INTERNATIONAL STANDARD

ISO/IEC 29160

Second edition
2020-12

Information technology — Radio frequency identification for item management — RFID Emblem

Technologies de l'information — Identification par radiofréquence (RFID) pour la gestion d'objets — Emblème RFID

Reference number
ISO/IEC 29160:2020(E)

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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organisation to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organisations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see https://patents.iec.ch).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organisation (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*.

This second edition cancels and replaces the first edition (ISO/IEC 29160:2012), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Minimum size of RFID Emblem has been modified in order to match industry needs and constraints

— Information about the registration authority has been updated in 5.1

— Annex D has been deleted

— RFID markings proposed by other organisations have been updated.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Radio frequency identification (RFID) is a technology that concerns all aspects of the supply chain, from manufacturing all the way to the end-user or consumer.

It is important for industrial users, retailers and consumers to know when an RFID tag is present. To this end, the RFID Emblem specified in this document provides the public with a readily identifiable method to inform users of the presence of RFID.

The RFID Emblem provides a visible identification of RFID transponders, interrogators, and tagged items. Visible signs inform consumers whether an item or product contains an RFID tag. Therefore, this meets one of the main requirements for consumer privacy protection.

The RFID Emblem is a public-domain object intended to augment rather than replace other emblems and logos such as recycling and CE (European Conformity) mark. The RFID Emblem requires no fee for use, nor does it have any membership or other use restriction or requirement, other than conformance to this document.

Information technology — Radio frequency identification for item management — RFID Emblem

1 Scope

This document specifies the design and use of the RFID Emblem: an easily identified visual guide that indicates the presence of radio frequency identification (RFID). It does not address the location of the RFID Emblem on a label. Specific placement requirements are left to application standards developers.

This document also specifies an RFID Index, which can be included in the RFID Emblem and which addresses the complication added by the wide range of RFID tags in existence (frequency, protocol and data structure). The RFID Index is a two-character code that provides specific information about tags and interrogators. Successful reading of RFID tags requires knowledge of the frequency, protocol and data structure information provided by the RFID Index.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 19762, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary*

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this document, the terms, definitions, symbols and abbreviated terms given in ISO/IEC 19762 and the following abbreviated terms apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

Bluetooth SIG	bluetooth special interest group
CAGE	commercial and government entity
EPC	electronic product code
EPCIS	electronic product code information service
GIAI	global individual asset identifier
GID	general identifier
GRAI	global returnable asset identifier
GSRN	global service relation number
GTIN	global trade identification number
ID	identifier

NFC	near field communication
RAIN	radio frequency identification
SDO	standard development organisation
SGLN	serialized global location number
SGTIN	serialized global trade item number
SSCC	serialized shipping container code
UHF	ultra high frequency
US DoD	United States department of defense

4 The RFID Emblem

4.1 General

The RFID Emblem consists of a unique, public-domain emblem with a two-character code (RFID Index) to indicate the frequency range and, in certain cases, the data structure contained within the encoded RFID transponder. A generic emblem without the RFID Index is permitted. Due to the incompatibility of different types of RFID, the use of the generic emblem is discouraged.

The RFID Emblem may be used in conjunction with other logos or indicia that indicate specific applications of RFID.

4.2 RFID Index

Two-character codes are used to identify the frequency, the air interface protocol, the defining agency for the data, and the data on the tag. This is referred to as the RFID Index. The first character defines the frequency, air interface protocol and defining authority, while the second character defines the data structure.

To help installation planners identify encoding or reading equipment suitable for a particular frequency and data structure, a "generic" code with an asterisk (*) as the second character is assigned for each grouping. This code shall only be used on interrogators and shall not be used on labels or tags. Currently assigned two-character codes are given in Annex A. Codes not currently assigned are reserved for future use.

4.3 Representation

The two representations of the RFID Emblem are dark-on-light and light-on-dark. Figure 1 gives examples of these representations. For use of the RFID emblems on RFID-enabled printers/encoders and interrogators, this identifies compatible reader/encoders for each type. For use on labels, inlays and tags, this indicates frequency, coding and data content/structure.

Earlier forms and representations of the emblem do not conform to this document and shall not be used.

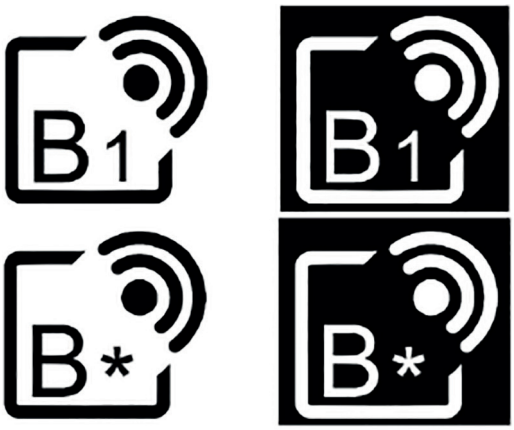

Figure 1 — Examples of the RFID Emblem with B1 (ISO/IEC 17364 tag) and B* (ISO/IEC 18000-63 compatible interrogator)

Either form of the RFID Emblem may be used; the form which is most visually striking on the printed RFID-enabled label material or tag should be preferred.

The RFID Emblem may also be engraved or embossed in the covering of an RFID tag or item containing an RFID transponder.

As described in 4.6 and Figure 2, a generic emblem with the characters "RFID" is also defined for transponders and interrogators with non-standardized communication protocols and/or non-standardized data structures.

4.4 Size

The RFID Emblem should be printed no smaller than (5 × 5) mm with a 1 mm clear, unprinted area around the RFID Emblem.

When represented in a low contrast form, it should be large enough to be easily recognizable under typical conditions of use.

Design graphics for the RFID Emblem are shown in Annex B.

4.5 Placement

Placement of the RFID Emblem shall be determined by an appropriate application standard. In the absence of an appropriate application standard, the RFID Emblem shall be placed such that it is easily visible to those trying to read the RFID tag or label. To improve readability, the RFID Emblem should be located near the actual transponder.

4.6 Using the RFID Emblem

The RFID Emblem is free to use for any RFID label, tag, encoder or interrogator manufacturer and companies printing or using RFID labels and tags who conform to the assignments of Table A.1.

Manufacturers of RFID equipment who do not conform to the assignments of Table A.1 may use the graphical symbol shown in Figure 2 to denote "RFID inside".

Figure 2 — Graphical symbol for generic RFID equipment (RFID tag, general, ISO 7000-3010)

Large, high-quality graphics of the RFID Emblem for all current assignments are available at the Registration Authority which can be found at https://www.iso.org/maintenance_agencies.html. These graphics may be resized to meet user needs.

Graphic files are available in BMP, JPG, EPS and PCX formats. Additional formats are made available upon request.

4.7 Restrictions on use

The RFID Emblem shall not be modified in any way.

Ad hoc and "internal use only" assignments of two-character codes in conjunction with the RFID Emblem are prohibited.

5 Maintenance

5.1 General

Additional index assignments are to be made as more standards and user applications evolve. Corresponding graphics are to be made available for download from the Registration Authority website.

Annex A provides a list of index assignments at the time of publication.

For up-to-date information and the complete list of current assignments and downloadable graphics, please refer to the Registration Authority.

Additional assignments may be requested by completing and submitting the application form that is provided by the Registration Authority.

5.2 Criteria for additional index assignments

— Requests shall come from an internationally recognized standards developing organisations (SDO).

— The technology standard(s) shall be stable.

— The SDO shall be a widely recognized coding authority.

— There is a demonstrated need for the assignment.

Annex A
(informative)

RFID Index

Table A.1 — Two-character code assignments for the RFID Emblem

Two-character printed code	Transponder frequency	Air interface protocol	Data structure defined by	Data structure
A*	433 MHz	ISO/IEC 18000-7	ISO TC 104/122	Indicates compatible interrogators
A0	433 MHz	ISO/IEC 18000-7	(RFU)	Reserved for future use
A1	433 MHz	ISO/IEC 18000-7	ISO 17363	Licence plate ID plus optional application data
A2	433 MHz	ISO/IEC 18000-7	(RFU)	Reserved for future use
A3	433 MHz	ISO/IEC 18000-7	(RFU)	Reserved for future use
B*	860-960 MHz	ISO/IEC 18000-63	ISO TC 104/122	Indicates compatible interrogators
B0	860-960 MHz	ISO/IEC 18000-63	(RFU)	Reserved for future use
B1	860-960 MHz	ISO/IEC 18000-63	ISO/IEC 17364	Licence plate ID plus optional application data
B2	860-960 MHz	ISO/IEC 18000-63	(RFU)	Reserved for future use
B3	860-960 MHz	ISO/IEC 18000-63	ISO/IEC 17365	Licence plate ID plus optional application data
B4	860-960 MHz	ISO/IEC 18000-63	(RFU)	Reserved for future use
B5	860-960 MHz	ISO/IEC 18000-63	ISO/IEC 17366	Licence plate ID plus optional application data
B6	860-960 MHz	ISO/IEC 18000-63	(RFU)	Reserved for future use
B7	860-960 MHz	ISO/IEC 18000-63	ISO/IEC 17367	Licence plate ID plus optional application data
B8	860-960 MHz	ISO/IEC 18000-63	ISO/IEC 17363	Licence plate ID plus optional application data
E*	860-960 MHz	ISO/IEC 18000-63	EPCglobal [a]	Indicates compatible interrogators
E0	860-960 MHz	ISO/IEC 18000-63	EPCglobal [a]	GID General Identifier
E1	860-960 MHz	ISO/IEC 18000-63	EPCglobal [a]	SGTIN Serialized GTIN
E2	860-960 MHz	ISO/IEC 18000-63	EPCglobal [a]	SSCC Serial Shipping Container Code
E3	860-960 MHz	ISO/IEC 18000-63	EPCglobal [a]	SGLN Serialized Global Location Number
E4	860-960 MHz	ISO/IEC 18000-63	EPCglobal [a]	GRAI Global Returnable Asset Identifier
E5	860-960 MHz	ISO/IEC 18000-63	EPCglobal [a]	GIAI Global Individual Asset Identifier
E6	860-960 MHz	ISO/IEC 18000-63	EPCglobal [a]	Reserved for future use
E7	860-960 MHz	ISO/IEC 18000-63	EPCglobal [a]	Reserved for future use
H*	13,56 MHz	ISO/IEC 18000-3 M3	ISO TC 104/122	Indicates compatible interrogators
H0	13,56 MHz	ISO/IEC 18000-3 M3	ISO 17364	Licence plate ID plus optional application data

[a] See GS1/EPC Tag Data Standards latest version.

NOTE 1 All assignments not otherwise indicated are reserved for future use.

Table A.1 *(continued)*

Two-character printed code	Transponder frequency	Air interface protocol	Data structure defined by	Data structure
H1	13,56 MHz	ISO/IEC 18000-3 M3	ISO 17365	Licence plate ID plus optional application data
H2	13,56 MHz	ISO/IEC 18000-3 M3	ISO 17366	Licence plate ID plus optional application data
H3	13,56 MHz	ISO/IEC 18000-3 M3	ISO 17367	Licence plate ID plus optional application data
L*	<135 kHz	ISO/IEC 18000-2	ISO TC 104/122	Indicates compatible interrogators
L0	<135 kHz	ISO/IEC 18000-2	ISO 17364	Licence plate identification only
L1	<135 kHz	ISO/IEC 18000-2	(RFU)	Reserved for future use
L2	<135 kHz	ISO/IEC 18000-2	ISO 17367	Licence plate identification only
L3	<135 kHz	ISO/IEC 18000-2	(RFU)	Reserved for future use
M*	860-960 MHz	ISO/IEC 18000-63	US DoD	Indicates compatible interrogators
M0	860-960 MHz	ISO/IEC 18000-63	(RFU)	Reserved for future use
M1	860-960 MHz	ISO/IEC 18000-63	US DoD	CAGE plus serial number
M2	860-960 MHz	ISO/IEC 18000-63	(RFU)	Reserved for future use
N*	13,56 MHz	ISO/IEC 14443	ISO/IEC 7816-5	Indicates compatible interrogators
N0	13,56 MHz	ISO/IEC 14443	ISO/IEC 7816-5	Application Specific
N1	13,56 MHz	ISO/IEC 14443-2 Type A	ISO/IEC 7816-5	Application Specific
N2	13,56 MHz	ISO/IEC 14443-2 Type B	ISO/IEC 7816-5	Application Specific
P*	13,56 MHz	ISO/IEC 15693	ISO/IEC 7816-5	Indicates compatible interrogators
P0	13,56 MHz	ISO/IEC 15693-2	ISO/IEC 7816-5	Application Specific

[a] See GS1/EPC Tag Data Standards latest version.

NOTE 1 All assignments not otherwise indicated are reserved for future use.

Annex B
(informative)

Design graphics

Dimensions in millimetres

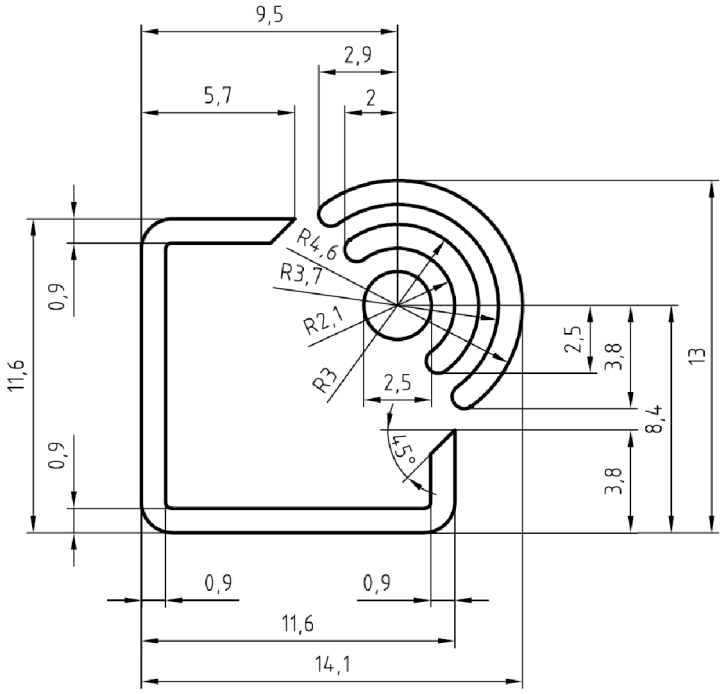

Figure B.1 — Construction of RFID Emblem's frame

Dimensions in millimetres

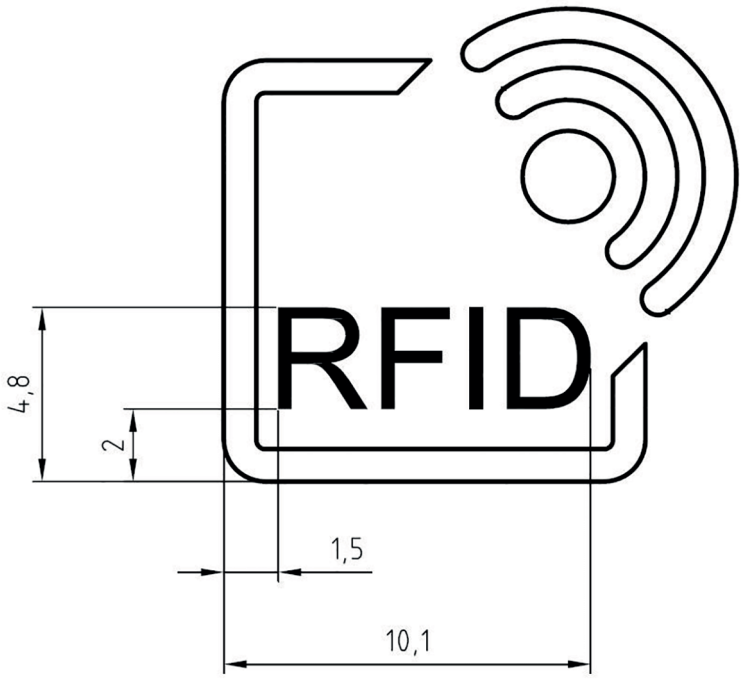

Figure B.2 — General purpose RFID Emblem

NOTE The basic dimensions of this figure, and all subsequent RFID Emblem figures, can be found in Figure B.1.

Figure B.3 — Filled general purpose RFID graphical symbol (RFID tag, general, ISO 7000-3010)

NOTE Font is Arial. Character size for “RFID” is 2,8 mm.

Dimensions in millimetres

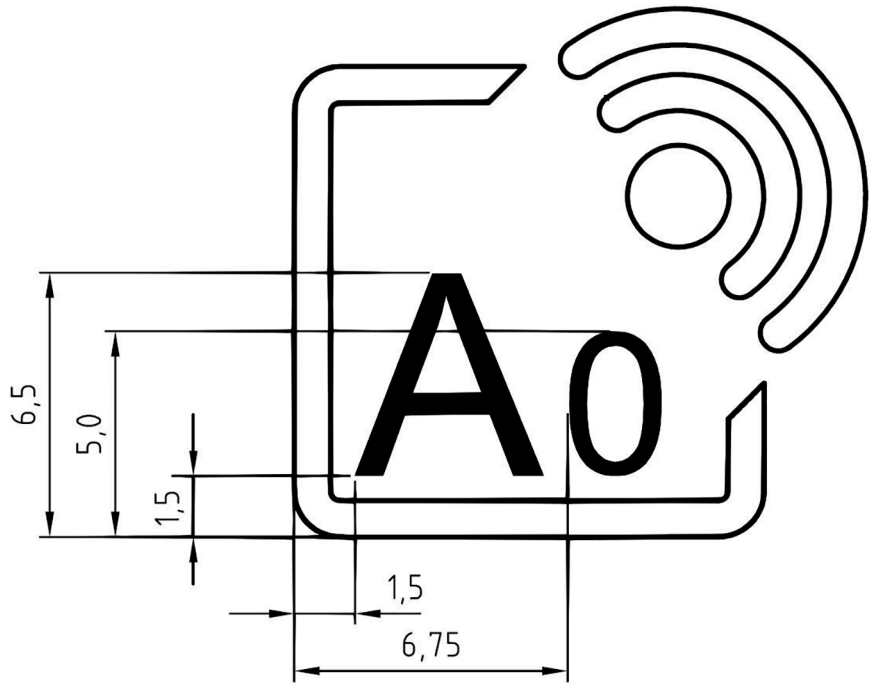

Figure B.4 — Example of RFID Emblem with two-character code of ISO/IEC 18000-7 tags

Dimensions in millimetres

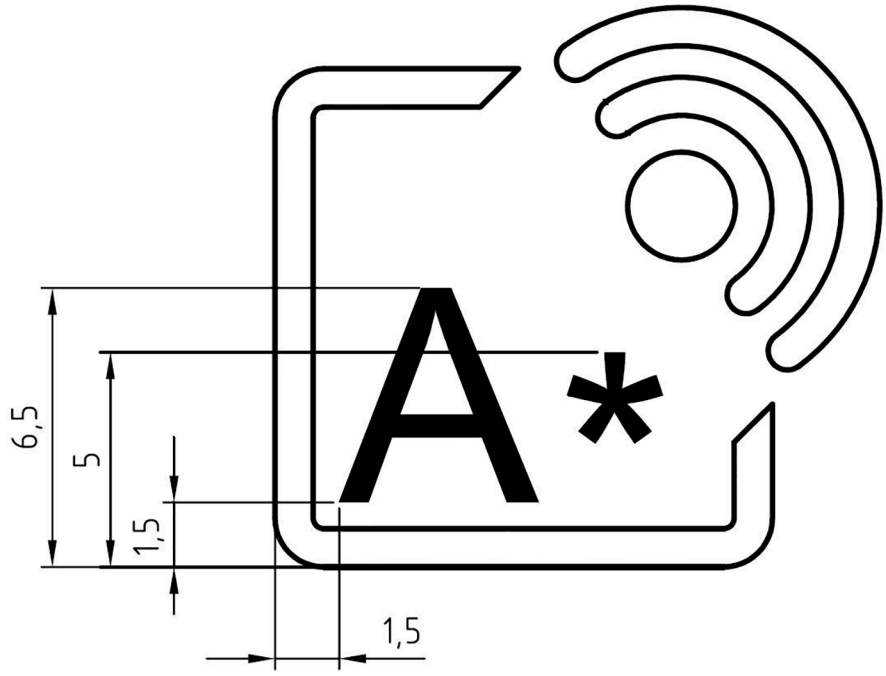

Figure B.5 — Example of RFID Emblem with interrogator code of ISO/IEC 18000-7 compatible interrogator

Annex C
(informative)

Other RFID markings

C.1 Industry-specific marking

Certain industries have adopted programmes based upon organisational membership or specific types of technology, for instance: GS1/ EPCglobal[1)], NFC and RAIN. Others have been approved by governmental entities. The purpose of this Annex is to describe the meanings of alternative RFID-related emblems that are provided by different organisations.

C.2 EPCglobal

C.2.1 General

Over the years, standards have been developed to support the use of RFID and allow for global visibility of items in today's fast-moving, information-rich, global trading networks.

GS1 EPC standards fall under two main categories:

— EPC/RFID tags

— EPC Information Services (EPCIS)

Today, the GS1 Innovation Board leverages the spirit of EPCglobal across a broader range of business challenges and technology solutions.

C.2.2 GS1 EPC symbol

RFID is used on many everyday consumer products as they move through the supply chain—from factories through distribution centres and into retail stores. As RFID evolves, it offers significant benefits to consumers and companies. The improved information in the supply chain speeds products to the shelf and ensures they are available when consumers want and in the quantities they need. Removal of expired products is easier, and prompt removal of recalled products is facilitated. In addition, checkout times for customers could be significantly shortened if this business case is broadly deployed in the future.

The GS1 EPC symbol is shown in Figure C.1. It shall be used when the content of the RFID tag conforms to GS1 standard. The GS1 EPC symbol is used to inform customers that an EPC/RFID tag data is present on or within the packaging of the object(s). The GS1 EPC symbol is provided by GS1, a neutral, not-for-profit standards organisation. GS1 promotes responsible use of RFID technologies by working across industries, for example, with the retailer/marketplace who is selling the product and the manufacturer who made the product.

1) GS1 is responsible for facilitating the technical development and global adoption of Electronic Product Code (EPC) standards. EPCglobal was initially established as a GS1 subsidiary to support this initiative and to track business trends and technologies in order to expand the role of international standards in support of their advancement. GS1 guidelines on the use of EPC/RFID are available upon request and focus on the responsible use of the EPC/RFID technology for consumer items (see https://www.gs1.org/standards/epc-rfid).

Figure C.1 — GS1 EPC symbol (black and white [left], colour [right])

C.2.3 GS1 EPC certification (hardware and software)

The GS1 EPC Certification Program is a standards-based compliance and interoperability-testing programme, developed by the GS1 EPC community to provide a neutral and authoritative source for testing hardware and software products. It provides information regarding certified products, and the vendors who manufacture them. The purpose of this programme is to enable end-users to easily access reliable information regarding EPC hardware, including RFID silicon chips, interrogators, interrogator modules, interrogators with embedded reader modules and software programmes that conform to one or more of the GS1 EPC data format and interface standards. End-users can be confident that the certified products which they implement will work in predictable ways as defined by GS1 EPC standards, such as the UHF Gen 2 Air Interface Protocol standard[14].

GS1 EPC compliance testing verifies that EPC/RFID hardware and software products conform to GS1 standards. The interoperability programme builds on the compliance programme.

Figure C.2 — GS1 EPC Compliance Certification Mark

C.3 RAIN RFID Alliance

C.3.1 RAIN RFID Alliance

RAIN[2] (RAdio frequency IdentificatioN) uses the GS1 UHF Gen2 Air Interface Protocol[14], which has been standardized in ISO/IEC 18000-63. The word RAIN makes the link between UHF RFID and the cloud, where RFID-based data can be stored, managed and shared via the internet.

C.3.2 RAIN Emblem

The use of the RAIN Emblem is shown in Figure C.3 and is restricted to applications that use the ISO/IEC 18000-63 (or the GS1 UHF Gen2 Air Interface Protocol) air interface. The use of the RAIN Emblem is to provide notification that a UHF RFID tag (conforming to ISO/IEC 18000-63 or the GS1 UHF Gen2 Air Interface Protocol) is present on or within the packaging of the object(s) or that the interrogator conforms to this air interface. The RAIN Emblem is provided by the RAIN RFID Alliance,

2) The RAIN RFID Alliance is a non-profit organisation founded to promote the universal adoption of UHF RFID technology in a way similar to other wireless technology organisations, including the NFC Forum, WiFi Alliance and Bluetooth SIG. Information on the use of the RAIN Emblem and its use can be found at https://rainrfid.org/rain-brand/and information about the RAIN RFID Alliance can be found at https://RAINRFID.org

an independent, not-for-profit organisation promoting the use of RAIN RFID. Negative versions of the black/white image may be used when appropriate.

Figure C.3 — RAIN Emblems

C.3.3 RAIN Emblem use

The RAIN Emblem may be used commercially when its use complies with the following conditions:

a) The RAIN Emblem is affixed to an item incorporating an RFID tag that conforms to the ISO/IEC 18000-63 (or the GS1 UHF Gen2 Air Interface Protocol) air interface.

b) The RAIN Emblem is affixed to a reader/writer/printer that supports the ISO/IEC 18000-63 (or the GS1 UHF Gen2 Air Interface Protocol) air interface. This requires an agreement with RAIN.

Bibliography

[1] ISO 10241, *International terminology standards — Preparation and layout*

[2] ISO/IEC 7816-5, *Identification cards — Integrated circuit cards — Part 5: Registration of application providers*

[3] ISO/IEC 14443 (all parts), *Cards and security devices for personal identification — Contactless proximity objects*

[4] ISO/IEC 14443-2, *Cards and security devices for personal identification — Contactless proximity objects — Part 2: Radio frequency power and signal interface*

[5] ISO/IEC 15693-2, *Cards and security devices for personal identification — Contactless vicinity objects— Part 2: Air interface and initialization*

[6] ISO/IEC 15693 (all parts), *Cards and security devices for personal identification — Contactless vicinity objects*

[7] ISO/IEC 17363, *Supply chain applications of RFID — Freight containers*

[8] ISO/IEC 17364, *Supply chain applications of RFID — Returnable transport items (RTIs) and returnable packaging items (RPIs)*

[9] ISO/IEC 17365, *Supply chain applications of RFID — Transport units*

[10] ISO/IEC 17366, *Supply chain applications of RFID — Product packaging*

[11] ISO/IEC 17367, *Supply chain applications of RFID — Product tagging*

[12] ISO/IEC 18000-2, *Information technology — Radio frequency identification for item management — Part 2: Parameters for air interface communications below 135 kHz*

[13] ISO/IEC 18000-3, *Information technology — Radio frequency identification for item management — Part 3: Parameters for air interface communications at 13,56 MHz*

[14] ISO/IEC 18000-63, *Information technology — Radio frequency identification for item management — Part 63: Parameters for air interface communications at 860 MHz to 960 MHz Type C*

[15] ISO/IEC 18000-7, *Information technology — Radio frequency identification for item management — Part 7: Parameters for active air interface communications at 433 MHz*

[16] IEC 60027 (all parts), *Letter symbols to be used in electrical technology*

[17] GS1, *EPC Tag Data Standard (TDS)*

[18] GS1, *EPC Radio Frequency Identity Protocols, Generation-2 UHF RFID Standard*

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