



# B-21

## *JAIF Global Radio Frequency Identification (RFID) Item Level Standard*

# JAMA

JAPAN AUTOMOBILE MANUFACTURERS ASSOCIATION, INC.

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## **B-21**

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## FOREWORD

This Radio Frequency Identification (RFID) Item Level Standard describes best practices, processes, and methods for item<sup>1</sup> identification, verification, traceability, product characteristics, and Vehicle Identification Number (VIN<sup>2</sup>) throughout the global automotive supply chain. An extensive effort has been undertaken by the automotive industry to make data interchangeable between 2D (e.g., Data Matrix / QR Code) optical symbols and electronic media such as RFID to permit the user to select the appropriate technology with a minimum impact on IT infrastructures. These technologies complement each other and may be used jointly or separately as the application may require. This document is focused on the application of RFID to achieve these ends.

Core to achieving data interchangeability is the use of ANSI MH10-based Data Identifiers (DIs) and ISO or EPC/GS1 standards-based Data Syntax; this document will reflect the adoption of these methodologies.

This standard will also provide additional data-use details: what data to put in which Memory Bank (MB), which data syntax standards to use where, and how to use them effectively. This standard provides details on the MB01 (0x01)-centric Monomorphic Unique Item Identifier (UII), also called Birth Record (what it is and how to use it), and what data to put into MB11 (0x11) (the User Memory Bank), and how that data should be placed there. The intent is to reduce ambiguity through concise explanations and details.

Two regional documents were used by the committee to create the core of this standard: the AIAG B-11 *Item-Level Radio Frequency Identification (RFID) Standard* and the Odette recommendation *RFID for Tracking of Parts and Assemblies / VDA 5510*.

**NOTE:** Two processes not addressed within this standard are shipping labels and returnable containers. These processes are detailed in the following automotive global documents:

JAIF B-16 *Global Transport Label Standard for the Automotive Industry*  
JAIF RC-6 *Global Guideline for Returnable Transport Items*

This standard is built on these assumptions:

1. Only passive or battery-assisted passive RFID tags are used.
2. The air interface protocol is ISO/IEC 18000-63 previously known as ISO/IEC 18000-6, Type C / GS1 UHF Gen 2.
  - a. With trading partner agreement, only ISO/IEC 18000-3, Mode 3 (ASK) / GS1 HF Gen 2 (ASK) may be used.
  - b. For the purposes of this document, ISO/IEC 18000-6, Type C / GS1 UHF Gen 2 shall be referred to as “UHF” and ISO/IEC 18000-3, Mode 3 (ASK) / GS1 HF Gen 2 (ASK) shall be referred to as “HF”.
  - c. For the purposes of this document, references to ISO/IEC 18000-63 also shall be applicable to ISO/IEC 18000-3, Mode 3 (ASK).
3. The data syntax is ISO/IEC 15962, or ISO 17367; Data Identifier (DI)-based.
4. This document also addresses GS1 SGTIN-96.

<sup>1</sup> Within this document, the terms *item*, *product*, *part*, *component*, *module*, and *assembly* are synonymous.

<sup>2</sup> VIN and vehicle identification are synonymous within this document.

## B-21

### Global Radio Frequency Identification (RFID) Item Level Standard

Version 1, Issued 11/2011



In this document, the word “shall” indicates a requirement and the word “should” indicates a recommendation.

It is the supplier’s responsibility to provide RFID tags that meet this standard. Strict adherence to these specifications for RFID tags for item-level identification will reduce implementation costs and increase benefits throughout the industry.

Various number-type designators are available and have been used in various documents;

- 17**hex**, 17**h**, 17<sub>H</sub>, 17<sub>h</sub>, or **x**17 is used to denote HEX-based data.
- 15**b** or 15<sub>2</sub> is used to denote BINARY-based data.
- 10<sub>10</sub> is used to denote DECIMAL-based data.

**NOTE:** For this document, the following ISO-based designators shall be used:

- **Decimal** numbers shall be shown with only the written number, without a radix; e.g., ‘123456’.
- For **hexadecimal** numbers, the prefix ‘0x’ shall be used to the left of the number; e.g., ‘0x31’.
- For **binary** numbers, the prefix ‘0b’ shall be used to the left of the number; e.g., 0b1011.

**NOTE:** Long strings of binary numbers shall not be prefixed; however, the text shall clearly state “the binary (equivalent) (expression) (value) is as follows:”

**NOTE:** There are a number of terms that are used frequently in this document: Their proper designation is Memory Bank 0b01 (MB01), Memory Bank 0b10 (MB10), Memory Bank 0b11 (MB11), PC Bit 0x15 (PC Bit 15), and PC Bit 0x17 (PC Bit 17). In this document, these terms shall be used as indicated within the parentheses; i.e., MB01, MB10, MB11, PC Bit 15, and PC Bit 17.

**NOTE:** Spaces have been added to binary and hex data for clarity **ONLY**.

In this document, single control characters (ISO 646 and 6-bit encoding) shall be represented as <control character>. For example, <sup>G</sup><sub>S</sub> shall be shown as <GS>, <sup>E</sup><sub>O</sub><sub>T</sub> shall be shown as <EOT>, and <sup>R</sup><sub>S</sub> shall be shown as <RS>.

**Bold** used within this document is only for emphasis and does not indicate a requirement. For example, Data Identifiers (DIs) **25S** and **I** are bolded to have them stand apart from the data.



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## **B-21**

### ***Global Radio Frequency Identification (RFID) Item Level Standard***

Version 1, Issued 11/2011

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## TABLE OF CONTENTS

<b>FOREWORD</b> .....	<b>3</b>
<b>ACKNOWLEDGEMENTS</b> .....	<b>5</b>
<b>TABLE OF CONTENTS</b> .....	<b>7</b>
<b>FIGURES</b> .....	<b>8</b>
<b>TABLES</b> .....	<b>10</b>
<b>1 SCOPE</b> .....	<b>11</b>
<b>2 NORMATIVE REFERENCES</b> .....	<b>13</b>
<b>3 TERMS AND DEFINITIONS</b> .....	<b>15</b>
<b>4 INTRODUCTION</b> .....	<b>23</b>
4.1 POSITIONING OF RFID IN THE AUTOMOTIVE ENVIRONMENT .....	23
4.2 RFID; GENERAL.....	24
4.2.1 RFID Data Fields and Data Identifiers .....	25
4.2.2 Using Data Fields in MB11 .....	25
4.3 AIDC LINK TO EDI.....	25
<b>5 DATA STRUCTURES</b> .....	<b>27</b>
5.1 REASONS FOR AND USE OF THE DATA STRUCTURE.....	27
5.1.1 Data Organization According to ISO/IEC 18000-63 .....	27
5.1.2 Data Structure on the Tag (Air Interface) .....	27
5.1.3 TID Memory Bank – MB10 (SERIALIZED AND LOCKED).....	30
5.2 DATA STRUCTURE FOR UNIQUE ITEM IDENTIFIER (MB01).....	31
5.2.1 UII Coding Scheme with UN (DUNS), OD (Odette), LA (JIPDEC), VTD (TEIKOKU DATABANK), 0-9 (GS1), or D (NCAGE) format .....	31
5.3 DATA STRUCTURE IN THE USER MEMORY BANK (MB11).....	43
5.3.1 Data Requirements .....	43
5.3.2 Data Storage Format Identifier (DSFID) .....	43
<b>6 RFID TAG DATA SCENARIOS</b> .....	<b>47</b>
6.1 SCENARIO 1: TAG CONTAINS UII IN MB01 (LOCKED); NO DATA IN MB11 .....	47
6.2 SCENARIO 2: TAG CONTAINS UII IN MB01 (LOCKED) AND DATA IN MB11 (LOCKED).....	47
6.3 SCENARIO 3: TAG CONTAINS UII IN MB01(LOCKED) AND DATA IN MB11 (NOT LOCKED) .....	47
<b>7 TECHNICAL SPECIFICATIONS FOR RFID TAGS</b> .....	<b>49</b>
7.1 TAG TYPES .....	49
7.2 TAG MEMORY SIZE .....	49
7.3 ANTI-COLLISION MECHANISM FOR MULTI-READER SYSTEMS .....	49
7.4 ENVIRONMENTAL CONDITIONS.....	49
7.5 TAG LOCATION.....	50
7.6 SECURITY / LOCKING DATA (PERMALOCK COMMAND) .....	50
7.7 EMI AND EMC.....	51
7.8 TAG LIFE SPAN.....	51
7.9 RELATIVE SPEED THROUGH PORTALS.....	51
7.10 RFID REGULATIONS.....	51

# B-21

## Global Radio Frequency Identification (RFID) Item Level Standard

Version 1, Issued 11/2011



7.11 TAG IDENTIFICATION MARK .....	52
<b>8 BUSINESS PROCESS APPLICATIONS .....</b>	<b>53</b>
8.1 APPLICATION-SPECIFIC DATA STRUCTURES .....	53
8.1.1 Summary of Tag Memory Layout .....	53
8.1.2 Data Field Identification .....	54
8.1.3 Maximum Data Length .....	54
8.1.4 Character Set .....	54
8.1.5 UII (MB01) Data Structure .....	54
8.2 ITEM IDENTIFICATION – MB01-CENTRIC (DATA IDENTIFIERS 25S OR SGTIN) .....	56
8.2.1 ISO-96 Bit UII – Future Item Identification .....	57
8.2.2 MB11-Based Customer-Assigned Source and Item Identification .....	57
8.3 VERIFICATION .....	58
8.4 ITEM TRACEABILITY DATA PLACED INTO MB01 (25S OR SGTIN-96) .....	58
8.5 ITEM CHARACTERISTIC(S): 25S OR SGTIN (MB01) AND USER MEMORY (MB11) .....	58
8.5.1 Unique Serial Number with Product Characteristic .....	59
8.6 MB01-CENTRIC VEHICLE IDENTIFICATION NUMBER (VIN) DI = I .....	59
8.6.1 MB01 Encodation Example: VIN .....	60
8.7 ANTI-COUNTERFEITING (TID AND 25S OR SGTIN (MB01)) .....	61
8.8 DATA RETENTION REQUIREMENTS .....	62
<b>ANNEX A: SMART LABEL; INFORMATIVE .....</b>	<b>63</b>
<b>ANNEX B: ASCII-CHARACTER TO 6-BIT-ENCODING .....</b>	<b>64</b>
<b>ANNEX C: MB01; ISO- AND EPC-BASED DATA FORMAT EXAMPLES; INFORMATIVE .....</b>	<b>65</b>
<b>ANNEX D: MB11; ACCESS METHOD 0, FORMAT 3 DATA EXAMPLE; INFORMATIVE .....</b>	<b>66</b>
<b>ANNEX E: MB11; ACCESS METHOD 0, FORMAT 13 DATA EXAMPLES; INFORMATIVE .....</b>	<b>71</b>
<b>ANNEX F: SGTIN-96 DATA FORMAT; INFORMATIVE .....</b>	<b>77</b>
<b>ANNEX G: MINIMUM RFID SYSTEM PERFORMANCE; INFORMATIVE .....</b>	<b>78</b>
<b>ANNEX H: ANS MH10.8.2 DATA IDENTIFIERS USED IN THIS DOCUMENT; INFORMATIVE .....</b>	<b>79</b>
<b>ANNEX I: ISO 646 CHARACTER REPRESENTATION; NORMATIVE .....</b>	<b>82</b>
<b>ANNEX J: RFID AND 2D SYMBOLOGIES; INFORMATIVE .....</b>	<b>83</b>
<b>ANNEX K: USE OF BATCH / LOT NUMBERS WITH SERIALIZATION; INFORMATIVE .....</b>	<b>90</b>
<b>ANNEX L: VIN REFERENCE TABLES; NORMATIVE .....</b>	<b>91</b>
<b>ANNEX M: ANSI X12.3 DATA ELEMENT NUMBER 355 UNIT OF MEASURE CODE; INFORMATIVE .....</b>	<b>92</b>
<b>ANNEX N: DATA CONSTRUCTS; INFORMATIVE .....</b>	<b>93</b>
<b>ANNEX O: ANSI DATA IDENTIFIER REQUEST FORM .....</b>	<b>97</b>
<b>ANNEX P: MAINTENANCE REQUEST .....</b>	<b>101</b>
<b>FIGURES</b>	
FIGURE 1: RFID VISION IN AUTOMOTIVE .....	23
FIGURE 2: MEMORY STRUCTURE OF ISO/IEC 18000-63 RFID TAG .....	28
FIGURE 3: ISO/IEC 18000-63 MB01 LAYOUT .....	31



---

FIGURE 4: ISO/IEC 18000-63 AND ISO/IEC 18000-3 MODE 3 STRUCTURE OF MEMORY BANK "11"; FIRST 16 BITS.....	46
FIGURE 5: DEFINITION OF IP67 .....	50
FIGURE 6: RFID EMBLEM FOR ISO/IEC 18000-63 USING ISO/IEC 15434 AND DATA IDENTIFIERS .....	52
FIGURE 7: RFID EMBLEM FOR ISO/IEC 18000-3, MODE 3 (ASK) USING ISO/IEC 15434 AND DATA IDENTIFIERS .....	52
FIGURE 8: RFID EMBLEM FOR ISO/IEC 18000-63 USING EPC – SGTIN .....	52
FIGURE 9: GENERIC RFID EMBLEM NOT SHOWING AIR INTERFACE OR DATA FORMAT.....	52
FIGURE 10: SYSTEM-SIDE SECURITY - SUPPLY CHAIN TRANSPARENCY .....	61
FIGURE 11: OBJECT-ORIENTED SECURITY .....	62
FIGURE 12: EXAMPLE OF A SMART LABEL THAT COULD BE AFFIXED TO AN ITEM WHERE BOTH HUMAN-READABLE AND/OR 2D BARCODE DATA MIGHT BE REQUIRED .....	63
FIGURE 13: EXAMPLE OF SMART LABEL THAT COULD BE AFFIXED TO A SHIPPING CONTAINER COMPLYING WITH THE JAIF B-16 <i>GLOBAL TRANSPORT LABEL STANDARD FOR THE AUTOMOTIVE INDUSTRY</i> .....	63
FIGURE 14: EXAMPLE OF A SMART LABEL PRINTER.....	63
FIGURE 15: GAS TANK AND ASSOCIATED ITEMS (PARTS) .....	84
FIGURE 16: 2D SYMBOL WITH "AS BUILT" DATA ENCODED WITHIN IT.....	84
FIGURE 17: THE DATA; AS ENCODED WITHIN DATA MATRIX SYMBOL USING MACRO 06 (~6) .....	85
FIGURE 18: THE DATA; AS ENCODED WITHIN DATA MATRIX SYMBOL.....	86

## B-21

### Global Radio Frequency Identification (RFID) Item Level Standard

Version 1, Issued 11/2011



## TABLES

TABLE 1: TERMS AND DEFINITIONS .....	15
TABLE 2: USAGE OF MB11 IN AN ISO/IEC 18000-63 TAG.....	29
TABLE 3: ODETTE CODING SCHEME FOR PARTS IDENTIFICATION IN MB01 .....	32
TABLE 4: DUNS CODING SCHEME FOR PARTS IDENTIFICATION IN MB01.....	33
TABLE 5: JAMA/JAPIA (IAC = LA) CODING SCHEME FOR PARTS IDENTIFICATION IN MB01.....	35
TABLE 6: JAMA/JAPIA CODING SCHEME (IAC = VTD) FOR PARTS IDENTIFICATION IN MB01 .....	36
TABLE 7: THE UNIQUE IDENTIFICATION (UII) OF AN RFID TAG (MB01) FOR DOD.....	38
TABLE 8: EPC CODING SCHEME FOR PART ID (SGTIN-96).....	40
TABLE 9: CODING SCHEME FOR VEHICLE IDENTIFICATION (VIN) IN MB01 .....	42
TABLE 10: ASSIGNED AND RESERVED ACCESS METHODS.....	44
TABLE 11: SIX-BIT CHARACTER ENCODATION TABLE.....	44
TABLE 12: COMPARISON OF ISO AND EPC DATA STRUCTURES IN MB01, MB10 AND MB11 .....	54
TABLE 13: UII (MB01) DATA STRUCTURE .....	55
TABLE 14: DATA FORMAT EXAMPLES - CIN.....	55
TABLE 15: ITEM IDENTIFICATION STRUCTURES USED IN MB01 .....	56
TABLE 16: ISO-BASED EXAMPLE OF MB01 UNIQUE ITEM IDENTIFICATION.....	57
TABLE 17: EXAMPLE OF PROPOSED ISO 96-BIT UII STRUCTURE .....	57
TABLE 18: EXAMPLE OF A CUSTOMER-ASSIGNED ITEM IDENTIFICATION PLACED IN MB11 .....	57
TABLE 19: EXAMPLE OF PRODUCT CHARACTERISTICS DATA STORED IN MB11 .....	59
TABLE 20: VEHICLE IDENTIFICATION NUMBER (VIN) DEFINITION.....	60
TABLE 21: EXAMPLE OF 6-BIT ENCODING OF THE VIN DATA INTO THE UII OF MB01.....	61
TABLE 22: ASCII-CHARACTER-TO-6-BIT ENCODING TABLE .....	64
TABLE 23: ISO-BASED BIRTH RECORD EXAMPLE: WHEN PC BIT 17 = 1.....	65
TABLE 24: MB01 STRUCTURE OF AFI AND UII (DUNS) USING 6-BIT ENCODING, WHEN PC BIT 17 = 1.....	65
TABLE 25: SGTIN-96 BIRTH RECORD EXAMPLE: WHEN PC BIT 17 = 0.....	65
TABLE 26: SGTIN-96 DATA FORMAT .....	77
TABLE 27: ACTUAL READ/WRITE MEASUREMENTS.....	78
TABLE 28: ANS MH10.8.2 DATA IDENTIFIERS USED IN THIS DOCUMENT.....	79
TABLE 29: ISO 646 CHARACTER SET .....	82
TABLE 30: SUBASSEMBLY INFORMATION THAT MAKES UP THE "AS-BUILT" DATA.....	86
TABLE 31: DESCRIPTION OF "AS-BUILT" DATA; AS PROGRAMMED INTO MB01 AND MB11 .....	87
TABLE 32: TABLE OF COUNTRY CODES.....	91
TABLE 33: TABLE OF MODEL YEAR CODES.....	91
TABLE 34: EXAMPLES OF ANSI X12.3 355 DATA ELEMENT NUMBER 355 UNIT OF MEASURE (QUALIFIER).....	92
TABLE 35: DATA FORMATS .....	93
TABLE 36: ACCESS METHODS .....	95



## 1 SCOPE

This standard is based on ISO and GS1 standards. They ensure compatibility between readers and tags using Issuing Agency Codes from UN, OD, LA, VTD, D, and GS1.

This global standard recommends the basic features of data carriers as applied to an item, product, part, component, module, or assembly. In particular, this standard:

- Provides recommendations for the identification of “items”:
  - As used in this document, the terms *item*, *product*, *part*, *component*, *module*, and *assembly* are synonymous terms. For descriptions, see **Product** in Section 3.
- Specifies the air interface standards required between the RF interrogator and RF tag.
- Specifies the semantics and data syntax to be used.
- Provides a unique identifier for traceability.
- Specifies the minimum RFID system performance requirements.
- Specifies a minimum User Memory Bank (MB11) size.
- Specifies the process to be used to interface with business applications and the RFID system.
- Provides specific business process application recommendations for:
  - Item Identification
  - Verification (error proofing)
  - Item Traceability
  - Item Characteristics
  - Vehicle Identification (VIN)
  - Anti-counterfeiting