AIAG
Automotive Industry Action Group

B-21

JAIF Global Radio Frequency Identification (RFID) Item Level Standard

JAMA
Japan Automobile Manufacturers Association, Inc.

ODETTE

A Joint Publication

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FOREWORD

This Radio Frequency Identification (RFID) Item Level Standard describes best practices, processes, and methods for item[1] identification, verification, traceability, product characteristics, and Vehicle Identification Number (VIN[2]) 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*

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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.

[1] Within this document, the terms *item, product, part, component, module*, and *assembly* are synonymous.

[2] VIN and vehicle identification are synonymous within this document.

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_{H}, 17_{h}, or **x**17 is used to denote HEX-based data.
- 15**b** or 15_{2} is used to denote BINARY-based data.
- 10_{10} 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, $^{G}_{S}$ shall be shown as <GS>, $^{E}O_{T}$ shall be shown as <EOT>, and $^{R}_{S}$ 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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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