International Standard

ISO/IEC 18000-65

First edition
2026-02

Information technology — Radio frequency identification for item management —

Part 65: Parameters for air interface communications for streaming sensors based on ISO/IEC 18000-63

Technologies de l'information — Identification par radiofréquence (RFID) pour la gestion d'objets —

Partie 65: Paramètres de communication d'une interface radio pour capteurs de flux basée sur l'ISO/IEC 18000-63

Reference number
ISO/IEC 18000-65:2026(en)

© ISO/IEC 2026



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2026

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ... **iv**

Introduction ... **v**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **1**

4 Symbols, abbreviated terms and notations ... **2**
4.1 Symbols ... 2
4.2 Abbreviated terms ... 2
4.3 Notations ... 3

5 Streaming sensor ... **3**
5.1 General ... 3
5.2 Full duplex operation in backscatter communication ... 3
5.3 Configuration of streaming sensor ... 6
5.4 Streaming sensor state machine ... 7
5.5 Communication protocol ... 8
5.5.1 General ... 8
5.5.2 Writing configuration to tag and digital sensor ... 9
5.5.3 Streaming data frame ... 12
5.5.4 Streaming data encoding ... 12
5.5.5 *StreamStart* ... 13
5.5.6 *StreamStop* (full duplex operation) ... 14
5.5.7 Subcarrier and bitrate allocation ... 14

Annex A (normative) **State transition tables for streaming sensors** ... **16**

Annex B (informative) **Stream sensor implementation guide** ... **17**

Annex C (informative) ***Write* and *Read* command and reply sequence in stage 2** ... **20**

© ISO/IEC 2026 – All rights reserved

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

ISO and IEC draw attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO and IEC take no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO and IEC had received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents and https://patents.iec.ch. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*.

A list of all parts in the ISO/IEC 18000 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

© ISO/IEC 2026 – All rights reserved

Introduction

Passive-backscatter Interrogator-Talks-First (ITF) systems comprise Interrogators, also known as readers and tags. To differentiate the tags in ordinarily ITF system from the functional tags defined in this document, the functional tag is referred as to streaming sensor. A streaming sensor comprises, at least, a tag, which exploits the backscatter technology to establish the tag-to-interrogator link and an optional digital sensor. If a stream sensor involves a digital sensor, the tag provides a unique identification number for the digital sensor as well as working as a wireless modem between the interrogator and the digital sensor. Depending on the usage of the system, the interrogator may process, store and pass-through the received data from the tag. General functions as an item management application, specifically inventory, reading and writing tags are utilizing functionality defined in ISO/IEC 18000-63.

This document is based on ISO/IEC 18000-63. The unique features of this document are to accommodate the backscatter communication capability to various digital sensors and to allow simultaneous communication between streaming sensors and interrogators.

The described backscatter sensor system supports the following system capabilities in addition to the basic capability of ISO/IEC 18000-63:

— allocation of dedicated subcarrier frequency, bitrate and channel coding method to a selected set of streaming sensors;

— start and stop control of continuous data streaming from the set of streaming sensors to the interrogator;

— configuration and read/write of digital sensors from the interrogator through the tag in a streaming sensor.

© ISO/IEC 2026 – All rights reserved

Information technology — Radio frequency identification for item management —

Part 65: Parameters for air interface communications for streaming sensors based on ISO/IEC 18000-63

1 Scope

This document establishes the air interface based on ISO/IEC 18000-63 for radio frequency identification (RFID) devices operating in the 860 MHz to 930 MHz range used in sensing as well as item management applications.

This document specifies the physical and logical requirements for a passive-backscatter Interrogator-Talks-First (ITF) system.

This document specifies:

— logical and physical procedures between the interrogator and tags to allocate a dedicated subcarrier channel to each of the tags to produce continuous data streaming;

— logical and physical procedure between the interrogator and the tags to start and stop the continuous data streaming;

— logical interface between the interrogator and the tag to configure a digital sensor and to receive data from the digital sensor through the tag.

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.

ISO/IEC 18000-63:2026, *Information technology — Radio frequency identification for item management — Part 63: Parameters for RAIN air interface communications at 860 MHz to 930 MHz Type C*[1)]

ISO/IEC 19762, *Information technology — Automatic identification and data capture (AIDC) techniques — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions giving in ISO/IEC 19762 and the following 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/

1) Under preparation. Stage at the time of publication: ISO/IEC DIS 18000-63:2026.

© ISO/IEC 2026 – All rights reserved

3.1
streaming sensor
combination of a tag and a *digital sensor* (3.2)

Note 1 to entry: A tag is essentially a radio frequency integrated circuit to handle bilateral wireless communication with interrogator.

3.2
digital sensor
sensor which furnishes a digital interface, particularly SPI in this document

Note 1 to entry: An analog digital converter with digital interface is considered to be a type of digital sensors.

3.3
streaming
continuous data transmission

3.4
differential coding
channel coding produced as the differential with respect to the previous symbol

4 Symbols, abbreviated terms and notations

4.1 Symbols

f	designated DCO frequency
X	14 bits DCO value

4.2 Abbreviated terms

CPHA	clock phase
CPOL	clock polarity
DCO	digitally controlled oscillator
EBV	extensible bit vector
FS	full function sensor indicator
LSB	least significant bit
MB	memory bank
MSB	most significant bit
SPI	serial peripheral interface
P/S	parallel to serial conversion
RFU	reserved for future use
RSSI	received signal strength indicator
SSC	streaming sensor configuration
TID	tag-identification or tag identifier, depending on context
XPC_W1	XPC word 1

© ISO/IEC 2026 – All rights reserved