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**Information technology —  
Telecommunications and information  
exchange between systems — High-rate  
ultra-wideband PHY and MAC standard**

*Technologies de l'information — Téléinformatique — Norme PHY et  
MAC à bande ultralarge et haut débit*

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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.

International Standard ISO/IEC 26907 was prepared by Ecma International (as ECMA-368) and was adopted, under a special “fast-track procedure”, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

This second edition cancels and replaces the first edition (ISO/IEC 26907:2007), which has been technically revised.

The second edition adds the following for regulatory flexibility:

- an additional TFI code;
- an additional Band Group;
- tone nulling for interference avoidance.

It also

- relaxes the requirement for Band group 1,
- relocates some assigned numbers to Ecma registries on the website,
- adds an information element for Bluetooth.

## Introduction

This International Standard specifies the ultra wideband (UWB) physical layer (PHY) and medium access control (MAC) sublayer for a high-speed, short-range wireless network, utilizing all or part of the spectrum between 3 100 MHz and 10 600 MHz, supporting data rates of up to 480 Mb/s.

This International Standard divides the spectrum into 14 bands, each with a bandwidth of 528 MHz. The first 12 bands are then grouped into four band groups consisting of three bands. The last two bands are grouped into a fifth band group. A sixth band group is also defined within the spectrum of the first four, consistent with usage within worldwide regulatory regulations.

A MultiBand Orthogonal Frequency Division Modulation (MB-OFDM) scheme is used to transmit information. A total of 110 sub-carriers (100 data carriers and 10 guard carriers) are used per band. In addition, 12 pilot subcarriers allow for coherent detection. Frequency-domain spreading, time-domain spreading, and forward error correction (FEC) coding are provided for optimum performance under a variety of channel conditions.

The MAC sublayer is designed to enable mobility, such that a group of devices may continue communicating while merging or splitting from other groups of devices. To maximize flexibility, the functionality of this MAC is distributed among devices. These functions include distributed coordination to avoid interference between different groups of devices by appropriate use of channels and distributed medium reservations to ensure Quality of Service. The MAC sublayer provides prioritized schemes for isochronous and asynchronous data transfer. To do this, a combination of Carrier Sense Multiple Access (CSMA) and Time Division Multiple Access (TDMA) is used. A Distributed Reservation Protocol (DRP) is used to reserve the medium for TDMA access for isochronous and other traffic. For network scalability, Prioritized Contention Access (PCA) is provided using a CSMA scheme. The MAC has policies that ensure equitable sharing of the bandwidth.

Taken together, the PHY and MAC specified in this Ecma standard are well-suited to high rate, zero infrastructure communications between a mixed population of portable and fixed electronic devices.

This International Standard is not intended to represent the regulatory requirements of any country or region.

# Information technology — Telecommunications and information exchange between systems — High-rate ultra-wideband PHY and MAC standard

## 1 Scope

This International Standard specifies a distributed medium access control (MAC) sublayer and a physical layer (PHY) for wireless networks.

## 2 Conformance

Conforming devices implement the MAC sublayer and the PHY layer as specified herein and support:

1. data rates of 53,3 Mb/s, 106,7 Mb/s, and 200 Mb/s for transmitting and receiving;
2. at least one of the band groups;
3. time-frequency codes using both TFI and FFI.

In addition, conforming devices may implement the MAC/PHY Interface as specified in ISO/IEC 26908.

## 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.

*IEEE 100, The Authoritative Dictionary of IEEE Standard Terms, Seventh Edition*

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