
**Information technology — Real-time
locating systems (RTLS) —**

Part 5:

**Chirp spread spectrum (CSS) at 2,4 GHz
air interface**

*Technologies de l'information — Systèmes de localisation en temps réel
(RTLS) —*

*Partie 5: Spectre étalé de compression d'impulsions (CSS) à une
interface d'air de 2,4 GHz*

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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.

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.

ISO/IEC 24730-5 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*.

ISO/IEC 24730 consists of the following parts, under the general title *Information technology — Real-time locating systems (RTLS)*:

- *Part 1: Application program interface (API)*
- *Part 2: 2,4 GHz air interface protocol*
- *Part 5: Chirp spread spectrum at 2,4 GHz air interface*

Introduction

CSS is a technique for spreading the bandwidth of a digital signal by using chirp pulses. Chirp pulses are pulses with a monotonically increasing or decreasing instantaneous frequency. Chirp pulses were originally used for radar applications. Recently, systems and standards have been developed which use chirp pulses also for communication applications. This part of ISO/IEC 24730 includes ranging and bidirectional communication between tags and infrastructure. Bidirectional communication enables the infrastructure to control the behaviour of tags in a timely manner.

Information technology — Real-time locating systems (RTLS) —

Part 5: Chirp spread spectrum (CSS) at 2,4 GHz air interface

1 Scope

ISO/IEC 24730 defines air interface protocols and an application programming interface (API) for real-time locating systems (RTLS). This part of ISO/IEC 24730 defines an air interface protocol which utilizes chirp spread spectrum (CSS) at frequencies from 2,4 GHz to 2,483 GHz. This protocol supports bidirectional communication and two-way ranging between the readers and tags of an RTLS. The mandatory default mode ensures interoperability between tags and infrastructure from various manufacturers, while the availability of several options offers flexibility to the developer of the infrastructure to adapt the behaviour of the overall system to the specific needs of his application.

2 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 15963, *Information technology — Radio frequency identification for item management — Unique identification for RF tags*

ISO/IEC 19762-1, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary — Part 1: General terms relating to AIDC*

ISO/IEC 19762-3, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary — Part 3: Radio frequency identification (RFID)*

ISO/IEC 19762-4, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary — Part 4: General terms relating to radio communications*

ISO/IEC 19762-5, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary — Part 5: Locating systems*

ISO/IEC 24730-1, *Information technology — Real-time locating systems (RTLS) — Part 1: Application program interface (API)*

Guidelines on Limiting Exposure to Non-Ionizing Radiation, International Commission on Non-Ionizing Radiation Protection (ICNIRP), Munich, 1999

IEC 62369-1 ed1.0, *Evaluation of human exposure to electromagnetic fields from short range devices (SRDs) in various applications over the frequency range 0 GHz to 300 GHz — Part 1: Fields produced by devices used for electronic article surveillance, radio frequency identification and similar systems*

IEEE Std C95.1-2005, *IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz*