics — Automatic vehicle and equipment identification — Numbering and data structure*

ISO/IEC 19762-1, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary — Part 1: General terms relating to AIDC*[1)]

ISO/IEC 19762-3, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary — Part 3: Radio frequency identification (RFID)*[1)]

1) To be published.

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ANS INCITS 256, *Radio Frequency Identification (RFID)*

General EAN.UCC Specifications (EAN International, Brussels)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19762-1, ISO/IEC 19762-3 and the following apply.

3.1
RF tag unique identifier
number that uniquely identifies an RF tag

3.2
RF tag issuer
company or organization that allocates the RF tags to the items they identify

3.3
IC manufacturer
company that manufactures the RF tag integrated circuit

3.4
RF tag manufacturer
company that manufactures the RF tag in a ready-to-use configuration

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3.5
allocation class
8-bit value used to classify companies or organizations allowed to allocate unique tag identification

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3.6
IC manufacturer registration number
number allocated to IC manufacturers according to ISO/IEC 7816-6 or ANSI ASC INCITS T6

3.7
RF tag issuer registration number
number allocated to RF tag issuers according to ISO 6346, ISO/TS 14816, or EAN.UCC

4 Symbols and abbreviated terms

AC	Allocation Class
AID	Application IDentifier
ANS	American National Standard
ANSI	American National Standards Institute
ASC	Accredited Standards Committee
EAN.UCC	a set of standards administered by EAN International
IC	Integrated Circuit
ID	IDentifier
INCITS	InterNational Committee for Information Technology Standards
LSB	Least Significant Bit

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MSB	Most Significant Bit
RFU	Reserved for Future Use
UID	Unique (RF tag) IDentifier

5 The use of unique identifiers

This International Standard addresses those cases when a unique identifier (UID) is required as part of the read or write operation from or to RFID tags. The UID guarantees that the information transacted with a tag is unambiguously transacted with the correct data carrier (tag). A UID may be required in many read or write situations where the contents of the tag are tied to a specific item and that item needs to be unambiguously identified. There are some situations, however, when a UID is not required for reading or writing. These situations include circumstances where the presence of the information is all that is required and the tie to a specific asset is not required.

A UID does not need to be a permanent unique identifier in all situations. It is sufficient at times to identify a tag unambiguously by data contents, physical position or reply timing. In these situations a virtual ID tag is sufficient to uniquely identify a tag.

6 Possible ways to uniquely identify an RF tag

When a UID is required, it can be done in several ways. The following subclauses list and explain some of them.

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6.1 Virtual ID

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A virtual tag ID is a temporary ID based on tag parameters that may vary over the life of the tag. It may take several forms. A virtual ID is also known as a logical ID or a session ID. Several tags could have the same virtual ID at different times, but all tags at the same time for the same interrogator should have a different virtual ID, allowing an unambiguous identification of each tag at any time relative to any given interrogator.

The technical means to achieve and guarantee such uniqueness is outside of the scope of this International Standard. However, 6.1.1, 6.1.2 and 6.1.3 discuss possible approaches.

6.1.1 Data as a unique ID

Data is a possible way to implement a virtual ID where the tag contains data that when read is unique in time and location to a single tag. An example is a tag that contains date and time information. The time information can be unique to a single tag from a manufacturer, but is not guaranteed to be unique over all tags at all times. Another situation is a closed application where tag data describes only one set of information. Taken globally, the tag bit pattern might be repeated, but in a closed application the tag data uniquely identifies a single tag.

6.1.2 Time as a unique ID

Time is a possible way to implement a virtual ID where bit patterns alone do not necessarily identify a single tag unambiguously. Tag response time slot can be part of a uniquely identifying parameter set. For example, some tags use time slots to differentiate between several tags appearing to a reader at the same time. If these time slots are fixed for a single interrogation exchange, then the time slot may be used to help define a single tag at a particular time.

NOTE If the time slots are randomly defined each time a tag responds, then time slots are not suitable for determining a unique tag ID.

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