ISO/IEC 15962:2022-01 (E)

Information technology - Radio frequency identification (RFID) for item management - Data protocol: data encoding rules and logical memory functions

Contents

Page

Foreword ix

Introduction x

1 Scope 1

2 Normative references 1

3 Terms and definitions and abbreviated terms 1
3.1 Terms and definitions 1
3.2 Abbreviated terms 2

4 Conformance 2
4.1 Conformance with the air interface 2
4.2 Conformance with the application interface 2
4.2.1 Encoders and the application interface 2
4.2.2 Decoders and the application interface 3
4.2.3 Comprehensive encoder/decoder devices and the application interface 3
4.3 Conformance with the Access-Method 3
4.3.1 Encoders and the Access-Method 3
4.3.2 Decoders and the Access-Method 3
4.3.3 Comprehensive encoder/decoder devices and the Access-Method 3

5 Protocol model 3
5.1 Overview 3
5.2 Layered protocol 4
5.2.1 Layers 4
5.2.2 Application layer as defined in the ISO/IEC 15961 series 4
5.2.3 Application interface as defined in ISO/IEC 15961-1 5
5.2.4 Data Protocol processing 5
5.2.5 Data Protocol interface 5
5.3 Flexible implementation configurations 6
5.4 Functional processes — Interrogator implementation 6
5.4.1 Logical functions and interfaces 6
5.4.2 Functional processes — Application interface 7
5.4.3 Functional processes — Interrogator 7
5.4.4 RFID tag 8
5.5 ISO/IEC 15962 and the Data Processor 9

6 Data and presentation conventions 9
6.1 Data types in ISO/IEC 15961-1 commands and responses 9
6.2 Extensible bit vector (EBV) 9
6.3 Object Identifier presentation in the application interface 10
6.3.1 Object identifier structure to ISO/IEC 8824-1 10
6.3.2 Presenting the Object-Identifier in accordance with ISO/IEC 8824-1 11
6.3.3 Presenting the Object-Identifier as a Uniform Resource Name (URN) 11
6.4 The Object 11
6.5 8-bit byte 11
6.6 N-bit encoding 11

7 Data Processor — High level processing 11

8 Data Processor and the application interface 12
8.1 Application commands — Overview 12
8.2 Application commands and responses — Write 14
8.2.1 Configure-AFI 14
8.2.2 Configure-DSFID 15
8.2.3 Write-Objects 15
8.2.4 Write-Objects-Segmented-Memory-Tag 19
8.2.5 Write-EPC-UII 22
8.2.6 Write-Password-Segmented-Memory-Tag 23
8.2.7 Write-Segments-6TypeD-Tag 24
8.2.8 Write-Monomorphic-UII 27
8.2.9 Configure-Extended-DSFID 30
8.2.10 Configure-Multiple-Records-Header 31
8.3 Application commands and responses — Read 33
8.3.1 Read-Object-Identifiers 33
8.3.2 Read-Logical-Memory-Map 34
8.3.3 Read-Objects 35
8.3.4 Inventory-ISO-UIImemory 36
8.3.5 Inventory-EPC-UIImemory 37
8.3.6 Read-Words-Segmented-Memory-Tag 38
8.3.7 Read-Segments-6TypeD-Tag 39
8.3.8 Read-Multiple-Records 40
8.4 Application commands and responses — Other 44
8.4.1 Inventory-Tags 44
8.4.2 Delete-Object 44
8.4.3 Modify-Object 46
8.4.4 Erase-Memory 48
8.4.5 Get-App-based-System-Info 49
8.4.6 Kill-Segmented-Memory-Tag 49
8.4.7 Delete-Packed-Object 50
8.4.8 Modify-Packed-Object-Structure 51
8.4.9 Delete-Multiple-Record 52
8.5 Air interface support for application commands 53
9 Data Processor and the air interface 53
9.1 Use 53
9.2 Air interface services 53
9.3 Defining the system information 54
9.3.1 System information elements 54
9.3.2 Singulation-Id 54
9.3.3 Physical block size 55
9.3.4 Number of blocks 55
9.3.5 AFI 55
9.3.6 DSFID 55
9.3.7 Encoding the Extended-Data-Format 56
9.3.8 Other extensions using the Extended Syntax indicator bit 56
9.3.9 Extended Syntax flag byte 1 56
9.3.10 Memory length indicator bits 56
9.3.11 Procedure for length encoding 58
9.3.12 Data CRC indicators 58
9.3.13 Data CRC 58
9.3.14 Extended Syntax flag byte 2 58
9.3.15 Simple Sensor indicator 59
9.3.16 Battery Assist indicator 59
9.3.17 Full-Function Sensor indicator 59
9.3.18 DSFID and Extended Syntax 59
9.4 Configuring the Logical Memory 63

10 Command/Response Unit — Processing of command and response arguments 63
10.1 Function 63
10.2 Process arguments 64
10.2.1 Access-Password 64
10.2.2 Additional-App-bits 64
10.2.3 AFI 64
10.2.4 AFI-Lock 64
10.2.5 Append-To-Existing-Multiple-Record 65
10.2.6 Application-Defined-Record-Capacity 65
10.2.7 Avoid-Duplicate 65
10.2.8 Check-Duplicate 65
10.2.9 Compact-Parameter 66
10.2.10 Data-Length-Of-Record 66
10.2.11 DSFID 67
10.2.12 DSFID-Lock 67
10.2.13 Directory-Length-EBV8-Indicator 67
10.2.14 Encoded-Memory-Capacity 67
10.2.15 EPC-Code 67
10.2.16 Hierarchical-Identifier-Arc 67
10.2.17 Identifier-Of-My-Parent 68
10.2.18 Identify-Method and Number-Of-Tags 68
10.2.19 Instance-Of-Arc 68
10.2.20 Item-Related-DSFID 69
10.2.21 Item-Related-Segment-Map 69
10.2.22 Kill-Password 69
10.2.23 Length-Of-Mask 69
10.2.24 Lock-Directory-Entry 69
10.2.25 Lock-Multiple-Records-Header 69
10.2.26 Lock-Record-Preamble 69
10.2.27 Lock-UII-Segment-Arguments 70
10.2.28 Max-App-Length 70
10.2.29 Memory-Bank 70
10.2.30 Memory-Bank-Lock 70
10.2.31 Memory-Segment 70
10.2.32 Memory-Type 70

10.2.33 Multiple-Records-Directory-Length 70
10.2.34 Multiple-Records-Features-Indicator 71
10.2.35 NSI-bits 71
10.2.36 Number-In-Data-Element-List 71
10.2.37 Number-Of-Records 71
10.2.38 Object-Lock 71
10.2.39 Packed-Object-Directory-Type 71
10.2.40 Password 72
10.2.41 Password-Type 72
10.2.42 Pointer 72
10.2.43 Pointer-To-Multiple-Records-Directory 72
10.2.44 Read-Record-Type 73
10.2.45 Read-Type 73
10.2.46 Record-Memory-Capacity 73
10.2.47 Record-Type-Arc 74
10.2.48 Record-Type-Classification 74
10.2.49 Sector-Identifier 74
10.2.50 Segment-Read-Type 74
10.2.51 Simple-Sensor-Data-Block 75
10.2.52 Start-Address-Of-Record 75
10.2.53 Tag-Data-Profile-ID-Table 75
10.2.54 Tag-Mask 75
10.2.55 TID-Segment-Map 75
10.2.56 UII-DSFID 75
10.2.57 UII-Segment-Map 75
10.2.58 Update-Multiple-Records-Directory 75
10.2.59 Word-Count 76
10.2.60 Word-Pointer 76

10.3 Completion-Codes ... 76
10.4 Execution-Codes ... 79

11 Access-Method ... 80
11.1 Methods ... 80
11.2 No-Directory structure ... 81
11.2.1 Structure ... 81
11.2.2 Restrictions to air interfaces ... 82
11.2.3 The dataset ... 82
11.2.4 Encoding rules ... 82
11.3 Directory structure ... 83
11.3.1 Structure ... 83
11.3.2 Restrictions to air interfaces ... 83
11.3.3 Directory structure for Data-Format = "3 ...287" ... 84
11.3.4 Directory structure for Data-Format = 2 ... 84
11.3.5 Encoding the address of the dataset ... 84
11.3.6 Encoding example ... 84
11.4 Packed-Objects structure ... 84
11.5 Tag Data Profile ... 85
11.5.1 Use ... 85
11.5.2 Restrictions to air interfaces ... 86
11.5.3 Defining the Tag-Data-Profile ... 86
11.5.4 Encoding Rules ... 86
11.6 Multiple-Records ... 86
11.6.1 Structure ... 86
11.6.2 Categories of multiple records ... 87
11.6.3 Object-Identifier structure ... 89
11.6.4 Sector identifier ... 91
11.6.5 Restrictions to air interfaces ... 91
11.6.6 Encoding rules ... 91

12 ISO/IEC 15434 direct encoding and transmission method using Access-Method 0 and Data-Format 3 ... 91
12.1 Use ... 91
12.2 General rules for ISO/IEC 15434 direct encoding ... 92
12.3 Specific support for ISO 17364, ISO 17365, ISO 17366 and ISO 17367 ... 92

13 Monomorphic-UII encoding ... 92
13.1 Use ... 92
13.2 6-bit encoding ... 93
13.3 7-bit encoding ... 93
13.4 URN Code 40 encoding ... 94
13.5 8859-1 octet encoding ... 94
13.6 Application-defined 8-bit coding ... 94

Annex A (informative) **Air interface support for application commands ... 95**

Annex B (normative) **Pro forma description for the Tag Driver ... 101**

Annex C (normative) **ISO/IEC 18000 Series Tag Driver Descriptions ... 103**

Annex D (normative) **Encoding rules for No-Directory Access-Method ... 115**

Annex E (normative) **Basic data compaction schemes ... 128**

Annex F (normative) **ISO/IEC 646 characters supported by the compaction schemes ... 133**

Annex G (informative) **Encoding example for No-Directory structure ... 137**

Annex H (informative) **Encoding example for a directory structure ... 140**

Annex I (normative) **Packed-Objects structure ... 143**

Annex J (normative) **Packed Objects ID tables ... 165**

Annex K (normative) **Packed Objects Encoding tables** **175**
Annex L (informative) **Encoding example for Packed Objects** **180**
Annex M (informative) **Decoding Packed Objects** **184**
Annex N (normative) **Tag Data Profile encoding** **188**
Annex O (normative) **Tag Data Profile ID tables** **193**
Annex P (informative) **Encoding example for Tag Data Profile** **197**
Annex Q (normative) **Basic encoding rules for Multiple-Records Access-Method** **201**
Annex R (normative) **Multiple-Records encoding rules for hierarchical records** **218**
Annex S (informative) **Encoding example for the Multiple-Records Access-Method** **225**
Annex T (normative) **ISO/IEC 15434 direct encoding and transmission** **237**
Annex U (informative) **ISO/IEC 15434 direct DI encoding and transmission for ISO 17364, ISO 17365, ISO 17366 and ISO 17367** **243**
Annex V (normative) **URN Code 40 encoding** **248**
Bibliography **251**