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Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary —

Part 3:
Radio frequency identification (RFID)

Technologies de l'information — Techniques d'identification automatique et de capture de données (AIDC) — Vocabulaire harmonisé —

Partie 3: Identification par radiofréquence (RFID)

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Foreword

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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.

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ISO/IEC 19762-3 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*.

ISO/IEC 19762 consists of the following parts, under the general title *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary*:

— *Part 1: General terms relating to AIDC*

— *Part 2: Optically readable media (ORM)*

— *Part 3: Radio frequency identification (RFID)*

Introduction

ISO/IEC 19762 is intended to facilitate international communication in information technology, specifically in the area of automatic identification and data capture (AIDC) techniques. It provides a listing of terms and definitions used across multiple AIDC techniques.

Abbreviations used within each part of ISO/IEC 19762 and an index of all definitions used within each part of ISO/IEC 19762 are found at the end of each document.

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Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary —

Part 3: Radio frequency identification (RFID)

Scope

This part of ISO/IEC 19762 provides terms and definitions unique to radio frequency identification (RFID) in the field of automatic identification and data capture techniques. This glossary of terms enables the communication between non-specialist users and specialists in RFID through a common understanding of basic and advanced concepts.

Classification of entries

The numbering system employed within ISO 19762 is in the format nn.nn.nnn, in which the first two numbers (**nn**.nn.nnn) represent the "Top Level" reflecting whether the term is related to 01 = Common to All AIDC Techniques, 02 = Common to All Optically Readable Media, 03 = Linear Bar Code Symbols, 04 = Two-dimensional Symbols, and 05 = Radio Frequency Identification. The second two numbers (nn.**nn**.nnn) represent the "Mid Level" reflecting whether the term is related to 01 = Basic Concepts/Data, 02 = Technical Features 03 Symbology, 04 = Hardware, and 05 = Applications. The third two or three numbers (nn.nn.**nnn**) represent the "Fine" reflecting a sequence of terms.

The numbering in this part of ISO/IEC 19762 employs "Top Level" numbers (**nn**.nn.nnn) of 05.

Terms and definitions

05.01.01
air interface
conductor-free medium, usually air, between a **transponder** and the **reader/interrogator** through which data communication is achieved by means of a modulated inductive or propagated **electromagnetic field**

05.01.02
alignment
orientation of the **tag** relative to the reader **antennas**, in terms of pitch, skew, and tilt

NOTE   See 02.01.35, Figure 1.

05.01.03
amplitude modulation
modulation in which the amplitude of a periodic carrier is a given function, generally linear, of the instantaneous values of the modulating signal

[IEC 60050-702 702-06-17]

05.01.04
antenna polarization
⟨**antenna** system⟩ focus of the tip of the **vector** of the electrical **field strength** in a plane perpendicular to the transmission vector

05.01.05
anti-clash
anti-contention
anti-collision
term describing a facility for avoiding contention at the **reader/interrogator** receiver for responses arising from **transponders** simultaneously present within the read or **interrogation zone** of a **radio frequency identification** system and competing for attention at the same time without producing an error report or blocking transaction

05.01.06
authentication(1)
message exchange between two **elements**, which verifies that further communication between the two items is proper

05.01.07
authentication(2)
⟨security⟩ act of verifying the claimed identity of an entity

05.01.08
automatic equipment identification
AEI
system of identification for equipment that uses the surface transportation infrastructures by means of **transponders** and **interrogators** combined with an unambiguous data structure

05.01.09
automatic repeat request
ARQ
protocol consisting of error detection and following repetition of the transmission for correcting if necessary

05.01.10
awake
state at which the **tag's** receiver is powered, and able to receive and respond to a transmission from a compliant **interrogator**

05.01.11
backscatter
process whereby a **transponder** responds to a reader/interrogation signal or field by modulating and re-radiating or transmitting the response signal at the same carrier **frequency**

05.01.12
bandwidth times time
term to specify the product of bandwidth and time used for 1 bit

NOTE   Bandwidth times time implicitly specifies the occupied bandwidth for a given data rate.

05.01.13
baud
unit of **modulation** rate equal to the number of signal elements per second where all such elements are of equal length and each element represents one or more bits

NOTE   For some modems operating at or above 1200 bit/s, the modulation rate, expressed in bauds, is usually less than the bit rate because more than one bit is conveyed per signal element.

[ISO/IEC 2382-9 09.05.20]

05.01.14
binary phase shift keying
BPSK
modulation scheme of phase modulation where only two points in a constellation diagram are used

05.01.15
differential binary phase shift keying
DBPSK
binary phase shift keying where the data is differential pre-processed

05.01.16
gaussian minimum shift keying
GMSK
gaussian pulse shaped **MSK**

05.01.17
minimum shift keying
MSK
form of two-condition frequency shift keying with modulation index equal to 0, 5, in which variations are continuous

[IEC 60050-702 702-06-49]

05.01.18
bi-phase-mark
format for encoding digital data in which a logical "1" has a transition in the beginning, middle and end of the bit, and a logical "0" has a transition at the beginning and end of the bit

05.01.19
memory capacity
measure of the data, expressed in bits or bytes, that can be stored in a **transponder**

NOTE   The measure may relate simply to the bits that are accessible to the user or to the total assembly of bits, including data identifier and error control bits.

05.01.20
carrier sense multiple access(1)
CSMA
multiple access protocol that allows the **tag** to "sense" whether another tag is using the **channel** prior to transmitting itself

05.01.21
carrier sense multiple access(2)
CSMA
multiple access technique where data stations mediate their own use of the common resource based upon presence or absence of a **carrier** from another user

05.01.22
carrier sense multiple access with collision detection
CSMA/CD
multiple access protocol that allows the **tag** to "sense" whether another tag is using the **channel** prior to transmitting itself; and to detect a **collision**, if one occurs

05.01.23
chip
⟨digital radio communication⟩ time part of the signal which represents one character, transmitted with characteristics which are distinct from those of the other parts of the same signal, in accordance with a specified rule

NOTE   Adapted from IEC 60050-713 713-07-04.

05.01.24
chip rate
frequency at which the spreading **sequence** modulates the **carrier**

05.01.25
code division multiple access(1)
CDMA
technique in which each transmission is broken into **packets**, a unique code is assigned to each packet, all coded packets are then combined mathematically into one signal, and each intended receiver extracts only its data packets depending on the assigned code

05.01.26
code division multiple access(2)
CDMA
multiple access that depends upon the use of independently coded **modulations** within a single channel

05.01.27
collision(1)
simultaneous communication by two or more **tags** in the field of view of an **interrogator**, which results in an error or lost transmission

NOTE   Such communication may be inseparable without some means of anti-collision or contention management.

05.01.28
collision(2)
condition that results from concurrent transmissions on the transmission medium

05.01.29
collision(3)
⟨hashing⟩ occurrence of the same hash value for two or more different keys

05.01.30
compatibility
suitability of products, processes or services for use together under specific conditions to fulfil relevant requirements without causing unacceptable interactions

EXAMPLE   **Interchangeability**, interoperability, and non-interference are differing levels (or degrees) of compatibility.

05.01.31
interchangeability
condition that exists between devices or systems that exhibit equivalent functionality, interface features and performance to allow one to be exchanged for another, without alteration, and achieve the same operational service

05.01.32
equivalent isotropically radiated power
effective isotropically radiated power
equivalent isotropical radiated power
effective isotropical radiated power
EIRP
product of the net radiated **RF** power of a **transmitter** and the **gain** of an **antenna** system in one direction relative to an isotropic source

EXAMPLE   36 dBm EIRP equals 4 W transmitted into an isotropic antenna, or 1 W transmitted into a 6 dB antenna.

05.01.33
electromagnetic field
field characterizing the electric and magnetic conditions of a material medium or of vacuum, defined by the following set of four vector quantities:

E: electric field (vector)

D: electric flux density (vector)

H: magnetic field (vector)

B: magnetic flux density (vector)

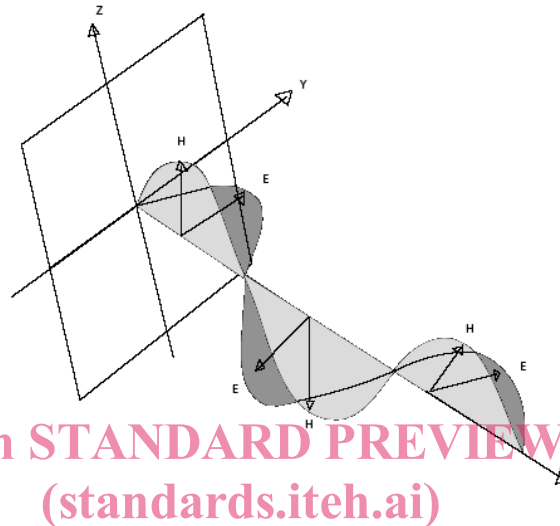**Figure 1 — Electromagnetic field**

NOTE   Adapted from IEC 50 (705):1995 705-01-07.

05.01.34
data transfer rate
average number of bits, characters, or blocks transferred per unit time between two points

[ISO/IEC 2382-9 09.05.21]

NOTE 1   The rate at which data is communicated between **transponder** and the reader/interrogator.

NOTE 2   Typical units are bits per second or bytes per second.

05.01.35
electromagnetic interference
EMI
degradation in the performance of an equipment transmission channel or system caused by an electromagnetic disturbance

[IEC 600500-161-01-06 (702-08-29]

05.01.36
false activation
result of a 'foreign' or non-assigned **transponder** entering the **interrogation zone** of a radio frequency **identification** system and effecting a response, erroneous or otherwise

05.01.37
family of tags
group of **tags** with differing capabilities which are nevertheless capable of communicating ID numbers and/or data with a common **interrogator**

05.01.38
far field region
region of an electromagnetic field of an antenna wherein the predominant components of the field are those which represent a propagation of energy and wherein the angular field distribution is essentially independent of the distance from the antenna

[IEC 50 (712):1992 712-02-02]

NOTE 1   In the far field region, field distribution is unaffected by the **antenna** structure and the wave propagates as a plane wave.

05.01.39
field strength
transmitter field intensity
⟨radio transmitter⟩ magnitude of the electromagnetic field created at a given point by a radio transmitting system operating at a specified characteristic frequency with specified installation and modulation conditions

[IEC 50 (705):1995 705-08-31]

05.01.40
forward link
down-link
communications from **reader/interrogator** to **transponder**

cf. **up-link, down-link**

05.01.41
frame(1)
⟨time division multiplexing⟩ repetitive set of consecutive time-slots constituting a complete cycle of a signal or of another process in which the relative position of each time-slot in the cycle can be identified

[IEC 60050-704 704-14-01]

05.01.42
frame(2)
⟨data communications⟩ transmission frame is a data structure that consists of fields, predetermined by a protocol, for the user of data and control data

NOTE   The composition of a frame, especially the number and types of fields may vary according to the type of protocol.

[ISO/IEC 2382-9 09.06.08]

05.01.43
frequency hop rate
frequency at which a frequency hopping spread spectrum (**FHSS**) system moves between transmission frequencies, equal to the reciprocal of the dwell time at an FHSS center frequency

05.01.44
frequency hop sequence
pseudo-random binary sequence (PRBS) determining the hopping frequencies used in frequency hopping spread spectrum (**FHSS**) systems

05.01.45
absolute gain
isotropic gain
⟨antenna⟩ ratio, generally expressed in decibels, of the radiation intensity produced by an antenna in a given direction to the radiation intensity that would be obtained if the power accepted by the antenna were radiated equally in all directions

NOTE 1   If no direction is specified, the direction of maximum radiation intensity from the given antenna is implied.

NOTE 2   If the antenna is lossless, its absolute gain is equal to its directivity in the same direction.

[IEC 50 (712):1992 712-02-43]

05.01.46
magnetic field
constituent of an electromagnetic field which is characterized by the magnetic field strength *H* together with the magnetic flux density *B* [221-01-01 MOD]

NOTE   In French, the term "champ magnétique" is also used for the quantity magnetic field strength.

[IEC 60050-121 121-11-69]

05.01.47
half-duplex transmission(1)
data transmission in either direction, one direction at a time

[ISO/IEC 2382-9:1995 09.03.07]

05.01.48
half-duplex transmission(2)
data transmission in either direction, one direction at a time, in which the information is communicated after the **transceiver** has stopped transmitting the activation field

cf. **full-duplex transmission**

NOTE 1   Adapted from ISO/IEC 2382-9:1995 09.03.06.

05.01.49
harmonics
power output at integer multiples of the primary frequency of a **transmitter** invariably exhibiting lower amplitudes

NOTE   Harmonics can be generated as a result of circuit non-linearities associated with radio transmissions resulting in harmonic distortion.

05.01.50
in-use programming
ability to read from and **write** to a **transponder** while it is attached to the object or item for which it is being used

cf. **factory programming, field programming**

NOTE   **Tags** and systems with this capability are called **read/write** tags and systems.

05.01.51
radio frequency interference
RFI
degradation of the reception of a wanted signal caused by a radio frequency disturbance

[IEC 60050-713:1998 713-11-05]

NOTE   Unwanted electromagnetic signals, where encountered within the environment of a **radio frequency identification** system, that cause disturbance in its normal operation, possibly resulting in bit errors, and degrading system performance.

05.01.52
radio frequency disturbance
any electromagnetic phenomenon having components in the radio frequency range, which may degrade the performance of a device, equipment or system, or adversely affect living or inert matter

NOTE   A radio frequency disturbance may be a **radio frequency noise**, an unwanted signal or a change in the propagation medium itself.

[IEC 60050-713:1998 713-11-04]

05.01.53
interlaced half duplex
full-duplex transmissions by the **interrogator**; **half-duplex** operation by the **tag**

05.01.54
interrogation zone
region in which a **transponder** or group of transponders can be effectively read by an associated **radio frequency identification** reader/interrogator

05.01.55
memory module
read/write or re-programmable **transponder**

05.01.56
pulse duration modulation
PDM
pulse time modulation in which the pulse duration varies in accordance with a given function of the value of the modulating signal

[IEC 60050-702 702-06-57]

05.01.57
radio noise
radio frequency noise
time-varying electromagnetic phenomenon having components in the radio frequency range, apparently not conveying information and which may be superimposed on or combined with a wanted signal

[IEC 60050-713:1998 713-11-03]

05.01.58
electromagnetic noise
time-varying electromagnetic phenomenon apparently not conveying information and which may be superimposed on or combined with a wanted signal

[IEC 600500-161-01-02]

05.01.59
frequency range
⟨equipment⟩ set of frequencies over which equipment can be adjusted to operate satisfactorily

NOTE   The frequency range of equipment can be subdivided into switched sub-ranges which may or may not be contiguous. [IEC 60050-702 702-09-68]

05.01.60
orientation sensitivity
⟨transponder⟩ sensitivity of response expressed as a function of angular variation or orientation

05.01.61
packet(1)
block of data sent over a communication link

NOTE 1   Each packet may contain sender, receiver, and error control information, in addition to the actual message.

NOTE 2   Packets can be fixed- or variable-length, and they are reassembled, if necessary, when they reach their destination.

05.01.62
packet(2)
⟨data communications⟩ sequence of bits arranged in a specific format, containing control data and possibly user data, and that is transmitted and switched as a whole

05.01.63
penetration(1)
ability of **electromagnetic waves** to propagate into or through materials

NOTE 1   Non-conducting materials are essentially transparent to electromagnetic waves, but absorption mechanisms, particularly at higher frequencies, reduce the amount of energy propagating through the material.

NOTE 2   Metals constitute good reflectors for freely propagating electromagnetic waves, with very little of an incident wave being able to propagate into the metal surface.

NOTE 3   Low frequency tagging systems are said to have good penetrative properties as their **tag** can be read when behind or encased in other materials.

NOTE 4   Microwave tagging systems, while having greater ranges, are less capable of penetration of materials.

05.01.64
penetration(2)
unauthorized access to a data processing system

05.01.65
phantom transaction
report of a non-existent **tag**

05.01.66
phase shift keying
PSK
angle modulation in which each significant condition in a discretely timed modulating signal is represented by a specified difference between the phase of the modulated signal and the phase of the carrier in the absence of modulation

[IEC 60050-702 702-06-40]