SLOVENSKI STANDARD
SIST EN 4905:2023

01-december-2023

Aeronavtika - Pasivne priponke UHF RFID za uporabo v zraku

Aerospace series - Passive UHF RFID for airborne use

Luft- und Raumfahrt - Passive UHF-RFID für den Einsatz in der Luft

Série aérospatiale - RFID UHF passive pour une utilisation aéroportée

Ta slovenski standard je istoveten z: **EN 4905:2023**

ICS:

49.035	Sestavni deli za letalsko in vesoljsko gradnjo	Components for aerospace construction

SIST EN 4905:2023   en,fr,de

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 4905

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ICS 35.040.50; 35.240.60; 49.035

Supersedes EN 4817:2012

English Version

Aerospace series - Passive UHF RFID for airborne use

Série aérospatiale - RFID UHF passive pour une
utilisation aéroportée

Luft- und Raumfahrt - Passive UHF-RFID für den
Einsatz in der Luft

This European Standard was approved by CEN on 16 July 2023.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 4905:2023 E

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European foreword

This document (EN 4905:2023) has been prepared by the Aerospace and Defence Industries Association of Europe — Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

This document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2024, and conflicting national standards shall be withdrawn at the latest by April 2024.

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 supersedes EN 4817:2012.

The main change between this document and EN 4817:2012 is that this document has been developed to define UHF passive RFID tags able to work under on-board conditions, be interoperable worldwide and conform to ATA Spec 2000, Chapter 9-5 requirements.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this document: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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Introduction

In order to improve:

— spare parts logistics;

— optimized maintenance process;

— component repair operations or replacements based on expiration date;

— as-flying configuration management process;

— cargo/catering operation;

in the aeronautical industry, an efficient data capture and storage tool, attached to the parts for their entire life and usable worldwide is highly desired.

Radio Frequency Identification (RFID) is considered as the best candidate for all stakeholders: suppliers, OEM (Original Equipment Manufacturers), aircraft manufacturers, airlines, MROs (Maintenance, Repair and Overhaul), etc., for more accurate, faster and more automatic processes for data capture.

The key characteristics of RFID are mainly the ability to store data onto an object, to read and write at the point of action, to be able to point and link with existing databases and for UHF RFID in particular the ability to be read from a distance and in batches.

The RFID label consists of an integrated circuit attached to a substrate with an integrated antenna and, when applicable, covered with a human-readable printed film and/or machine-readable 2D or data matrix barcode.

Standardization of these RFID tags for aeronautical industry adoption of RFID technology will provide key benefits in processes configuration management and for the maintenance of airborne components compared to paper records, bar code or classical human readable nameplates.

1 Scope

This document is applicable to new manufactured tags after publication of this document.

This document aims to:

— provide specification for RFID tag manufacturers to design and manufacture passive UHF RFID tags for the aeronautical industry;

— identify required performances for UHF RFID tags in order to be read/written during ground operations only, while being subject to the global flight environment;

— identify functional and environmental validation tests to be performed on passive UHF RFID tags with associated pass/fail criteria as well as associated test methods;

— check functionalities and resistance to environment for airborne passive UHF RFID tags.

This document does not apply to:

— the reader (interrogator – readers). It will be addressed appropriately by individual applicants;

— active RFID devices or battery assisted passive (BAP) RFID devices;

— RFID tags designed to operate outside the 860 MHz to 960 MHz frequency range.

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 9100, *Quality Management Systems — Requirements for Aviation, Space and Defence Organizations*

ATA Spec 2000,[1] *Chapter 9 — Automated Identification and Data Capture —* Ch. 9-4 (Barcode) & 9.5 (RFID)

ATA Spec 2000,[1] *Annex 11 — The format of user memory in EPCGlobal Class 1, Generation 2 RFID transponders*

EPC™ Radio-Frequency Identity Protocols Generation-2 UHF RFID Standard, *Specification for RFID Air Interface Protocol for Communications at 860 MHz — 960 MHz*

EUROCAE ED-14-RTCA DO-160,[2] *Environmental conditions and test procedures for airborne equipment*

Interoperability Test System for EPC Compliant Class-1 Generation-2 UHF RFID, *Devices — Interoperability test methodology*

ISO 105-X12,[3] *Textiles — Tests for colour fastness — Part X12: Colour fastness to rubbing*

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[1] Published by: ATA National (US), International Air Transport Association of America, https://www.airlines.org/.

[2] Published by: The European Organisation for Civil Aviation Equipment, https://www.eurocae.net/.

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ISO/IEC 18000-6, *Information technology — Radio frequency identification for item management — Part 6: Parameters for air interface communications at 860 MHz to 960 MHz, General*

ISO/IEC 18000-63, *Information technology — Radio frequency identification for item management — Part 63: Parameters for air interface communications at 860 MHz to 960 MHz Type C*

MIL-STD-202,[4] *Department of Defense Test Method Standard: Electronic and Electrical Component Parts*

MIL-STD-810G,[4] *Department of Defense Test Method Standard: Environmental Engineering Considerations and Laboratory Tests*

FAA 14 CFR Part 45,[5] *Aeronautics and Space — Part 45: Identification and Registration Marking*

3　Terms and definitions

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

ISO and IEC maintain terminology 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
air interface protocol
wireless air interface protocol by which RFID tags and readers communicate

3.2
backscatter
method of communication in which an RFID tag without a battery (or any internal power source) receives energy from an RFID reader's transmission and uses that same energy to send back a reply

3.3
barcode
method of representing data in a visual, machine-readable form

3.4
chip
tiny wafer of semiconductor material, such as silicon, processed to form a type of integrated circuit or component

3.5
electronic product code
EPC
universal identifier that gives a unique identity to a specific physical object

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[3]　Published by: ISO International Organization for Standardization, https://www.iso.org/.

[4]　Published by: DoD National (US) Mil. Department of Defense, https://www.defense.gov/.

[5]　Published by: FAA National (US) Federal Aviation Administration https://www.faa.gov/.

3.6
EPCglobal®
GS1 initiative to innovate and develop industry-driven standards for Electronic Product Code™ (EPC) to support the use of Radio Frequency Identification (RFID) and allow global visibility of items (EPCIS) in today's fast-moving, information rich, trading networks

3.7
EPCglobal® Class 1 Gen 2 UHF Tag
GS1 EPC™ Gen 2 UHF Tag
air interface protocol, which defines the physical and logical requirements for an RFID system of interrogators and passive tags, operating in the 860 MHz – 960 MHz UHF range

Note 1 to entry: It was first published by EPCglobal in 2004.

3.8
european telecommunication office
ETO
coordination entity between the postal and telecommunications organizations of the European States

3.9
european telecommunications standards institute
ETSI
independent, not-for-profit, standardization organization in the telecommunications industry (equipment makers and network operators) in Europe

3.10
federal aviation administration
FAA
government agency responsible for civil aviation treaties and controls in the United States

3.11
federal communications commission
FCC
regulator of interstate and international communications by radio, television, wire, satellite, and cable in all 50 States, the District of Columbia and U.S. territories

Note 1 to entry: An independent US government agency overseen by Congress, the Commission is the federal agency responsible for implementing and enforcing America's communications law and regulations.

3.12
human-readable
representation of data or information that can be naturally read by humans

3.13
international electrotechnical commission
IEC
international standards and conformity assessment body for all fields of electrotechnology

3.14
inlay
antenna made on an insulating support and to which an RFID chip is connected

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3.15
integrated circuit
IC
electronic circuit formed on a small piece of semiconducting material, which performs the same function as a larger circuit made from discrete components

3.16
integrated nameplate
identification or part marking containing an embedded RFID chip or device

Note 1 to entry: It may be utilized in the same manner as other identification and markings.

3.17
interoperability
ability of systems, from different manufacturers, to execute bi-directional data exchange functions, in a manner that allows them to operate effectively together

Note 1 to entry: RFID hardware and software interoperability determine the ability of RFID tags and interrogators manufactured by different suppliers to work interchangeably.

3.18
interrogator
reader/writer
transmitter/receiver that reads the contents of RFID tags in the vicinity

3.19
label
encapsulated RFID inlay within a type of material that covers and protects it; paper, plastic, polyethylene, polyamide, cardboard, foam

Note 1 to entry: RFID labels can be made with the adhesive required for the specific application.

3.20
machine-readable
data (or metadata) in a format that can be easily processed by a computer

3.21
non-operating temperature
temperature at which equipment will normally be exposed and not required to operate

3.22
operating temperature
temperature at which equipment will normally be exposed and required to operate

3.23
passive-backscatter, in mode Interrogator-Talk-First (ITF) System
backscattering of a signal towards the reader thanks to the modulation of the reflection coefficient of its antenna, following the transmission from the reader to the tag of continuous wave RF signals