

~~ISO TC 46/SC 4/WG 11~~

~~Date: 2022-06-30~~

~~ISO/PDTS 28560-4.6~~

~~Date: 2023-04-05~~

~~ISO/DTS 28560-4:2023(E)~~

~~ISO TC 46/SC 4/WG 11~~

Secretariat: KATS

**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/IEC 15962 ans une étiquette de RFID avec la mémoire divisée*

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

ISO/DTS 28560-4

<https://standards.iteh.ai/catalog/standards/sist/b21821a8-8788-4a82-9d04-037904ab6e2a/iso-dts-28560-4>

Document type:  
Document language:



**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**

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

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

ISO/DTS 28560-4

<https://standards.iteh.ai/catalog/standards/sist/b21821a8-8788-4a82-9d04-037904ab6e2a/iso-dts-28560-4>

~~Document type:—~~ Technical Specification  
~~Document language:—~~ E

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, 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

CP 401 • CH-1214 Vernier, Geneva

Phone: + 41 22 749 01 11

Email: [copyright@iso.org](mailto:copyright@iso.org)

Website: [www.iso.org](http://www.iso.org)

Published in Switzerland.

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

ISO/DTS 28560-4

<https://standards.iteh.ai/catalog/standards/sist/b21821a8-8788-4a82-9d04-037904ab6e2a/iso-dts-28560-4>

## Contents

Page

Foreword.....	5
Introduction.....	6
1 — Scope.....	1
2 — Normative references.....	1
3 — Terms and definitions.....	2
4 — Applicability and relationship with other systems.....	4
4.1 — General.....	4
4.2 — Independent standards-based components.....	4
4.3 — Integrated encoding/decoding software.....	6
4.4 — Legacy-based architecture.....	8
5 — Requirements.....	8
5.1 — Data elements.....	8
5.2 — RFID air interface: ISO/IEC 18000-63 for UHF.....	9
5.2.1 — General.....	9
5.2.2 — Air interface conformance.....	9
5.2.3 — Tag performance.....	9
5.2.4 — Interrogator performance.....	9
5.2.5 — System performance.....	9
5.3 — RFID air interface: Other air interface protocols.....	9
5.4 — Data protocol.....	9
5.5 — RFID interrogators (RFID readers).....	10
6 — Data elements.....	10
6.1 — General.....	10
6.2 — Unique item identifier (UII).....	12
6.2.1 — UII comprising of only the primary item identifier.....	13
6.2.2 — UII comprising owner institution + primary item identifier.....	13
6.2.3 — Encoding set information.....	13
6.2.4 — Unambiguous UII structure.....	14
6.3 — Primary item identifier.....	14
6.4 — Content parameter.....	14
6.5 — Owner institution (ISIL).....	15
6.6 — Set information.....	16
6.7 — Type of usage.....	16
6.8 — Shelf location.....	16
6.9 — ONIX media format.....	16
6.10 — MARC media format.....	16
6.11 — Supplier identifier.....	16
6.12 — Order number.....	17
6.13 — ILL borrowing institute.....	17
6.14 — ILL transaction number.....	17
6.15 — GS1 product identifier.....	17
6.16 — Alternative unique item identifier.....	17
6.17 — Local data.....	17

6.18	Title	18
6.19	Product identifier (local)	18
6.20	Media format (other)	18
6.21	Supply chain stage	19
6.22	Supplier invoice number	19
6.23	Alternative item number	19
6.24	Alternative owner institution	19
6.25	Subsidiary of an owner library	19
6.26	Alternative ILL borrowing institution	19
6.27	Other reserved data elements	19
7	Data encoding	20
7.1	Data protocol overview	20
7.1.1	Data constructs	20
7.1.2	AFI	20
7.1.3	Data format	20
7.1.4	Object identifier for library applications	21
7.1.5	Object identifier for the UH and its interpretation	21
7.1.6	DSFID	21
7.2	ISO/IEC 15961-1 commands and responses	21
7.3	ISO/IEC 15962 encoding rules for this part of ISO 28560	22
7.3.1	General	22
7.3.2	Structure of MB 00	24
7.3.3	Encoding and use of MB 00	24
7.3.4	Structure of MB 01	24
7.3.5	Encoding in MB 01	25
7.3.6	Relative-OID for the UH	27
7.3.7	Decoding and processing the Monomorphic UH	27
7.3.8	The use of GS1 EPC codes in MB 01	28
7.3.9	Structure and use of MB 10	28
7.3.10	Structure of MB 11	28
7.3.11	Encoding in MB 11	29
8	RFID tag requirements	33
8.1	Air interface protocol	33
8.1.1	General	33
8.1.2	Memory parameters	33
8.1.3	Declaring memory parameters	34
8.2	Required air interface commands	34
8.3	Air interface conformance	35
8.4	Performance	35
9	Data integrity, security, and privacy issues	35
9.1	Data integrity	35
9.2	Item security	36
9.2.1	General	36
9.2.2	Use of the UH	36
9.2.3	Using passwords in MB 00	36
9.2.4	Use of the unique tag ID	38
9.2.5	Use of the AFI	38
9.2.6	Use of the EAS features	39
9.3	Privacy issues	39
10	Implementation and migration	39
11	Miscellaneous	39

<b>Annex A (informative) Information about ISO 28560 RFID in libraries</b> .....	<b>40</b>
<b>A.1 — Informational website</b> .....	<b>40</b>
<b>A.2 — Types of support information</b> .....	<b>40</b>
<b>Annex B (normative) Relevant ISO/IEC 15961-1 application commands</b> .....	<b>41</b>
<b>B.1 — Write Monomorphic UH</b> .....	<b>41</b>
<b>B.2 — Write Objects Segmented Memory Tag</b> .....	<b>41</b>
<b>B.3 — Write Password Segmented Memory Tag</b> .....	<b>41</b>
<b>B.4 — Inventory ISO-UH memory</b> .....	<b>41</b>
<b>B.5 — Read Objects</b> .....	<b>42</b>
<b>B.6 — Read Words Segmented Memory Tag</b> .....	<b>42</b>
<b>B.7 — Read Object Identifiers</b> .....	<b>42</b>
<b>B.8 — Modify Object</b> .....	<b>42</b>
<b>B.9 — Delete Object</b> .....	<b>42</b>
<b>B.10 — Erase Memory</b> .....	<b>42</b>
<b>B.11 — Kill Segmented Memory Tag</b> .....	<b>43</b>
<b>Annex C (normative) Locking procedure for MB 01 with encoding in MB 11</b> .....	<b>44</b>
<b>Annex D (normative) Monomorphic UH and URN Code 40 encoding</b> .....	<b>45</b>
<b>D.1 — Monomorphic UH</b> .....	<b>45</b>
<b>D.2 — URN Code 40 encoding</b> .....	<b>45</b>
<b>D.2.1 — Basic character set</b> .....	<b>45</b>
<b>D.2.2 — Extended encoding</b> .....	<b>47</b>
<b>D.2.3 — Encoding example</b> .....	<b>47</b>
<b>Annex E (informative) Encoding examples</b> .....	<b>49</b>
<b>E.1 — General considerations</b> .....	<b>49</b>
<b>E.2 — Encoding the UH</b> .....	<b>49</b>
<b>E.3 — Encoding optional data in MB 11</b> .....	<b>49</b>
<b>E.3.1 — Input assumptions for the tag</b> .....	<b>49</b>
<b>E.3.2 — The input data</b> .....	<b>49</b>
<b>E.3.3 — Encoding the data elements</b> .....	<b>49</b>
<b>E.3.3.1 General</b> .....	<b>49</b>
<b>E.3.3.2 OID index</b> .....	<b>49</b>
<b>E.3.3.3 Set information</b> .....	<b>50</b>
<b>E.3.3.4 Shelf location</b> .....	<b>50</b>
<b>E.3.3.5 Owner institution (ISIL)</b> .....	<b>51</b>
<b>E.3.4 — The complete encoding</b> .....	<b>51</b>
<b>E.3.5 — Locking implications</b> .....	<b>51</b>

**ISO/DTS 28560-4:2023(E)**

<b>Annex F (informative) Implementation and migration</b> .....	<b>52</b>
<b>F.1 New RFID implementations</b> .....	<b>52</b>
<b>F.2 Legacy RFID implementations using ISO/IEC 18000-63 RFID tags</b> .....	<b>52</b>
<b>F.3 Legacy RFID implementations using other RFID tags</b> .....	<b>53</b>
<b>Bibliography</b> .....	<b>54</b>
<b>Foreword</b> .....	<b>vi</b>
<b>Introduction</b> .....	<b>vii</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>2</b>
<b>4 Applicability and relationship with other systems</b> .....	<b>4</b>
<b>4.1 General</b> .....	<b>4</b>
<b>4.2 Independent standards-based components</b> .....	<b>5</b>
<b>4.3 Integrated encoding/decoding software</b> .....	<b>8</b>
<b>4.4 Legacy-based architecture</b> .....	<b>10</b>
<b>5 Requirements</b> .....	<b>12</b>
<b>5.1 Data elements</b> .....	<b>12</b>
<b>5.2 RFID air interface: ISO/IEC 18000-63 for UHF</b> .....	<b>12</b>
<b>5.2.1 General</b> .....	<b>12</b>
<b>5.2.2 Air interface conformance</b> .....	<b>12</b>
<b>5.2.3 Tag performance</b> .....	<b>12</b>
<b>5.2.4 Interrogator performance</b> .....	<b>13</b>
<b>5.2.5 System performance</b> .....	<b>13</b>
<b>5.3 RFID air interface: Other air interface protocols</b> .....	<b>13</b>
<b>5.4 Data protocol</b> .....	<b>13</b>
<b>5.5 RFID interrogators (RFID readers)</b> .....	<b>13</b>
<b>6 Data elements</b> .....	<b>14</b>
<b>6.1 General</b> .....	<b>14</b>
<b>6.2 Unique item identifier (UII)</b> .....	<b>16</b>
<b>6.2.1 UII comprising of only the primary item identifier</b> .....	<b>16</b>
<b>6.2.2 UII comprising owner institution + primary item identifier</b> .....	<b>17</b>
<b>6.2.3 Encoding set information</b> .....	<b>17</b>
<b>6.2.4 Unambiguous UII structure</b> .....	<b>18</b>
<b>6.3 Primary item identifier</b> .....	<b>18</b>
<b>6.4 Content parameter</b> .....	<b>18</b>
<b>6.5 Owner institution (ISIL)</b> .....	<b>19</b>
<b>6.6 Set information</b> .....	<b>20</b>
<b>6.7 Type of usage</b> .....	<b>20</b>
<b>6.8 Shelf location</b> .....	<b>20</b>
<b>6.9 ONIX media format</b> .....	<b>20</b>
<b>6.10 MARC media format</b> .....	<b>21</b>
<b>6.11 Supplier identifier</b> .....	<b>21</b>
<b>6.12 Order number</b> .....	<b>21</b>
<b>6.13 ILL borrowing institute</b> .....	<b>21</b>
<b>6.14 ILL transaction number</b> .....	<b>21</b>
<b>6.15 GS1 product identifier</b> .....	<b>21</b>
<b>6.16 Alternative unique item identifier</b> .....	<b>22</b>



6.17	Local data .....	22
6.18	Title .....	22
6.19	Product identifier (local) .....	23
6.20	Media format (other) .....	23
6.21	Supply chain stage .....	23
6.22	Supplier invoice number .....	23
6.23	Alternative item number .....	23
6.24	Alternative owner institution .....	23
6.25	Subsidiary of an owner library .....	24
6.26	Alternative ILL borrowing institution .....	24
6.27	Other reserved data elements .....	24
7	Data encoding .....	24
7.1	Data protocol overview .....	24
7.1.1	General .....	24
7.1.2	Data constructs .....	25
7.1.3	AFI .....	25
7.1.4	Data format .....	25
7.1.5	Object identifier for library applications .....	25
7.1.6	Object identifier for the UII and its interpretation .....	26
7.1.7	DSFID .....	26
7.2	ISO/IEC 15961-1 commands and responses .....	26
7.3	ISO/IEC 15962 encoding rules for this document .....	27
7.3.1	General .....	27
7.3.2	Structure of MB 00 .....	30
7.3.3	Encoding and use of MB 00 .....	30
7.3.4	Structure of MB 01 .....	30
7.3.5	Encoding in MB 01 .....	31
7.3.6	Relative-OID for the UII .....	33
7.3.7	Decoding and processing the Monomorphic-UII .....	33
7.3.8	Use of GS1 EPC codes in MB 01 .....	34
7.3.9	Structure and use of MB 10 .....	34
7.3.10	Structure of MB 11 .....	34
7.3.11	Encoding in MB 11 .....	35
8	RFID tag requirements .....	40
8.1	Air interface protocol .....	40
8.1.1	General .....	40
8.1.2	Memory parameters .....	40
8.1.3	Declaring memory parameters .....	41
8.2	Required air interface commands .....	41
8.3	Air interface conformance .....	42
8.4	Performance .....	42
9	Data integrity, security, and privacy issues .....	42
9.1	Data integrity .....	42
9.2	Item security .....	43
9.2.1	General .....	43
9.2.2	Use of the UII .....	43
9.2.3	Using passwords in MB 00 .....	43
9.2.4	Use of the unique tag ID .....	45
9.2.5	Use of the AFI .....	46
9.2.6	Use of the EAS features .....	46
9.3	Privacy issues .....	46

**ISO/DTS 28560-4:2023(E)**

<b><u>10</u></b>	<b><u>Implementation and migration</u></b>	<b><u>47</u></b>
<b><u>11</u></b>	<b><u>Miscellaneous</u></b>	<b><u>47</u></b>
<b><u>Annex A (informative)</u></b>	<b><u>Information about ISO 28560 RFID in libraries</u></b>	<b><u>48</u></b>
<b><u>Annex B (informative)</u></b>	<b><u>Relevant ISO/IEC 15961-1 application commands</u></b>	<b><u>49</u></b>
<b><u>Annex C (informative)</u></b>	<b><u>Locking procedure for MB 01 with encoding in MB 11</u></b>	<b><u>52</u></b>
<b><u>Annex D (informative)</u></b>	<b><u>Monomorphic-UII and URN Code 40 encoding</u></b>	<b><u>53</u></b>
<b><u>Annex E (informative)</u></b>	<b><u>Encoding examples</u></b>	<b><u>57</u></b>
<b><u>Annex F (informative)</u></b>	<b><u>Implementation and migration</u></b>	<b><u>61</u></b>
<b><u>Bibliography</u></b>		<b><u>63</u></b>

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

ISO/DTS 28560-4

<https://standards.iteh.ai/catalog/standards/sist/b21821a8-8788-4a82-9d04-037904ab6e2a/iso-dts-28560-4>

## 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 documents 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](http://www.iso.org/directives)).

Field Code Changed

~~Attention is drawn to the possibility that some of the elements of this document may involve the use 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](http://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](http://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 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 the following URL: [Foreword — Supplementary information \[www.iso.org/iso/foreword.html\]\(http://www.iso.org/iso/foreword.html\)](http://www.iso.org/iso/foreword.html).

~~The committee responsible for this document is~~ **This document is was 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 added.~~ **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 added.**

**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.html](http://www.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.

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

[ISO/DTS 28560-4](#)

<https://standards.iteh.ai/catalog/standards/sist/b21821a8-8788-4a82-9d04-037904ab6e2a/iso-dts-28560-4>

## **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/DTS 28560-4:2023(E)

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*~~

## 4.3 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: ForIn 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: ForIn 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: ForIn 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