# DRAFT International Standard

# ISO/IEC DIS 18047-63

# Information technology — Radio frequency identification device conformance test methods —

## Part 63: Test methods for air interface communications at 860 MHz to 930 MHz

ICS: 35.040.50

ISO/IEC JTC **1**/SC **31**

Secretariat: **ANSI**

Voting begins on:
**2026-08-06**

Voting terminates on:
**2026-10-29**

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Published in Switzerland

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# 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).

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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*.

This second edition cancels and replaces the first edition (ISO/IEC 18047-63:2023), which has been technically revised.

The main changes are as follows:

— tests related to new commands like *QueryX*, *QueryY* and *ReadVar*, defined in ISO/IEC 18000-63:202x, have been added;

— the frequency range is changed from 860-960 MHz to 860-930 MHz, as meanwhile all applicable global radio regulations are within this frequency range.

A list of all parts in the ISO/IEC 18047 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.

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# Introduction

The ISO/IEC 18000 series defines the air interface for radio frequency identification (RFID) devices used in item management applications. ISO/IEC 18000-61, ISO/IEC 18000-62, ISO/IEC 18000-63 and ISO/IEC 18000-64 define the air interface for RFID devices that operate at frequencies from 860 MHz to 930 MHz

The ISO/IEC 18047 series provides air interface communication test methods to ensure conformance with the different parts of the ISO/IEC 18000 series.

Each part of the ISO/IEC 18047 series contains all measurements required to be made on a product to establish whether it conforms to the corresponding part of the ISO/IEC 18000 series.

NOTE Test methods for interrogator and tag performance are covered by the ISO/IEC 18046 series.

This document specifies the conformance requirements for a passive-backscatter, interrogator-talks-first (ITF), radio-frequency identification (RFID) system operating in the 860 MHz to 930 MHz frequency range. The system comprises interrogators, also known as readers, and tags, also known as labels.

An Interrogator transmits information to a Tag by modulating a radiofrequency (RF) signal in the 860 MHz to 930 MHz frequency range. The Tag receives both information and operating energy from this RF signal. Tags are passive, meaning that they receive all of their operating energy from the Interrogator's RF waveform.

An Interrogator receives information from a Tag by transmitting a continuous-wave (CW) RF signal to the Tag; the Tag responds by modulating the reflection coefficient of its antenna, thereby backscattering an information signal to the Interrogator. The system is ITF, meaning that a Tag modulates its antenna reflection coefficient with an information signal only after being directed to do so by an Interrogator.

Interrogators and Tags are not required to talk simultaneously; rather, communications are half-duplex, meaning that Interrogators talk and Tags listen – or vice versa.

Clause 6 describes and specifies all necessary conformance tests for ISO/IEC 18000-63:202x, Clause 6.

Clause 7 describes all necessary conformance tests that are described in ISO/IEC 18000-63:202x, 7.1 to 7.4.

Clause 8 describes all necessary conformance tests for ISO/IEC 18000-63:202x, 7.5.

Clause 9 describes all necessary conformance tests for ISO/IEC 18000-63:202x, Clause 8.

The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this document may involve the use of a patent.

ISO and IEC take no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured ISO and IEC that he/she is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with ISO and IEC. Information may be obtained from the patent database available at www.iso.org/patents or https://patents.iec.ch.

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# Information technology — Radio frequency identification device conformance test methods —

# Part 63:
# Test methods for air interface communications at 860 MHz to 930 MHz

## 1 Scope

This document specficies test methods for determining the conformance of radio frequency identification (RFID) devices (tags and interrogators) for item management with the specifications given in ISO/IEC 18000-63.

This document does not apply to the testing of conformity with regulatory or similar requirements.

The test methods specify only the verification of the mandatory functions and any optional functions which are implemented. This can, in appropriate circumstances, be supplemented by further, application-specific functionality criteria that are not available in the general case.

The interrogator and tag conformance parameters in this document are the following:

— type-specific conformance parameters including nominal values and tolerances;

— parameters that directly affect system functionality and inter-operability.

Parameters that are already included in regulatory test requirements are not included in this document.

Unless otherwise specified, the tests in this document are intended to be applied exclusively to RFID tags and interrogators defined in ISO/IEC 18000-63.

## 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 18000-63:202x, *Information technology — Radio frequency identification for item management — Part 63: Parameters for air interface communications at 860 MHz to 930 MHz Type C*

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

## 3 Terms, definitions, symbols, abbreviated terms and notations

### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 18000-63 and ISO/IEC 19762 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

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— IEC Electropedia: available at https://www.electropedia.org/

## 3.2 Symbols

For the purposes of this document, the symbols given in ISO/IEC 19762, ISO/IEC 18000-63 and the following apply.

*D* distance between the interrogator and test antenna

## 3.3 Abbreviated terms

For the purposes of this document, the abbreviated terms given in ISO/IEC 19762, ISO/IEC 18000-63 and the following apply.

DUT device under test

ITF interrogator-talks-first

RBW resolution bandwidth

RF radiofrequency

RFID radiofrequency identification

RNG random or pseudo-random number generator

VSWR voltage standing wave ratio

## 3.4 Notation

This document uses the following notational conventions as used in ISO/IEC 18000-63:

— States and flags are denoted in bold. Some command parameters are also flags; a command parameter used as a flag will be bold.

EXAMPLE 1 **ready**.

— Command and Tag reply parameters are underlined. Some flags are also command parameters; a flag used as a command parameter will be underlined.

EXAMPLE 2 Pointer.

— Command parameters are upper-case and Tag reply parameters are lower-case.

EXAMPLE 3 Pointer and handle.

— Commands are denoted in italics. Variables are also denoted in italics. Where there might be confusion between commands and variables, this protocol will make an explicit statement.

EXAMPLE 4 *Query*.

— For logical negation, labels are preceded by "~".

EXAMPLE 5 If **flag** is true, then **~flag** is false.

— The symbol, ⊗, refers to XOR.

— The symbol, ||, refers to concatenation.

— The symbol, ≠, refers to not equal.

— The symbol, R=>T, refers to commands or signalling from an Interrogator to a Tag (Reader-to-Tag).

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