INTERNATIONAL STANDARD

ISO/IEC 24771

Second edition
2014-08-01

Information technology — Telecommunications and information exchange between systems — MAC/PHY standard for ad hoc wireless network to support QoS in an industrial work environment

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Technologies de l'information — Télécommunications et échange d'information entre systèmes — Norme MAC/PHY pour un réseau ad hoc sans fil qui supporte QoS dans un environnement de travail industriel

ISO/IEC 24771:2014
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Reference number
ISO/IEC 24771:2014(E)

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Published in Switzerland

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The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 6, *Telecommunications and information exchange between systems*.

This second edition cancels and replaces the first edition (ISO/IEC 24771:2009), which has been technically revised.

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Information technology — Telecommunications and information exchange between systems — MAC/PHY standard for ad hoc wireless network to support QoS in an industrial work environment

1 Scope

This International Standard defines a protocol for the physical layer (PHY) and the data link layer in order to construct a reliable and high-speed data transmission network between devices on industrial sites such as factories and plants. This network specification provides a standardized protocol to provide a framework for various industrial devices to establish a simple, low-cost, energy-efficient, and high-speed network between them. In order to fulfil the service requirements of the factories and large plants, this network specification is designed to enable devices to establish a network by themselves without help of any infrastructure and reliably exchange various kinds of data, including real-time audio and video data, between them. In addition to high transmission rates, Quality of Service (QoS) for multimedia data - such as video - is also provided.

The devices mentioned in this International Standard refer to equipment that is and can be used in industrial sites such as factories and automated assembly lines. Such devices include PLC (Programmable Logic Controller), and CNC (Computerized Numerical Controller) and manufacturing robots. However, beyond such conventional devices, devices mentioned in this International Standard include personal IT devices that workers may carry and use while working, including cellular phones, personal industrial digital assistants (PDA), and laptop PCs.

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2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 9797-1, *Information technology — Security techniques — Message Authentication Codes (MACs) — Part 1: Mechanisms using a block cipher*

ISO/IEC 18033-3, *Information technology — Security techniques — Encryption algorithms — Part 3: Block ciphers*

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3 Terms and definitions, and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
Access control
control process to prevent unauthorized use of resources or bandwidth

3.1.2
Ad-hoc network
network that is spontaneously formed usually without system installation

NOTE Such networks are mainly characterized by time and space limitations.

3.1.3
Association
service used to connect authorized devices in the network

3.1.4
Authentication
device verification process allowing devices within the network to connect to one another

3.1.5
Camellia
128-bits secure block algorithm defined in the ISO/IEC 18033-3 standard

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3.1.6
Coverage area
territory over which two devices can achieve acceptable quality and performance while exchanging data

3.1.7
Dissociation
service used in an established network

3.1.8
Frame
format of bits in a data exchange

3.1.9
K
prefix indicating multiplication by 1024

3.1.10
Kμs
unit of 1024 μs

3.1.11
k
prefix indicating multiplication by 1000

3.1.12
Logical Channel
data link channel sitting distinctly above the physical layer

3.1.13
Master
station that manages the network by periodically transmitting a beacon frame

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3.1.14
MAC Management Protocol data Unit
MMPDU
data unit exchanged between two media access control apparatuses in order to implement the media access control management protocol

3.1.15
MAC Protocol data Unit
MPDU
data unit exchanged between two media access control apparatuses by means of utilizing the physical layer services

3.1.16
MAC Service data Unit
MSDU
data unit transmitted between media access control service access points

3.1.17
Mobile Device
device that utilizes communication networks while in motion

3.1.18
Portable Device
station that is normally portable but must be in a fixed location in order to link to the communication network

3.1.19
SEED
128-bits secure block algorithm defined in the ISO/IEC 18033-3 standard

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.1.20
Slave
station in the network other than the master

ISO/IEC 24771:2014
https://standards.iteh.ai/catalog/standards/sist/cc4fe2b2-e1b1-4557-82a9-c118542a53de/iso-iec-24771-2014

3.1.21
Station
device that can operate according to this International Standard

3.2 List of Abbreviations

AES	advanced encryption standard
ARQ	automatic repeat request
ARQN	automatic repeat request N
ASN.1	abstract symbol notation 1
BER	bit error rate
CAP	contention access period
CBC	cipher block chaining
CBC-MAC	cipher block chaining-message authentication code
CCA	clear channel assessment

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