SLOVENSKI STANDARD
oSIST prEN IEC 62657-2:2020

01-november-2020

Industrijska komunikacijska omrežja - Brezžična komunikacijska omrežja - 2. del: Upravljanje soobstoja

Industrial communication networks - Wireless communication networks - Part 2: Coexistence management

Industrielle Kommunikationsnetze - Funk-Kommunikationsnetze - Teil 2: Koexistenz-Management

Réseaux de communication industriels - Réseaux de communication sans fil - Partie 2: Gestion de coexistence

Ta slovenski standard je istoveten z: **prEN IEC 62657-2:2020**

ICS:

25.040.40	Merjenje in krmiljenje industrijskih postopkov	Industrial process measurement and control
35.110	Omreževanje	Networking

oSIST prEN IEC 62657-2:2020 **en,fr,de**

65C/1046/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 62657-2 ED3**	
DATE OF CIRCULATION: **2020-09-18**	CLOSING DATE FOR VOTING: **2020-12-11**
SUPERSEDES DOCUMENTS: **65C/1009/CD, 65C/1040/CC**	

IEC SC 65C : INDUSTRIAL NETWORKS

SECRETARIAT: France	SECRETARY: Ms Valérie DEMASSIEUX
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 3D	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING ☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Industrial communication networks - Wireless communication networks - Part 2: Coexistence management

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

NC comments on this CDV will be resolved during the next SC65C/WG17 meeting scheduled on January 11th-13th, 2021, tentatively in Frankfurt (Germany) (location to be confirmed by September 2020, or replaced by a series of web meetings).

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INDUSTRIAL COMMUNICATION NETWORKS – WIRELESS COMMUNICATION NETWORKS –

Part 2: Coexistence management

FOREWORD

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International Standard IEC 62657-2 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This third edition cancels and replaces the second edition published in 2017 and its Amendment 1 published in 2019. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

– alignment of some definitions and specifications of coexistence parameters in order to facilitate their future inclusion in the IEC Common Data Dictionary (IEC CDD) maintained by the IEC;
– alignment of some definitions and specifications to be consistent to the new Part 3 and Part 4.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
65C/XX/FDIS	65C/XX/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts of the IEC 62657 series, under the general title *Industrial communication networks – Wireless communication networks,* can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The National Committees are requested to note that for this document the stability date is 2025.

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The overall market for wireless communication solutions spans a range of diverse applications, with differing performance and functional requirements. Within this overall market, the industrial automation domain could include:

- process automation, covering for example the following industry branches:
  - oil and gas, refining,
  - chemical,
  - pharmaceutical,
  - mining,
  - pulp & paper,
  - water & wastewater,
  - steel
- electric power such as:
  - power generation (for example wind turbine),
  - power transmission and distribution (grid),
- factory automation, covering for example the following industry branches:
  - food and beverage,
  - automotive,
  - machinery,
  - semiconductor.

Industrial automation requirements for wireless communication systems are different from those of, for example, the telecommunications, commercial and consumer markets. These industrial automation requirements are identified and provided in IEC 62657-1.

Industrial premises may contain a variety of wireless communication technologies and other sources of radio emissions.

This document is intended for designers and persons responsible for production and process plants, system integrators and mechanical engineers having to integrate and start up wireless systems in machines and plants, and producers of industrial wireless solutions. In particular, it is intended to motivate exchange of information between automation and radio engineers.

Many wireless industrial automation applications are also located in physical environments over which the operator/owner can exert control. That is, within a physical facility where the presence and operation of all radio emitting devices are under the control of a single entity. This allows wireless management strategies to be employed which are not feasible for equipment installed in public or other unmanaged areas.

In industrial automation, many different wireless communication systems may operate in the same premises. Examples of these communication systems are IEC 62591 [8][1] (WirelessHART®[2]), IEC 62601 [9] (WIA-PA) and IEC 62734 [10] (ISA100.11a); all these communication systems use IEEE 802.15.4 [19] for the process automation applications. Other examples of wireless communication systems are specified in IEC 61784-1 [4] and IEC 61784-2 [5] CPs that use IEEE 802.11 [17] and IEEE 802.15.1 [18] for factory automation applications. Different to wired fieldbuses, the wireless communication devices can interfere with others on the same premises or environment, disturbing each other. Other sources of radio energy in these bands, often at high energy levels, include radiated process heating, plastic welding, plasma lamps, and microwave irradiation devices.

Clearly, without a means to manage the coexistence of these varied emitters, it would be problematic to ensure that wireless systems meet the time-criticality and other performance requirements of industrial automation.

The IEC 62657 series has four parts:

- Part 1: Wireless communication requirements and spectrum considerations
- Part 2: Coexistence management
- Part 3: Formal description of the automated coexistence management and application guidance
- Part 4: Coexistence management with central coordination of wireless applications

IEC 62657-1 provides general requirements for industrial automation and spectrum considerations that are the basis for industrial communication solutions. This document specifies the coexistence management of wireless devices to ensure predicable performance. It is intended to facilitate harmonization of future adjustments to international, national, and local regulations.

This document provides the coexistence management concept and process. Based on the coexistence management process, a predictable assuredness of coexistence can be achieved for a given spectrum with certain application requirements. This document describes mechanisms to manage the potential mutual interference that might occur due to the operation of multiple wireless devices in a plant.

This document provides guidance to the users of wireless systems on selection and proper use of wireless systems. To provide suitable wireless devices to the market, it also serves vendors in describing the behaviors of wireless devices to build wireless systems matching the application requirements.

This document is based on analyses of a number of International Standards, which focus on specific technologies. The intention of this standard is not to invent new parameters but to use already defined ones and to be technology independent.

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1 Numbers in square brackets refer to the bibliography.

2 WirelessHART is the registered trade name of the FieldComm Group, see www.fieldcommgroup.org. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

INDUSTRIAL COMMUNICATION NETWORKS – WIRELESS COMMUNICATION NETWORKS –

Part 2: Coexistence management

1 Scope

This document:

- specifies the fundamental assumptions, concepts, parameters, and procedures for wireless communication coexistence;
- specifies coexistence parameters and how they are used in an application requiring wireless coexistence;
- provides guidelines, requirements, and best practices for wireless communication's availability and performance in an industrial automation plant; it covers the life-cycle of wireless communication coexistence;
- helps the work of all persons involved with the relevant responsibilities to cope with the critical aspects at each phase of life-cycle of the wireless communication coexistence management in an industrial automation plant. Life-cycle aspects include: planning, design, installation, implementation, operation, maintenance, administration and training;
- provides a common point of reference for wireless communication coexistence for industrial automation sites as a homogeneous guideline to help the users assess and gauge their plant efforts;
- deals with the operational aspects of wireless communication coexistence regarding both the static human/tool-organization and the dynamic network self-organization.

This document provides a major contribution to national and regional regulations. It does not exempt devices from conforming to all requirements of national and regional regulations.

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.

IEC 62657-1:2017, *Industrial communication networks – Wireless communication networks – Wireless communication requirements and spectrum considerations*

IEC 62657-4, *Industrial communication networks - Wireless communication networks - Part 4: Coexistence management with central coordination of wireless applications*

IEC 62443 (all parts), *Industrial communication networks – Network and system security*

3 Terms, definitions, abbreviated terms and conventions

3.1 Terms and definitions

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

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

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

3.1.1
active environmental influence
influence on the signal propagation through interfering of the wireless communication application or wireless application

EXAMPLE Welding machines, electrical drives or frequency converters, but also other wireless communication devices through using a similar frequency band, the same of nearby channels, the power spectral density and the duty cycle.

3.1.2
adjacent channel interference
interference that occurs from wireless devices using adjacent frequency channels

3.1.3
adjacent channel selectivity
ability of a radio receiver to respond to the desired signal and to reject signals in adjacent frequency channels

3.1.4
antenna gain
ratio of the power required at the input of a reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength at the same distance

[SOURCE: Federal Standard 1037C:1996, modified – Deletion of "loss-free" before "reference antenna", deletion of the two notes and synonyms] [21]

3.1.5
antenna radiation pattern
variation of the field intensity of an antenna as an angular function with respect to the axis

3.1.6
antenna type

kind of part of a radio transmitting or receiving system which is designed to provide the required coupling between a transmitter or a receiver and the medium in which the radio wave propagates

NOTE 1: In practice, the terminals of the antenna or the points to be considered as the interface between the antenna and the transmitter or receiver should be specified.

NOTE 2 If a transmitter or receiver is connected to its antenna by a feed line, the antenna may be considered to be a transducer between the guided waves of the feed line and the radiated waves in space.

[SOURCE: IEC 60050-712:1990, 712-01-01, modified - Addition of "kind of" at front]

3.1.7
application communication requirements
quantitative requirements specifying the required conditions and the required characteristics of wireless communication solutions at the communication interface that is met in order to achieve the purpose of the automation application

3.1.8
area of operation
distinguishing properties of the area where the wireless communication system is operated

3.1.9
automated collaborative coexistence management
tool supported collaborative coexistence management with defined interfaces between the tool and the wireless communication system

Note 1 to entry: The tool can be according to IEC 62657-4

3.1.10
automation application
industrial automation application
application of measurement and automatic control in the industrial automation domain

3.1.11
automation application data length
user data length
number of octets that are exchanged at the reference interface

3.1.12
bit rate of the physical link
measure of the number of binary digits transferred per second

3.1.13
cellular topology
cellular network topology
network topology where the geographical area is divided in cells

Note 1 to entry: A device can move from one cell to another cell. Devices that are in a cell communicate through a central hub. Hubs in different cells are interconnected.

3.1.14
center frequency
geometric mean of lower cut-off frequency and upper cut-off frequency of a frequency channel

3.1.15
channel number
unsigned integer number identifying a wireless communication channel in accordance to an authoritative document or rule

3.1.16
channel occupation
time interval in which the medium is busy

Note 1 to entry: Beyond the pure transfer of user data, this time includes all time slices necessary to process the transmission protocol, for example to transfer an acknowledgement.

3.1.17
coexistence
wireless communication coexistence
state in which all wireless communication solutions of a plant using shared medium fulfil all their application communication requirements

Note 1 to entry: In IEEE 802.15.2-2003 [19] the coexistence is defined as a characteristic of a device.