



BSI Standards Publication

Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol

Part 9: Wireless Communication in ISM bands

National foreword

This British Standard is the UK implementation of [EN 14908-9:2021](#).

The UK participation in its preparation was entrusted to Technical Committee RHE/16, Performance requirements for control systems.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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English Version

Open Data Communication in Building Automation,
Controls and Building Management - Control Network
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Réseau ouvert de communication de données
pour l'automatisation, la régulation et la
gestion technique du bâtiment - Protocole de
contrôle du réseau - Partie 9 : Communication
sans fil dans les bandes ISM

Firmenneutrale Datenkommunikation für die
Gebäudeautomation und Gebäudemanagement
- Steuerungs-Netzwerk-Protokoll - Teil 9:
Drahtlose Kommunikation im ISM Band

This European Standard was approved by CEN on 8 July 2021.

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European foreword

This document ([EN 14908-9:2021](#)) has been prepared by Technical Committee CEN/TC 247 “Building Automation, Controls and Building Management”, the secretariat of which is held by SNV.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2022, and conflicting national standards shall be withdrawn at the latest by March 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document is part of a series of European Standards for open data transmission in building automation, control and in building management systems. The content of this document covers the data communications used for management, automation/control and field functions. This document is based on the American standards EIA/CEA-709.1-B Control Network Protocol Specification.

This document is part of a series of European Standards under the general title *Open Data Communication in Building Automation, Controls and Building Management — Control Network Protocol*, which comprises the following parts:

- *Part 1: Protocol Stack*
- *Part 2: Twisted Pair Communication*
- *Part 3: Power Line Channel Specification*
- *Part 4: IP-Communication*
- *Part 5: Implementation*
- *Part 6: Application elements*
- *Part 7: Communication via internet protocols*
- *Part 8: Communication using Broadband over Power Line Networks — with internet protocols*
- *Part 9: Wireless Communication in ISM bands (this document)*

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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Introduction

This document enables utilization of wireless communication in the general title *Control Network Protocol (CNP)* in the EN 14908 series. The wireless communication can provide fast and easy system deployment, robust, de-centralized and autonomous network operation for [EN 14908](#) based applications.

Wireless communication is defined to operate in ISM bands, which are licensed exempt bands available either regionally or globally.

1 Scope

This document specifies an adaptation layer for the control network protocol (CNP), as described in [EN 14908-1](#) to utilize wireless communication network. This document defines the services of the wireless communication provided to CNP layer for delivering data and commands towards and from sensors, actuators, etc. which are wirelessly connected as part of the [EN 14908-1](#) network.

In addition, this document defines the requirements for the radio communication applicable for CNP layer operation.

For the radio communication different frequency bands can be utilized. [Annex A](#) defines requirement for operation in different frequency bands.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

[EN 14908-1:2014](#), *Open Data Communication in Building Automation, Controls and Building Management - Control Network Protocol - Part 1: Protocol Stack*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in [EN 14908-1](#) and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

ISM RF radio layer

layer used for radio communications in ISM RF 14908-9 system

NOTE Higher layers of the [EN 14908-1](#) can access ISM RF radio layer based on interface defined in [Clause 7](#).

3.2

RF gateway

entity which has a backhaul connection for data delivery to the wireline CNP network

NOTE The RF gateway operates as sink of ISM RF radio network, providing a root of routing, which in multi-hop network RF nodes are directing traffic.

3.3

RF node

physical node capable of wireless communication that represents the highest degree of address resolvability on a wireless network

4 Abbreviations

AES	Advanced Encryption Standard
APDU	Application layer Protocol Data Unit
ARQ	Automatic Repeat Request

CBC-MAC	Cipher Block Chaining MAC algorithm
CMAC	cipher-based Message Authentication Code
CNP	Control Network Protocol
CTR	Counter Mode
CRC	Cyclic Redundancy Check
ISM	Industrial Scientific and Medical
LPDU	Link Protocol Data Unit, or frame as defined according to EN 14908-1:2014 , 6.5
NPDU	Network Protocol Data Unit, or packet as defined according to EN 14908-1:2014 , 8.5
OMAC1	One-Key CBC-MAC
PDUID	Protocol Data Unit ID
QoS	Quality of Service
RF	Radio Frequency
RF-CSAP	RF Control Service Access Point
RF-DSAP	RF Data Service Access Point

5 Overview of ISM RF in EN 14908 based systems

5.1 General

The overall protocol architecture of the ISM RF in [EN 14908](#) based system is depicted in [Figure 1](#). The higher layer protocols of [EN 14908-1](#) can access to the ISM RF radio protocols via open interfaces as specified in [Clause 7](#). [Annex A](#) defines requirements for ISM RF radio protocol layers.

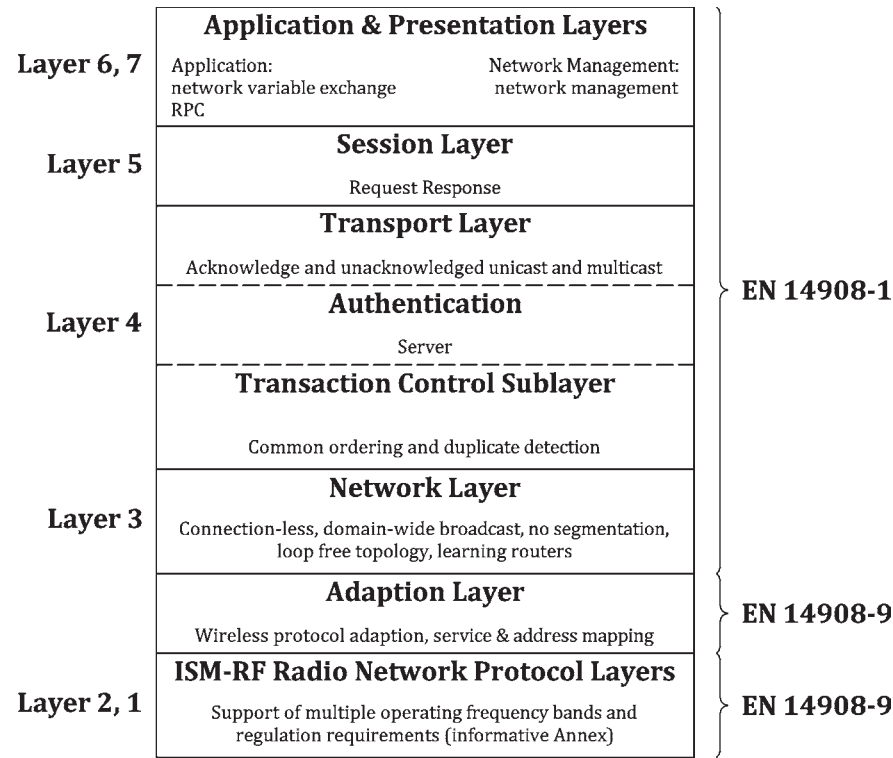


Figure 1 — Protocol layering

5.2 ISM RF radio communication introduction

5.2.1 Architecture

The radio communication solution for ISM RF radio communication is based on decentralized RF node to RF node communication network architecture as depicted in [Figure 2](#). This enables ISM RF radio communication, to support deployments where some RF nodes are located outside of RF gateway radio coverage. The RF-node is capable of local decision making related to data routing, used transmission power, and used transmission time and frequency.