

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