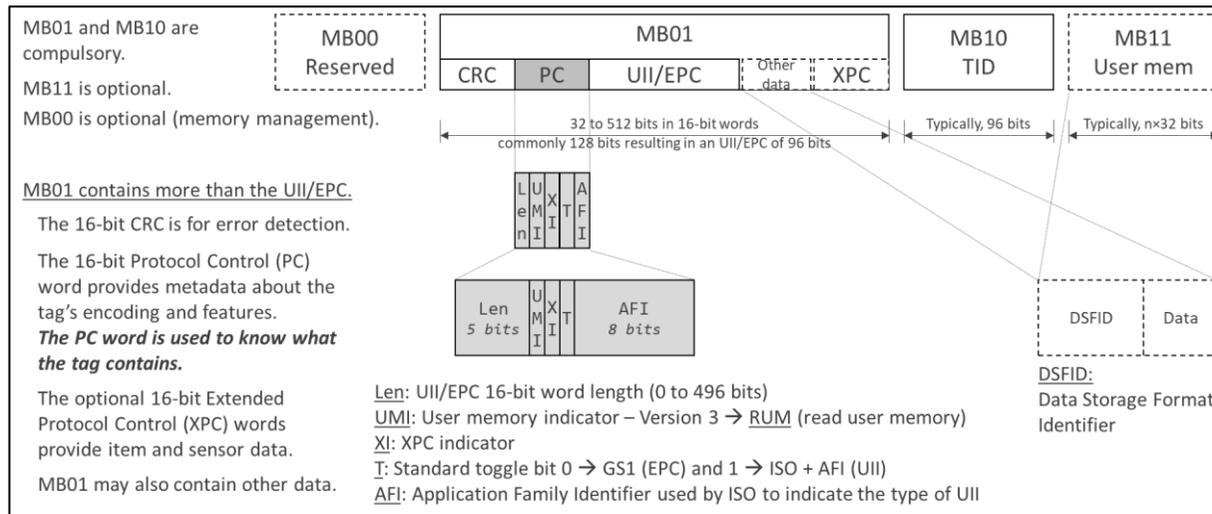# ISO/IEC 15961-2 APPLICATIONS FAMILY IDENTIFIER (AFI) ASSIGNMENTS REGISTER

Committee Approved: 2025-11-25

RAIN tag (a tag compliant with ISO/IEC 18000-63) memory map detailing the use of AFIs and DSFIDs

UII/EPC is either an UII or an EPC based on the T-Bit. It is encoded in the same memory location and reported in the same manner.
NOTE: Many RAIN readers incorrectly use the term EPC even when $T=1_2$. Compliant RAIN readers must use the terms "UII/EPC", or "UII" and "EPC" as indicated by the standard toggle bit (T).

- **EPC (Electronic Product Code)**: When $T=0_2$, then MB01 and MB11 shall be encoded with a valid EPC and optional additional data as specified by GS1 EPC Tag Data Standard (TDS).

- **UII (Unique Item Identifier)**: When $T=1_2$, then MB01 shall be encoded with an AFI and UII as specified by this data construct register (as such, the term UII is used in this document).

The DSFID specifies the data storage format for other data in MB01 and MB11 according to the rules of the encoded UII/EPC.

Horizontal Application Family Identifier (AFI) and Data Storage Format Identifier (DSFID) summary

AFIs are assigned either for use across multiple application domains (horizontal AFIs) or for a specific application domain managed by the corresponding sector organization (vertical AFIs). DSFIDs are horizontal in nature.

Function	AFIs	Application
Free-form BINARY, 6-bit TEXT and UTF-8 TEXT	AFIs: 0x01, 0x02, 0x03 DSFIDs 33,34,35	For closed applications requiring free-form data encoding on tags. These AFIs allow existing non-GS1 applications using the default tag setting $T=0_2$ to migrate easily to a compliant encoding. Set the PC word to $T=1_2$ and apply the appropriate AFI from this group. The existing UII/EPC remains unchanged and remains used as is. These AFIs should be used with caution, see note below the table.
RAIN Alliance-issued ISO/IEC 15459 company identifier (CIN) with free-form BINARY or ASCII TEXT	0xAE, 0xBC	The recommended encoding method for closed applications that require free-form data encoding on tags. These AFIs ensure global uniqueness and prevent interference with other applications. They also provide a migration path for non-compliant systems to achieve RAIN compliance with minimal changes by prefixing the CIN during encoding and stripping it upon reading.
URI encoding to be used as a primary identifier (UII), or to add a URI, using User Memory, to any other UII.	AFI: 0xBD DSFID: 36	URI encoding facilitates direct access to web-based item information. Prefixing a UII with a URI stored in User Memory enables traditional industrial applications to use a single data carrier across both industrial and consumer use cases, without requiring changes to existing industrial systems. The URI encoding can be applied to standard commodity tags.
ISO/IEC 15434 Data Identifier (DI) encodings according to ISO/IEC 17360	0xA1, 0xA2, 0xA3, 0xA5, 0xAC, 0xAD	The first data element of these AFI encodings shall contain the ISO/IEC 15459 Company Identification Number (CIN) of the tag issuer, followed by the appropriate set of ANS MH10.8.2 Data Identifiers (DIs). These AFIs enable interoperability between ISO/IEC 15434 barcode data and RAIN tag encodings.
A digital signature verifiable data structure. The data structure is issuer specified, open and interoperable.	AFI: 0x92 DSFID: 17	This AFI is anchored by the ISO/IEC 15459 Company Identification Number (CIN), followed by the tag data issuing entity's (identified by its CIN) specified open data structure. The verifiable data structure may also be encoded in User Memory to verify the primary identifier, prefix it with a URI, and include additional data fields that, together with visible product security marks, allow verification that the RAIN tag is affixed to the correct product. This method ensures interoperability in operational use between verifying and non-verifying systems, thereby maintaining backward compatibility.

NOTE: Closed-application AFIs (0x01 to 0x07) do not ensure global uniqueness of the encoded item identifier (UII) (global uniqueness of the UII prevents inter-application interference in all read-scenarios). RAIN RFID delivers extended read range resulting in potentially overlapping application read-zones. To ensure uniqueness for non-GS1 compliant applications, the user is recommended to obtain a Customer Identification Number (CIN) from an approved ISO/IEC 15459 Issuing Agency, like The RAIN Alliance, and use it with the appropriate AFI. Using AFIs 0xAE or 0xBC together with a RAIN Alliance-issued CIN provides an efficient means for non-compliant encodings to achieve global uniqueness and standards compliance.

Application Family Identifier (AFI) assignments

AFI (HEX)	Assigned Organisation or Function	Comments
0x00	AFI not configured	See ISO/IEC 15961-3
0x01	Assigned to closed application environments A multiple of 16-bit word free-form encoding in binary	See ISO/IEC 15961-3 See The RAIN Alliance specification *RAIN Free-Form encodings*
0x02	Assigned to closed application environments 6-bit TEXT using the ISO/IEC 15434 direct encoding character set as specified in ISO/IEC 15962	See ISO/IEC 15961-3 For the 6-bit character set see Annex A See The RAIN Alliance specification *RAIN Free-Form encodings*
0x03	Assigned to closed application environments UTF-8 (8-bit) encoding	See ISO/IEC 15961-3 For UTF=8 see ISO/IEC 10646 in accordance with IEFT RFC 362 See The RAIN Alliance specification *RAIN Free-Form encodings*
0x04	Assigned to closed system data under the control of the manufacturer of the item associated with the RFID tag, when encoded in RFID tags with partitioned memory	See ISO/IEC 15961-3
0x05	Assigned to closed system data under the control of the transport company of the item associated with the RFID tag, when encoded in RFID tags with partitioned memory	See ISO/IEC 15961-3
0x06	Assigned to closed system data under the control of the end user of the item associated with the RFID tag, when encoded in RFID tags with partitioned memory	See ISO/IEC 15961-3
0x07	Assigned to closed systems control of re-circulating items (e.g., library items, media, returnable assets)	See ISO/IEC 15961-3
0x08 to 0x0F	Reserved for allocation to other closed system data or applications	See ISO/IEC 15961-3
0x10 to 0x8F	Not assigned by the ISO/IEC 15961-2 Registration Authority	See ISO/IEC JTC 1/SC 17
0x90	Odette for Vehicle Identification using the ISO/IEC 15962 6-bit encoding Monomorphic-UII in RAIN tags	The vehicle identification UII is prefixed by a Data Identifier from a limited set controlled by Odette For the 6-bit character set see Annex A

AFI (HEX)	Assigned Organisation or Function	Comments
0x91	IATA – for asset control, initially for ULD containers for cargo and passenger use	Compliant with IATA RP1640 standard
0x92	DigSig: A digital signature verifiable UII and associated application specific data as issued by an ISO/IEC 15459 registered entity.	See: ISO/IEC 20248 See: https://digsig.org
0x93 to 0x9F	RESERVED FOR FUTURE USE	
0xA0	IPC – for postal items Monomorphic-UII using URN Code 40 compaction in RAIN tags	
0xA1	Monomorphic-UII using 6-bit encoding for ISO/IEC 17360 product tagging	Encodes ANS MH10.8.2 Data Identifiers (DI) For the 6-bit character set see Annex A
0xA2	Monomorphic-UII using 6-bit encoding for ISO/IEC 17360 transport unit	Encodes ANS MH10.8.2 Data Identifiers (DI) For the 6-bit character set see Annex A
0xA3	Monomorphic-UII using 6-bit encoding for ISO/IEC 17360 returnable transport unit	Encodes ANS MH10.8.2 Data Identifiers (DI) For the 6-bit character set see Annex A
0xA4	Monomorphic-UII using 6-bit encoding for ISO/IEC 17360 product tagging, but for hazardous materials	**For Historical Use Only – Do NOT use in new applications** Hazardous material is indicated with the XPC flag HazMat
0xA5	Monomorphic-UII using 6-bit encoding for ISO/IEC 17360 product packaging	Encodes ANS MH10.8.2 Data Identifiers (DI) For the 6-bit character set see Annex A
0xA6	Monomorphic-UII using 6-bit encoding for ISO/IEC 17360 product packaging, but for hazardous materials	**For Historical Use Only – Do NOT use in new applications** Hazardous material is indicated with the XPC flag HazMat
0xA7	Monomorphic-UII using 6-bit encoding for ISO/IEC 17360 transport unit, but containing hazardous materials	**For Historical Use Only – Do NOT use in new applications** Hazardous material is indicated with the XPC flag HazMat
0xA8	Monomorphic-UII using 6-bit encoding for ISO/IEC 17360 returnable transport unit, but containing hazardous materials	**For Historical Use Only – Do NOT use in new applications** Hazardous material is indicated with the XPC flag HazMat
0xA9	EXPLICITLY RESERVED FOR ISO 17363	
0xAA	EXPLICITLY RESERVED FOR ISO 17363	**For Historical Use Only – Do NOT use in new applications**
0xAB	UII for Mobile AIDC services as defined in ISO/IEC 29174	**The standard has been withdrawn – Do NOT use in new applications**
0xAC	Monomorphic-UII using 8-bit encoding for ISO/IEC 17360	Encodes ANS MH10.8.2 Data Identifiers (DI)

AFI (HEX)	Assigned Organisation or Function	Comments
0xAD	Monomorphic-UII using binary encoding for ISO/IEC 17360	Encodes ANS MH10.8.2 Data Identifiers (DI) The encoding compacts the IAC-CIN, and declares the optional use of TID for serialisation, and the presence of other data.
0xAE	The RAIN Alliance Free-Form Schema BINARY RAIN Alliance-issued CIN + free-form 8-bit BINARY data	See: The RAIN Alliance specification *The RAIN Alliance CIN with Free-Form Schema BINARY / TEXT*
0xAF	Managed by VDMA for electronic identification of animals in accordance with ISO 6881 Radio-frequency identification of animals – Code Structure Ultra High Frequency transponders	
0xB0	6C Toll Operators Coalition Monomorphic-UII using 8-bit (Octet) encoding in RAIN tags	
0xBA	RESERVED FOR FUTURE USE	
0xBB	ISBT – for blood, tissue, organ and cellular therapy products	Compliant with ISBT 128 & ISBT RFID Guidelines
0xBC	The RAIN Alliance Free-Form Schema TEXT RAIN Alliance-issued CIN + free-form ASCII TEXT (8-bit encoding)	See: The RAIN Alliance specification *The RAIN Alliance CIN with Free-Form Schema BINARY / TEXT*
0xBD	RAIN URI Identifier	URI encoding for ≥ 96-bit tags See: The RAIN Alliance specification *RAIN URI Identifier*
0xBE to 0xBF	RESERVED FOR FUTURE USE	
0xC0	Identification of rail vehicles	Compliant with CEN standard EN 17230.
0xC1	IATA – for baggage handling	Compliant with IATA RP1740C standard
0xC2	EDItEUR – for library items when on loan	• Compliant with ISO 28560 Parts 2 and 3 when using ISO/IEC 18000-3M1 tags. • Compliant with ISO TS 28560 Part 4 with Monomorphic-UII using URN Code 40 compaction in ISO/IEC 18000-63 tags
0xC3 to 0xCE	RESERVED FOR FUTURE USE	
0xCF	Reserved as an extension code for multiple byte **AFI** code values.	
0xD0 to 0xFF	Not assigned by the ISO/IEC 15961-2 Registration Authority	See ISO/IEC JTC 1/SC 17

Data Storage Format Identifier (DSFID) assignments

DSFID decimal hex	Assigned Organisation or Specification	Function/Purpose
0 0x00	Not-Formatted	This value is the default for a RFID tag yet to be formatted, so the system may assume that the tag has no encoded data The DSFID combining the Data Format with the Access Method) shall be 0x00.
1 0x01	Full-Featured	This is used where each OID has to be encoded in full, i.e. without truncating the Root-OID. This is relevant where the RFID tag is likely to contain a mixture of OIDs from different domains, or one from a minor domain.
2 0x02	ISO/IEC 15961-1 Root-OID-Encoded	This is useful for small domains requiring to encode a set of data. This data format requires the Root-OID to be encoded, but then truncates all OIDs so that only the Relative-OID needs to be encoded.
3 0x03	ISO/IEC 15434	This standard supports a number of message structures originally intended for two-dimensional bar codes. An efficient encoding scheme is defined in ISO/IEC 15962 Annex T and Annex U.
4 0x04	ISO/IEC 6523	This standard deals with the registration of domains to the level of the International Code Designator (ICD). This data format allows existing organisation structures to be supported with the minimum of change. A list of ICDs up to number 0183 is at: http://iso6523.info/icd_list.pdf **Registration under ISO/IEC 15961-2 should be for a particular ICD, and not all ICDs.**
5 0x05	ISO/IEC 15459	ISO/IEC 15459 provides a mechanism to support unique identification codes across multiple industry and commercial sectors. The various parts of this standard provide the basis for track and trace codes for all levels in supply chains.
6 0x06	ISO 28560-2 and ISO TS 28560-4	These standards address the encoding of data on RFID tags in the library community and defines all the Relative-OID values
7 0x07	ISO/IEC 29174	**The standard has been withdrawn – Do NOT use in new applications**
8 0x08	ISO/IEC 15961-1 ISO/IEC 15961-2 ISO/IEC 15961-3 ISO/IEC 15961-4	This allows any combinations of OID that have the common root-OID {1 0 15961} to be encoded. The relative-OID then becomes the next arc (which can differ for different objects) followed by another arc identifying the particular data element. The structure was developed so that two, or more, related organisation could share encoding - by agreement – without one having all the encoding efficiencies. Joint registration by the relevant organisation should be a requirement for data constructs to be assigned.
9 0x09	GS1 Application Identifiers (AI)	This data format enables GS1 Application Identifiers (AI) to be used as the Relative-OID in an Object Identifier structure

DSFID decimal hex	Assigned Organisation or Specification	Function/Purpose
10 0x0A	MHI DI-Algorithm	This data format enables ANS MH10.8.2 Data Identifiers (DI) to be used as the Relative-OID in an Object Identifier structure. The alphanumeric DI is converted to a Relative-OID using an algorithm defined ISO/IEC 15961:2004 The preferred option for new applications is to use Data Format 13, which provides for more efficient encoding
11 0x0B	IATA-Asset	The data format is assigned to IATA for various low volume asset control applications, each of which will be registered. The Relative-OID values are assigned in various IATA standards, specifically: IATA RP1640 standard for ULD containers
12 0x0C	IATA-Baggage	The Relative-OID values are defined in the IATA RP1740C standard
13 0x0D	MHI DI-Mapping Table	This data format enables ANS MH10.8.2 Data Identifiers (DI) to be used as the Relative-OID in an Object Identifier structure in a more efficient encoding manner than data format 10.
14 0x0E	IPC-Postal	The data format is assigned to IPC for various postal applications, each of which will be recorded in the registration table below. The Relative-OID values are assigned in various IPC standards, specifically: IPC RFID standard for: Identifying postal receptacles based on the UPU S9 code. IPC RFID standard for: Identifying postal items based on the UPU S10 code. IPC RFID standard for: Test letters IPC RFID standard for: Receptacle Asset Identification IPC RFID standard for: Tracking Items based on a Universal Identifier
15 0x0F	6C Toll Operators Coalition	The Data Format only applies to the UII encoded in MB 01 of the 18000-63 tag. Data Format 30 is for MB 11, indicating that the encoding is based on a bit structure defined by the 6C Toll Operators Coalition
16 0x10	Odette for Vehicle Identification Number	The Data Format only applies to the UII encoded in MB 01 of the 18000-63 tag. Data Formats 3 or 13 are used for MB 11, depending on the choice of the vehicle manufacturer and related to Model ID, colour, technical status or like other formatted according to ISO 15459 or 16022.
17 0x11	ISO/IEC 20248	Digital signature verifiable data construct for an encoded UII and application specific data
18 to 28	RESERVED	
29 0x1D	Closed system data fully encoded to ISO/IEC 15962 rules	This Data Format enables closed system or prototype data to be encoded in a manner compliant with the ISO/IEC 15962 encoding rules (i.e., by declaring the relevant Access Method). As those implementing the application know the interpretation of the Relative-OID values, the Root-OID is implied and does not require to exist or to be registered.

DSFID decimal hex	Assigned Organisation or Specification	Function/Purpose
30 0x1E	Closed system data not encoded to ISO/IEC 15962 rules	The complete DSFID shall be one of the following: 0x1E, 0x3E, 0x5E, 0x7E. 0x9E, 0xBE, 0xDE, 0xFE. These values indicate that the encoded bytes are passed through unchanged in ISO/IEC 15962 and ISO/IEC 24791 implementations
31 0x1F	ISO/IEC 15962 Extended Data Format	Various extension mechanisms are included in ISO/IEC 15962 for the DSFID; one enables an additional 256 Data Formats to be assigned. If the First DSFID has the value 0x0F, then the Data Format that is encoded is one that is defined in the following rows on this table.
32 0x20	ISO 6881	Data structure according to ISO 6881 Radio-frequency identification of animals – Code Structure Ultra High Frequency transponders
33 0x21	The RAIN Alliance	Additional UII free-form BINARY data See: The RAIN Alliance specification *RAIN Free-Form encodings*
34 0x22	The RAIN Alliance	Additional UII free-form 6-bit TEXT encoding for the ISO/IEC 15434 direct encoding method as specified in ISO/IEC 15962 For the 6-bit character set see Annex A See: The RAIN Alliance specification *RAIN Free-Form encodings*
35 0x23	The RAIN Alliance	Additional UII free-form UTF-8 (8-bit) encoding For UTF=8 see ISO/IEC 10646 in accordance with IEFT RFC 362 See: The RAIN Alliance specification *RAIN Free-Form encodings*
36 0x24	The RAIN Alliance	URI prefix for an UII See: See: The RAIN Alliance specification *RAIN URI identifier*
37 to 287	RESERVED	

Annex A

The ISO/IEC 15962 6-bit universal TEXT character set for AIDC use

6-bit #	Character	6-bit #	Character	6-bit #	Character	6-bit #	Character
100000	[space]	110000	0	000000	@	010000	P
100001	<EOT>	110001	1	000001	A	010001	Q
100010	"	110010	2	000010	B	010010	R
100011	<FS>	110011	3	000011	C	010011	S
100100	<US>	110100	4	000100	D	010100	T
100101	%	110101	5	000101	E	010101	U
100110	&	110110	6	000110	F	010110	V
100111	'	110111	7	000111	G	010111	W
101000	(	111000	8	001000	H	011000	X
101001	)	111001	9	001001	I	011001	Y
101010	*	111010	:	001010	J	011010	Z
101011	+	111011	;	001011	K	011011	[
101100	,	111100	<	001100	L	011100	\
101101	-	111101	=	001101	M	011101	]
101110	.	111110	>	001110	N	011110	<GS>
101111	/	111111	?	001111	O	011111	<RS>