



SLOVENSKI STANDARD

oSIST prEN 4905:2022

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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: **prEN 4905**

<https://standards.iteh.ai/catalog/standards/sist/ba508960-2e88-4197-9e54-fc1f46bf37c9/osist-pren-4905-2022>

ICS:

49.035	Sestavni deli za letalsko in vesoljsko gradnjo	Components for aerospace construction
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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 draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ASD-STAN.

If this draft becomes a European Standard, 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.

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

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

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European foreword

This document (prEN 4905:2022) 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, prior to its presentation to CEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 4817:2012.

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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<https://standards.iteh.ai/catalog/standards/sist/ba508960-2e88-4197-9c54-fc1f46bf37c9/osist-pren-4905-2022>

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 shall consist in 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 cover:

- 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 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.

However, unless you have obtained a specific exemption, nothing in this document supersedes existing laws and regulations. All RFID applications must comply with applicable local laws and regulations (i.e. European Telecommunication Office (ETO)/European Telecommunications Standards Institute (ETSI) for Europe, Federal Communications Commission (FCC) for the United States and or corresponding regulations in Asia).

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 2000,² *Annex 11 — The format of user memory in EPC Global 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*

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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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*

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 Defence Test Method Standard: Electronic and Electrical Component Parts*

MIL-STD-810G,⁵ *Department of Defence Test method Standard: Environmental Engineering considerations and Laboratory Tests*

RTCA/DO-160, *Environmental Conditions and test Procedures for Airborne Equipment*

3 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:

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

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/>.

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 which 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

3.24**passive UHF RFID tag**

tag with no internal power source and instead is powered by the electromagnetic energy transmitted from an RFID reader

Note 1 to entry: It does not transmit radio waves from itself.

3.25**read range**

straight-line distance between an RFID tag and the antenna of the RFID interrogator

3.26**Radio Frequency Identification****RFID**

remote identification method using radio frequency markers and readers

3.27**Radio Technical Commission for Aeronautics****RTCA**

United States volunteer organization that develops technical guidance for use by government regulatory authorities and by industry

3.28**Specification Control Document or Drawing****SCD**

document or drawing prepared for the purpose of defining and controlling key characteristics of purchased material, and used to describe qualification and acceptance requirements for procured items

3.29**RFID tag**

see "label"

Note 1 to entry: A tag could be an adhesive label, an attached tag or an embedded tag.

Note 2 to entry: When it is possible, the RFID information shall be completed by human readable information.

3.30**Survival temperature**

ambient temperature range at which a component can survive in a non-operating range mode and perform within specifications when operated

3.31**Ultra-High Frequency****UHF**

Radio frequencies in the range between 300 megahertz (MHz) and 3 gigahertz (GHz), also known as the "decimetre band" as the wavelengths range from one meter to one tenth of a meter (one decimeter)

Note 1 to entry: UHF RFID Frequencies vary in each country based on each country's regulations. UHF allocations for passive RFID are within the 860 to 960 MHz band worldwide.

3.32**user memory**

memory used for storing data other than the unique identifier of the product the tag is attached to

Note 1 to entry: It is typically an optional feature.