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Information technology — Automatic identification and data capture techniques — Air interface specification for Mobile RFID interrogators

Technologies de l'information — Techniques d'identification et de captage automatiques des données — Spécification d'interface d'air pour interrogateurs Mobile RFID

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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 organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

ISO/IEC 29143 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*.

Introduction

This International Standard provides an air interface specification for Mobile radio frequency identification (RFID) interrogators that are part of a passive backscatter system. This system comprises one or more mobile interrogators, also known as Mobile RFID interrogators, and an undefined number of tags, also known as labels.

Interrogators are not required to support channel sensing, i.e. do not need to implement Listen Before Talk (LBT), and transmit commands on the off chance under the risk of colliding with one or more peer-interrogators. Moreover, interrogators compliant to this International Standard are not obliged to synchronize by any means (wired or wireless), i.e. no control channel dedicated to coordinating Time Division Multiplexing (TDM) is provided.

Tags are powered by the RF signal provided by the interrogator and respond to an interrogator by modulating the reflection coefficient of its antenna, thereby backscattering data to the interrogator. The working mode adopted by the tags is purely passive, i.e. tags do not actively initiate any kind of RF communication.

In this International Standard, collision arbitration and collision avoidance for Mobile RFID applications are defined by specifying methods aimed at mitigating the impact of emerging collisions and mechanisms used to avoid follow-up collisions.

The International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this document may involve the use of patents concerning radio-frequency identification technology given in the clauses identified below.

ISO and IEC take no position concerning the evidence, validity and scope of these patent rights.

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The latest information on intellectual property that may be applicable to this International Standard can be found at www.iso.org/patents.

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1 Scope

This International Standard applies to Mobile radio frequency identification (RFID) interrogator devices used to inventory passive or semi-passive backscatter tags at 860 MHz to 960 MHz in a mobile (non-fixed) application independent from specific communication details, i.e. modulation technique and command set.

Furthermore, the scope of this International Standard is mobile consumer applications, whereas mobile enterprise applications are not covered as long as operating in a closed environment.

An operating environment is considered to be closed if it belongs to a central administrative authority able to guarantee for sufficient isolation, i.e. preventing mobile enterprise interrogator devices from being used outside the dedicated operating environment, and if sufficient spatial separation and/or electromagnetic shielding from adjacent operating environments is provided.

An application is considered a consumer application if at least one of two interacting entities is a private individual (consumer) and the interaction is taking place in the public domain. Consequently, a Mobile RFID consumer application is defined as Mobile RFID equipment (e.g. mobile phones equipped with an RFID interrogator) being used in a consumer application.

NOTE   As there is currently no active contribution on Mobile HF interrogators, this International Standard covers only UHF.

This International Standard specifies

⎯ Mobile RFID interrogator media access control,

⎯ interrogator to interrogator and multiple interrogator to tag collision arbitration scheme including interrogator requirements,

⎯ interrogator to interrogator and multiple interrogator to tag collision avoidance scheme, and

⎯ tag memory use for Mobile RFID applications.

This International Standard does not specify

⎯ physical interactions (the signaling layer of the communication link) between interrogators and tags,

⎯ interrogator and tag operating procedures and commands, and

⎯ the collision arbitration algorithm used to singulate (separate to the current response slot) a specific tag in a multiple-tag environment.

NOTE   These aspects are addressed by other International Standards.

In particular, this International Standard does not replace any existing RFID air interface specification issued by ISO/IEC but extends the existing methodologies for fixed RFID interrogators with mechanisms addressing

the special challenges of Mobile RFID. The concepts and mechanisms described in this International Standard can be integrated in any existing RFID protocol approved by ISO/IEC for the given frequency range of 860 MHz to 960 MHz (unless explicitly prohibited by such protocol) regardless of the actual command set.

The mechanisms defined by this International Standard can be used for Mobile RFID interrogators used in consumer applications and compliant to ISO/IEC 18000-6.

2 Conformance

To claim conformance with this International Standard, an interrogator shall comply with all relevant clauses, except those marked as "optional". Moreover, the interrogator shall also operate within local radio regulations, which may further restrict operation.

To claim conformance with this International Standard, an interrogator shall also fulfill all requirements to claim conformance with the basic air interface specification ISO/IEC 18000-6.

NOTE   The basic assumption is that this International Standard cannot be used standalone. It is not intended to encourage usage of a proprietary air interface in combination with the extension defined in this International Standard and allow claiming conformance with this International Standard in that context.

Mobility of the RFID interrogator device is not a requirement for claiming conformance with this International Standard. It is recommended that all RFID interrogators operating in public areas of service, where interrogator to interrogator and multiple interrogators to tag collisions cannot be ruled out by administrative measures such as Time Division Multiplexing or Frequency Division Multiplexing, support the mechanisms specified in this International Standard regardless of the particular usage of the device (fixed, mobile, or both).

Conformance may also require a license from the owner of any intellectual property utilized by this device.

A mobile device shall only activate its RF for RFID capabilities if it is established that it operates according to the RF regulations of the country where it is turned on. For mobile phones this implies that the phone shall derive the country of operation from the network before activating the RF capabilities for RFID.

3 Normative references

The following referenced documents are indispensable for the application 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 18000-6:2010, *Information technology — Radio frequency identification for item management — Part 6: Parameters for air interface communications at 860 MHz to 960 MHz*

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

RFC 2141, *URN Syntax*, May 1997

RFC 3406, *Uniform Resource Names (URN) Namespace Definition Mechanisms*, October 2002