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Information technology — Mobile item identification and management — User data for Mobile AIDC services

Technologies de l'information — Gestion et identification d'élément mobile — Données d'utilisateur pour services AIDC mobiles

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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 shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 29175 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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Information technology — Mobile item identification and management — User data for Mobile AIDC services

1 Scope

This International Standard provides identification of user data for the purpose of encoding and identifying user data in Mobile AIDC services using

- ISO/IEC 29143 radio frequency (RF) tags;
- ISO/IEC 18000-63 RF tags, and
- ISO/IEC 15434-applied optically readable media such as linear bar codes and two-dimensional symbols.

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/IEC 15434, *Information technology — Automatic identification and data capture techniques — Syntax for high-capacity ADC media*

ISO/IEC 15961-2, *Information technology — Radio frequency identification (RFID) for item management — Data protocol — Part 2: Registration of RFID data constructs*

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

ISO/IEC 18000-6, *Information technology — Radio frequency identification for item management — Part 6: Parameters for air interface communications at 860 MHz to 960 MHz*

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

ISO/IEC 29143, *Information technology — Automatic identification and data capture techniques — Air interface specification for Mobile RFID interrogators*

ISO/IEC TR 29172, *Information technology — Mobile item identification and management — Reference architecture for Mobile AIDC services*

ISO/IEC 29174-1, *Information technology — UII scheme and encoding format for Mobile AIDC services — Part 1: Identifier scheme for multimedia information access triggered by tag-based identification*[1]

ANSI MH10.8.2, Data Identifier and Application Identifier Standard

[1] To be published.

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19762, ISO/IEC 29172 and the following apply.

3.1
UII resolution
process of converting unique item identifier (UII) into its associated information

4 Abbreviated terms

DI	data identifier
MII	mobile item identifier
ODS	object directory service
OID	object identifier
ORM	optically readable media
UII	unique item identifier
UMI	user-memory indicator

5 User Data Identifier

5.1 General

In typical Mobile AIDC services, information is provided through specific network communications, called UII resolution. Once a Mobile AIDC terminal reads an identifier from the data carrier, information associated with the identifier can be acquired through the network by UII resolution.

According to ISO/IEC 29172, the typical procedures for Mobile AIDC services are as follows:

- The Mobile AIDC terminal reads an MII from the data carrier and sends an MII resolution request to ODS.
- ODS then resolves the MII to the locations of the information associated with the MII and sends an MII resolution response to the Mobile AIDC terminal.
- The Mobile AIDC terminal then requests an AIDC service from the selected location.

The concept of MII (ISO/IEC 29174-1), explained in ISO/IEC 29172, is included within UII. As explained above, the MII resolution occurs prior to getting information about the tagged object or the targeted service. However, it may be useful that user is able to get the information such as the object name, and the product/service name from RF tag or ORM without network communication. MII shall be as defined in ISO/IEC 29174-1.

This information is called user data in this International Standard, and user data can be helpful. For example, when UIIs from multiple items are read simultaneously by the Mobile AIDC terminal the user can select the targeted item using user data.

5.2 Identifier for user data

Identifiers for user data shall follow ASC MH10 Data Identifiers, which are given in ANSI MH10.8.2 and ISO/IEC 15418.

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ASC MH10 Data Identifiers may be used with any alphanumeric data carrier and are designed to ensure cross-industry commonality of the Data Identifiers used in automatic identification technologies. ASC MH10 Data Identifiers have a format of one alphabetic character alone, or one alphabetic character prefixed by one, two or three numeric characters.

Some ASC MH10 Data Identifiers may incorporate format definitions. The American National Standards Institute (ANSI) has designated ANSI MH10.8.2 as a "Continuous Maintenance" standard available at:

http://www.autoid.org/ANSI_MH10/ansi_mh10sc8_wg2.htm

A full list of ASC MH10 Data Identifiers from the last full publication is available from:

Customer Service
Material Handling Industry
8720 Red Oak Blvd., Suite 201
Charlotte, NC 28217-3992
USA
(V): +1 704/522-8644
(F): +1 704/522-7826
(U1): http://www.mhia.org/
(U2): http://www.mhia.org/vango/Core/orders/category.aspx?catid=52

There are alternative identifiers to meet the use case addressed by this International Standard, including those of GS1. Those interested in this technique are encouraged to contact GS1 for further information.

5.3 RF tag for user data

5.3.1 ISO/IEC 29143 and ISO/IEC 18000-63 air interface requirements

RF tags compliant to this International Standard shall use the air interface described in ISO/IEC 18000-63 and ISO/IEC 29143.

5.3.2 ISO/IEC 29143 and ISO/IEC 18000-63 memory architecture for user data

User data for ISO/IEC 29143 and ISO/IEC 18000-63 shall be stored at Memory Bank "11_2" (User memory) and shall follow ISO/IEC 15961-1 and ISO/IEC 15962. To indicate that user data resides in MB11, the User-memory indicator (UMI, bit 0x15 of MB01) is set to a "1".

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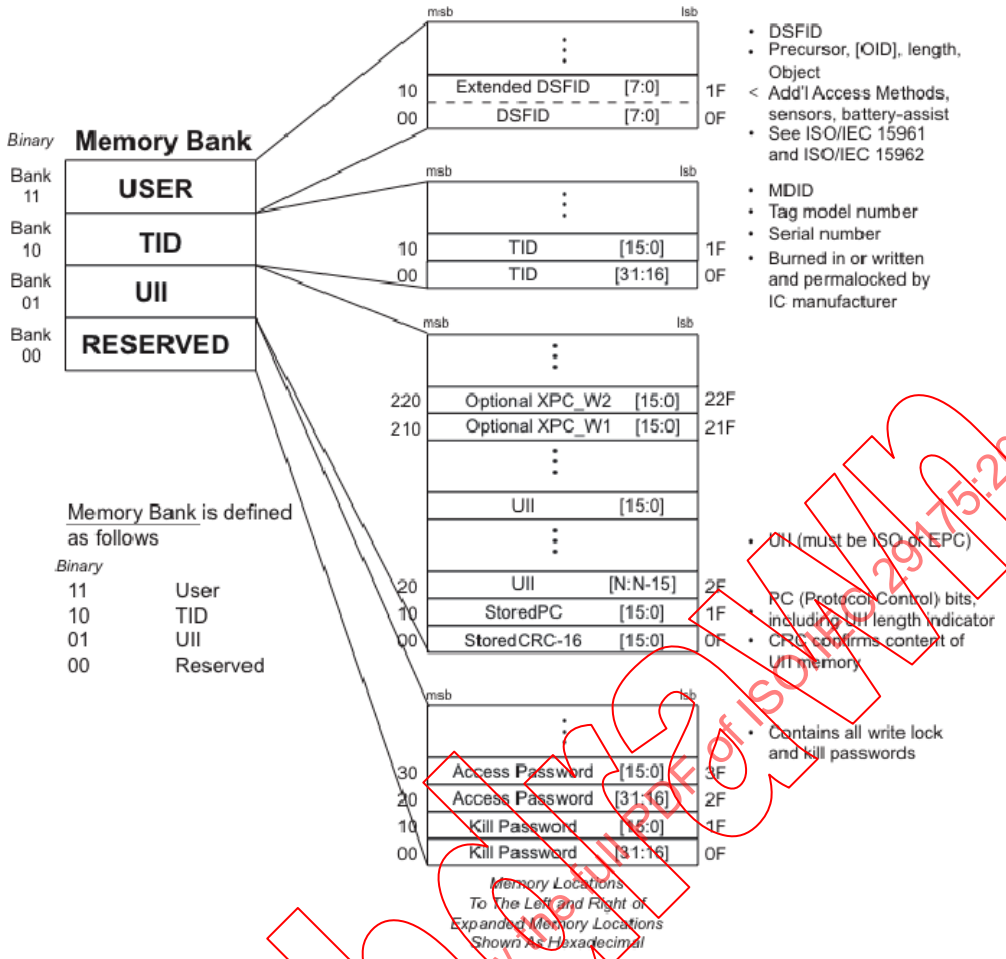

Figure 1 – ISO/IEC 29143 and 18000-63, Type C, Memory structure

5.3.3 DSFID of user data for ISO/IEC 15962

When user data is stored in User memory, User memory locations 0x00 to 0x07 shall be the DSFID as defined in ISO/IEC 15962. The encoding of user data to User Memory locations above 0x07 shall conform to ISO/IEC 15962.

5.3.3.1 Access Method

ISO/IEC 15961-1 defines Access Methods incorporated into the ISO/IEC 15962 Access Methods as shown in Table 1. Access Methods for user data can be chosen from Table 1.

Table 1 – Assigned and Reserved Access Methods

15961 integer code	15962 DSFID bit code	Name	Description
0	00	**No-Directory**	This structure supports the contiguous abutting of all the Data-Sets
1	01	**Directory**	The data is encoded exactly as for **No-Directory** but the RFID tag supports an additional directory, which is first read to point to the address of the relevant object identifier.

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15961 integer code	15962 DSFID bit code	Name	Description
2	10	**Packed-Objects**	This is an integrated compaction and encoding scheme that formats data in an indexed structure as defined by the Application administrator (see ISO/IEC 15961-2)
3	11	**Tag-Data-Profile**	This is an integrated compaction and encoding scheme for a fixed set of data elements, each of a defined length
4-15	00-11		Reserved for future revisions of ISO/IEC 15962

5.3.3.2 Data-Format

Data Formats shall be limited to those identified in ISO/IEC 15961-2. As explained in clause 5.2, ASC MH10 Data Identifiers shall be used to identify data fields for user data. According to ISO/IEC 15961-2, Data Format "13" is one of the Data Formats assigned to ASC MH10 Data Identifiers.

Table 2 – Data-Format for user data

Data Format (Decimal)	Assigned Organisation or Function	Root-OID	Comments
13	ANSI-DI-Mapping Table	1 0 15961 13	This data format enables ANS MH10 Data Identifiers to be used as the Relative-OID in an Object Identifier structure in a more efficient encoding manner than data format 10. The current mapping table is available at: http://www.autoid.org/ANSI_MH10/ansi_mh10sc8_wg2.htm

The root-OID shall be {1 0 15961 13} and shall not be encoded on the RF tag because the DSFID Data Format "13" implies this. Each user data object is encoded on the RF tag using a RELATIVE-OID, representing a data element according to the rules of the ASC MH10 Data Identifiers standard.

5.3.4 Preparing object identifier for user data identifier

To prepare the object identifier for user data, alphanumeric ASC MH10 Data Identifiers should be converted to the final arc of the root-OID {1 0 15961 13}.

Data-Format 13 to Relative-OID mapping table is available at:
http://www.autoid.org/ANSI_MH10/ansi_mh10sc8_wg2.htm

The final component of the object identifier for ASC MH10 Data Identifiers is derived by mapping table. Examples are given in Annex A.

5.3.5 Encoding of user data

The encoding of user data to User memory locations above 0x07 shall conform to ISO/IEC 15962.

5.4 ISO/IEC 15434-applied ORM for user data

5.4.1 ISO/IEC 15434 envelope structure for user data

User data for ORM shall be encoded in accordance with ISO/IEC 15434 envelope structure.

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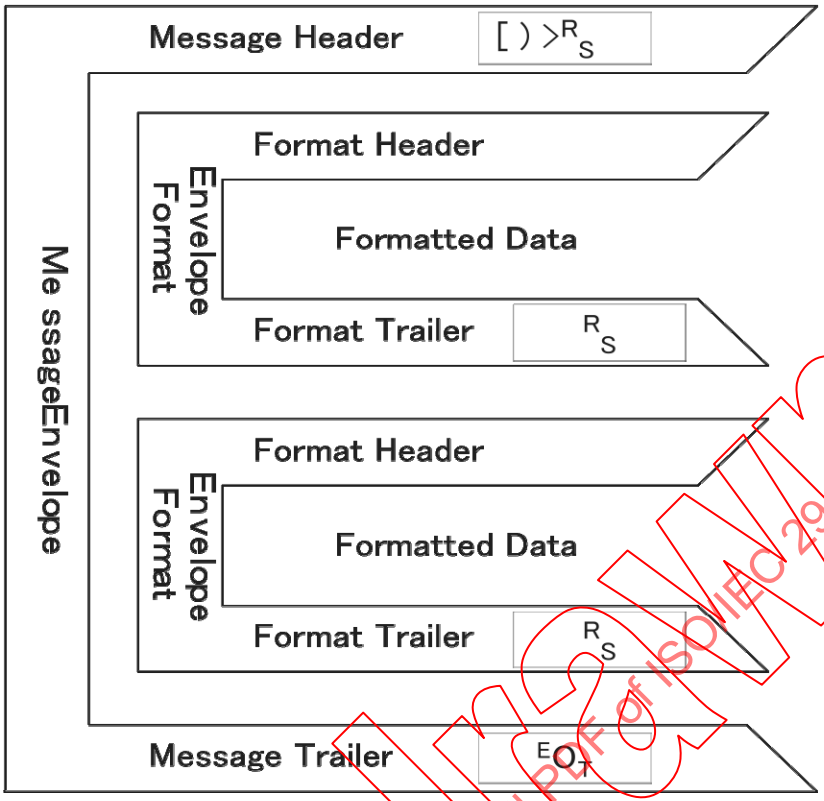

Figure 2 – Envelope structure of ISO/IEC 15434

ISO/IEC 15434 defines a transfer structure, syntax, and coding of messages and data formats for use with high capacity AIDC media.

To allow multiple data Formats to be contained within a data stream, a two level structure of enveloping is employed. The outermost layer of the message is a Message Envelope that defines the beginning and end of the message. Within the Message Envelope are one or more Format Envelopes that contain the data (See Figure 2).

5.4.2 Header data and format trailer for user data

Header data and format trailer for each format are defined in Table 3.

Table 3 – ISO/IEC 15434 header data and trailers

Format Indicator	Variable Header Data	Format Trailer	Format Description
00			Reserved for future use
01	$^{G}_{S}vv$	$^{R}_{S}$	Transportation
02			Complete EDI message / transaction
03	$vvvrrr^{F}_{S}{}^{G}_{S}{}^{U}_{S}$	$^{R}_{S}$	Structured data using ANSI ASC X12 Segments

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Format Indicator	Variable Header Data	Format Trailer	Format Description
04	*vvvrrr*F_S G_S U_S	R_S	Structured data using UN/EDIFACT Segments
05	G_S	R_S	Data using GS1 Application Identifiers
06	G_S	R_S	Data using ASC MH 10 Data Identifiers
07		R_S	Free form text
08	*vvvvrrnn*		Structured data using CII Syntax Rules
09	G_S *ttt...t* G_S *ccc...c* G_S *nnn...n* G_S	R_S	Binary data (file type) (compression technique) (number of bytes)
10-11			Reserved for future use
12	G_S	R_S	Structured data following Text Element Identifier rules
13-99			Reserved for future use

In this International Standard, ASC MH10 Data Identifiers are used to identify data fields in user data.

As shown in Table 3, Format Indicator “06” indicates that data using ASC MH 10 Data Identifiers is encoded in the Formatted Data area in the envelope structure.

Each user data element in this format shall be preceded by the appropriate ASC MH10 Data Identifier code and followed by the Data Element Separator character “G_S” unless the data element is the last field in the data Format, i.e., the last Format “06” data element is followed by the Format Trailer Character “R_S”.

An example of QR Code encoding for ASC MH10 Data Identifiers is given in Annex B.

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Annex A
(informative)

Examples of the final arcs for ASC MH10 Data Identifiers for an RF tag

Table A.1 – OID arcs for Data Identifiers

DI	Relative OID for Data Identifier (Decimal)	Complete Object ID (Decimal)	Description
D	47	1 0 15961 13 47	Date: Format YYMMDD
3Z	425	1 0 15961 13 425	Free Text
14K	48	1 0 15961 13 48	Combined Order Number and Line Number
Q	23	1 0 15961 13 23	Quantity, Number of Pieces or Amount
25S	1	1 0 15961 13 1	Identification of party to a transaction in 18V followed by the supplier assigned serial number

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