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

**Part 63:
Test methods for air interface
communications at 860 MHz to 960
MHz**

*Technologies de l'information — Méthodes d'essai de conformité du
dispositif d'identification de radiofréquence —*

*Partie 63: Méthodes d'essai pour des communications d'une interface
d'air entre 860 MHz et 960 MHz*

ISO/IEC 18047-63:2023

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see <https://patents.iec.ch>).

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 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.

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 960 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 960 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 960 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 18000-63:2021, Clause 6.

[Clause 7](#) describes all necessary conformance tests that are described in ISO/IEC 18000-63:2021, 7.1 to 7.4.

[Clause 8](#) describes all necessary conformance tests for ISO/IEC 18000-63:2021, 7.5.

[Clause 9](#) describes all necessary conformance tests for ISO/IEC 18000-63:2021, 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 960 MHz

1 Scope

This document specifies 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 18000-63:2021, *Information technology — Radio frequency identification for item management — Part 63: Parameters for air interface communications at 860 MHz to 960 MHz Type C*

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

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

3.2 Symbols

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

D distance between the interrogator and test antenna

T_{REPLY} time between the Interrogator's command and the Tag's backscattered reply

3.3 Abbreviated terms

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

BLF backscatter-link frequency (BLF = $1/T_{\text{pri}} = DR/TR_{\text{cal}}$)

CW continuous-wave

DUT device under test

ITF interrogator-talks-first

ppm parts per million

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.

EXAMPLE 1 **ready**.

— Commands and variables are denoted in italics. Where there can be confusion between commands and variables, this document provides an explicit statement.

— Command parameters are underlined.

EXAMPLE 2 Pointer.

— For logical negation, labels are preceded by “~”.

EXAMPLE 3 If **flag** is true, then **~flag** is false.

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

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

4 Default conditions applicable to the test methods

4.1 Test environment

Unless otherwise specified, testing shall take place in a temperature environment of $(23 \pm 3) ^\circ\text{C}$ and non-condensing humidity from 40 % to 60 %.

4.2 Pre-conditioning

4.2.1 General

Before testing, the interrogators and tags to be tested shall be conditioned to the test environment for a period of 24 h.

4.2.2 Default tolerance

Unless otherwise specified, a default tolerance of ± 5 % shall be applied to the quantity values given to specify the characteristics of the test equipment (e.g. linear dimensions) and the test method procedures (e.g. test equipment adjustments).

4.2.3 Noise floor at test location

Noise floor at test location shall be measured for at least 1 min with the spectrum analyser, using the same conditions as for the measurement of the DUT.

The maximum of the measured noise amplitude, measured in a 10 kHz bandwidth, shall be -60 dB from 0,5 GHz to 2 GHz and -90 dBm around the center frequency of the tag backscatter signal.

Special attention shall be given to spurious emissions, for example, insufficiently shielded computer monitors. The electromagnetic test conditions of the measurements shall be checked by performing the measurements with and without a tag in the field.

4.2.4 Total measurement uncertainty

The total measurement uncertainty for each quantity determined by these test methods shall be stated in the test report.

NOTE Basic information is given in ISO/IEC Guide 98-3.

5 Conformance

To claim conformance to ISO/IEC 18000-63, a device shall pass the conformance tests in this document.

6 Conformance tests for ISO/IEC 18000-63:2021, Clause 6

This clause specifies conformance tests for product built according to ISO/IEC 18000-63:2021, Clause 6:

- conformance requirements for physical interactions (the signalling layer of the communications) between Interrogators and Tags;
- conformance requirements for Interrogator and Tag operating procedures and commands.

Testing for this clause shall be done with the test setups as defined in [Annex A](#).

All tests are defined in [Table 1](#); the column M/O indicates either mandatory (M) or optional (O).

NOTE 1 In case an error condition has multiple choices for the error codes, either of the error codes is valid and the test has to be evaluated as pass for any of these codes.

For conformance evaluation, as in [Table 1](#), the following conformance test methods shall apply:

- By design: for Protocol requirements that are verified by design, the method of technical analysis is at the discretion of the product vendor and, except in special cases, is not specified by this document. In general, the technical analysis shall have sufficient rigor and technical depth to be accepted by a test engineer knowledgeable of the Protocol that the requirement has been met.
- By demonstration: for Protocol requirements that are verified by demonstration, the test conditions are specified by this document.

NOTE 2 A competent demonstrator typically complies with ISO/IEC 17025.

- As implemented: if a Tag or Interrogator implements a subset of the Protocol, conformance shall be verified over the subset that is implemented. For example, although Interrogators may implement DSB-ASK, SSB-ASK or PR-ASK modulation, a manufacturer may choose to only implement DSB-ASK modulation. In this case, conformance testing shall only use DSB-ASK modulation. For parameters that are continuously variable, conformance shall be verified at the minimum and maximum values of the implemented range, unless the test conditions specifically state otherwise.

Table 1 — ISO/IEC 18000-63 protocol subclauses and requirements

Item	ISO/IEC 18000-63:2021 subclause	Requirement	M/O	Applies to	Conformance test method
1	6.1.1	Tags shall not be required to demodulate Interrogator commands while backscattering.	M	T	By design
2	6.1.1	A Tag shall not respond to a mandatory or optional command using full-duplex communications.	M	T	By design
3	6.3.1.1	Tags shall receive power from and communicate with Interrogators within the frequency range from 860 MHz to 960 MHz, inclusive.	M	T	By demonstration Test conditions: Temperature: (23 ± 3) °C Frequency: 860 MHz, 910 MHz and 960 MHz Power: 0 dBm at Tag antenna Modulation: DSB-ASK Tari: 25 µs RTcal: 62,5 µs PW: 0,5 × Tari Modulation depth: 90 % Rise/fall time: ≤ 0,33 × Tari TRcal: 100 µs DR: 8 M: 1 TNext: 0
4	6.3.1.1	Interrogators certified for operation in dense-Interrogator environments shall support, but are not required to always use, the dense-Interrogator mode described in ISO/IEC 18000-63:2021, Annex G.	M	I	By design
5	6.3.1.2	Interrogators shall use a fixed modulation format and data rate for the duration of an inventory round, where "inventory round" is defined in ISO/IEC 18000-63:2021, 4.1.	M	I	By design
Key M: mandatory O: optional T: tag I: interrogator					

Table 1 (continued)

Item	ISO/IEC 18000-63:2021 subclause	Requirement	M/O	Applies to	Conformance test method
6	6.3.1.2.1	Interrogators certified for operation in single- or multiple-Interrogator environments shall have appropriate frequency accuracy. Local regulations can apply to the frequency accuracy	M	I	By design
7	6.3.1.2.1	Interrogators certified for operation in dense-Interrogator environments shall have a frequency accuracy of ± 10 ppm (parts per million) over the nominal temperature range (-25 °C to $+40$ °C) and ± 20 ppm over the extended temperature range (-40 °C to $+65$ °C) while transmitting. Local regulations can apply to the frequency accuracy. Local regulations can specify a tighter frequency accuracy.	M	I	By demonstration. Test conditions: Temperature: maximum (-40 °C, minimum supported temperature) and minimum (65 °C, maximum supported temperature). If supported temperature range exceeds -25 °C or 40 °C then testing shall also be performed at -25 °C or 40 °C respectively. All temperatures are in °C (all ± 3 °C). Frequency: 5 test points situated at the band edges and linearly spanning the supported band at valid channel frequencies. Test can be skipped if regulatory approval shows that these requirements have been fulfilled already. Measurement equipment setting: Resolution bandwidth: 1 kHz Video bandwidth: equal to the RBW. Sweep time: AUTO Span: 1 MHz Trace mode: max. hold sufficient to capture all emissions. Detection mode: averaging. Modulation method: continuous wave to allow exact measurement based on the clear peak.
8	6.3.1.2.2	Interrogators shall communicate using DSB-ASK, SSB-ASK, or PR-ASK modulation, detailed in ISO/IEC 18000-63:2021, Annex H.	M	I	By design
9	6.3.1.2.2	Tags shall demodulate all three modulation types.	M	T	By demonstration Test conditions: Temperature: (23 ± 3) °C Frequency: 860 MHz and 960 MHz. Power: 0 dBm at Tag antenna. Modulation: DSB-ASK, SSB-ASK and PR-ASK. Tari: 6,25 μ s, 12,5 μ s and 25 μ s. RTcal: $2,5 \times$ Tari. PW: minimum and maximum. Modulation depth: 90 % ASK, 200 % PR-ASK.
Key M: mandatory O : optional T : tag I : interrogator					

Table 1 (continued)

Item	ISO/IEC 18000-63:2021 subclause	Requirement	M/O	Applies to	Conformance test method
					DSB-ASK rise/fall time: $\leq 0,33 \times \text{Tari}$ SSB-ASK rise/fall time: $\leq 0,33 \times \text{Tari}$ PR-ASK rise/fall time: $\leq 0,62 \times \text{PW}$ TRcal: $2 \times \text{RTcal}$ DR: 8 M: 1 TRext: 0
10	6.3.1.2.3	The R=>T link shall use PIE, shown in ISO/IEC 18000-63:2021, Figure 6.1.	M	I	By design
11	6.3.1.2.3	Pulse modulation depth, rise time, fall time and PW shall be as specified in ISO/IEC 18000-63:2021, Table 6.5, and shall be the same for a data-0 and a data-1.	M	I	By demonstration Test conditions: Temperature: $(23 \pm 3) ^\circ\text{C}$ Frequency: at channel frequency closest to center of supported band. Power: maximum Interrogator transmit power, as implemented. Other transmit parameters: as implemented.
12	6.3.1.2.3	Interrogators shall use a fixed modulation depth, rise time, fall time, PW, Tari, data-0 length and data-1 length for the duration of an inventory round.	M	I	By design
13	6.3.1.2.3	The RF envelope shall be as specified in ISO/IEC 18000-63:2021, Figure 6.2.	M	I	By demonstration Test conditions: Temperature: $(23 \pm 3) ^\circ\text{C}$ Frequency: at channel frequency closest to center of supported band. Power: maximum Interrogator transmit power, as implemented. Other transmit parameters: as implemented.
14	6.3.1.2.4	Interrogators shall communicate using Tari values in the range of $6,25 \mu\text{s}$ to $25 \mu\text{s}$.	M	I	By design
15	6.3.1.2.4	Interrogator conformance shall be evaluated using at least one Tari value between $6,25 \mu\text{s}$ and $25 \mu\text{s}$ with at least one value of the parameter x.	M	I	This document uses vendor preferred Tari and x values as consistent with the Protocol.
16	6.3.1.2.4	The tolerance on all parameters specified in units of Tari shall be $\pm 1 \%$.	M	I	By demonstration Test conditions: Temperature: either a) or b) shown below
Key M: mandatory O : optional T : tag I : interrogator					

Table 1 (continued)

Item	ISO/IEC 18000-63:2021 subclause	Requirement	M/O	Applies to	Conformance test method
					<p>a) Single and Multi-Interrogators: (23 ± 3) °C</p> <p>b) Dense-Interrogators tested at modulation, data rate and encoding parameters specified in ISO/IEC 18000-63:2021, Annex G of the Protocol specification: maximum (-40 °C, minimum supported temperature) and minimum (65 °C, maximum supported temperature). If supported temperature range exceeds -25 °C or 40 °C then testing shall also be performed at -25 °C or 40 °C respectively. All temperatures are in °C (all ±3 °C).</p> <p>Frequency: at channel frequency closest to center of supported band.</p> <p>Power: maximum Interrogator transmit power, as implemented.</p> <p>Other transmit parameters: as implemented.</p>
17	6.3.1.2.4	The choice of Tari value and x shall be in accordance with local radio regulations.	M	I	By design
18	6.3.1.2.5	The R=>T RF envelope shall comply with ISO/IEC 18000-63:2021, Figure 6.2 and Table 6.1.	M	I	Tested in compliance with 6.3.1.2.3.
19	6.3.1.2.5	An Interrogator shall not change the R=>T modulation type (i.e. shall not switch between DSB-ASK, SSB-ASK or PR-ASK) without first powering down its RF waveform (see ISO/IEC 18000-63:2021, 6.3.1.2.7).	M	I	By design
20	6.3.1.2.6	The Interrogator power-up RF envelope shall comply with ISO/IEC 18000-63:2021, Figure 6.3 and Table 6.6.	M	I	<p>By demonstration</p> <p>Test conditions:</p> <p>Temperature: (23 ± 3) °C</p> <p>Frequency: at channel frequency closest to center of supported band.</p> <p>Power: maximum Interrogator transmit power, as implemented.</p>
21	6.3.1.2.6	Once the carrier level has risen above the 10 % level, the power-up envelope shall rise monotonically until at least the ripple limit M_r . The RF envelope shall not fall below the 90 % point in ISO/IEC 18000-63:2021, Figure 6.3 during interval T_s .	M	I	<p>By demonstration</p> <p>Test conditions:</p> <p>Temperature: (23 ± 3) °C</p> <p>Frequency: at channel frequency closest to center of supported band.</p> <p>Power: maximum Interrogator transmit power, as implemented.</p>
22	6.3.1.2.6	Interrogators shall not issue commands before the end of the maximum settling-time interval in ISO/IEC 18000-63:2021, Table 6.6 (i.e. before T_s).	M	I	By design
<p>Key</p> <p>M: mandatory</p> <p>O: optional</p> <p>T: tag</p> <p>I: interrogator</p>					

Table 1 (continued)

Item	ISO/IEC 18000-63:2021 subclause	Requirement	M/O	Applies to	Conformance test method
23	6.3.1.2.7	The Interrogator power-down RF envelope shall comply with ISO/IEC 18000-63:2021, Figure 6.3 and Table 6.7.	M	I	By demonstration Test conditions: Temperature: (23 ± 3) °C Frequency: at channel frequency closest to center of supported band. Power: maximum Interrogator transmit power, as implemented.
24	6.3.1.2.7	Once the carrier level has fallen below the 90 % level, the power-down envelope shall fall monotonically until the power-off limit M_s .	M	I	By demonstration Test conditions: Temperature: (23 ± 3) °C Frequency: at channel frequency closest to center of supported band. Power: maximum Interrogator transmit power, as implemented.
25	6.3.1.2.7	Once powered off, an Interrogator shall remain powered off for a least 1ms before powering up again.	M	I	By design
26	6.3.1.2.8	An Interrogator shall begin all R=>T signalling with either a preamble or a frame-sync, both of which are shown in ISO/IEC 18000-63:2021, Figure 6.4.	M	I	By design
27	6.3.1.2.8	A preamble shall precede a <i>Query</i> command (see ISO/IEC 18000-63:2021, 6.3.2.12.2.1) and denotes the start of an inventory round.	M	I	By design – inherently tested with other tests
28	6.3.1.2.8	All other signalling shall begin with a frame-sync.	M	I	By design – inherently tested with other tests
29	6.3.1.2.8	The tolerance on all parameters specified in units of Tari shall be ±1 %.	M	I	Tested in compliance with 6.3.1.2.3.
30	6.3.1.2.8	PW shall be as specified in ISO/IEC 18000-63:2021, Table 6.5.	M	I	Tested in compliance with 6.3.1.2.3.
31	6.3.1.2.8	The RF envelope shall be as specified in ISO/IEC 18000-63:2021, Figure 6.2.	M	I	By design
32	6.3.1.2.8	A preamble shall comprise a fixed-length start delimiter, a data-0 symbol, an R=>T calibration (RTcal) symbol and a T=>R calibration (TRcal) symbol.	M	I	By demonstration Test conditions: Temperature: (23 ± 3) °C Frequency: at channel frequency closest to center of supported band. Power: maximum Interrogator transmit power, as implemented. Other transmit parameters: as implemented.
33	6.3.1.2.8	An Interrogator shall set RTcal equal to the length of a data-0 symbol plus the length of a data-1 symbol ($RTcal = 0_{length} + 1_{length}$).	M	I	By design
34	6.3.1.2.8	A Tag shall measure the length of RTcal and compute $pivot = RTcal / 2$.	M	T	By design
35	6.3.1.2.8	A Tag shall interpret subsequent Interrogator symbols shorter than <i>pivot</i> to be data-0s and subsequent Interrogator symbols longer than <i>pivot</i> to be data-1s.	M	T	By design
Key M: mandatory O : optional T : tag I : interrogator					

Table 1 (continued)

Item	ISO/IEC 18000-63:2021 subclause	Requirement	M/O	Applies to	Conformance test method
36	6.3.1.2.8	A Tag shall interpret symbols longer than $4 \times RT_{cal}$ to be invalid.	M	T	By design
37	6.3.1.2.8	Prior to changing RT_{cal} , an Interrogator shall transmit CW for a minimum of $8 \times RT_{cal}$.	M	I	By design
38	6.3.1.2.8	An Interrogator shall specify a Tag's backscatter link frequency (its FM0 datarate or the frequency of its Miller subcarrier) using the TR_{cal} and divide ratio (DR) in the preamble and payload, respectively, of a <i>Query</i> command that initiates an inventory round.	M	I	By design
39	6.3.1.2.8	A Tag shall measure the length of TR_{cal} , compute BLF and adjust its T=>R link rate to be equal to BLF (ISO/IEC 18000-63:2021, Table 6.9 shows BLF values and tolerances).	M	T	Tested in compliance with 6.3.1.3.3.
40	6.3.1.2.8	The TR_{cal} and RT_{cal} that an Interrogator uses in any inventory round shall meet the constraints in ISO/IEC 18000-63:2021, Formula (2): $1,1 \times RT_{cal} \leq TR_{cal} \leq 3 \times RT_{cal}$.	M	I	By design – inherently tested with other tests
41	6.3.1.2.8	An Interrogator, for the duration of an inventory round, shall use the same length RT_{cal} in a frame-sync as it used in the preamble that initiated the round.	M	I	By design
42	6.3.1.2.9	When an Interrogator uses frequency-hopping spread spectrum (FHSS) signalling, the Interrogator's RF envelope shall comply with ISO/IEC 18000-63:2021, Figure 6.5 and ISO/IEC 18000-63:2021, Table 6.8. The RF envelope shall not fall below the 90 % point in ISO/IEC 18000-63:2021, Figure 6.5 during interval T_{hs} .	M	I	By demonstration, for Interrogators that use FHSS: Test conditions: Temperature: $(23 \pm 3) ^\circ\text{C}$ Frequency: at channel frequency closest to center of supported band. Power: maximum Interrogator transmit power, as implemented.
43	6.3.1.2.9	Interrogators shall not issue commands before the end of the maximum settling-time interval in ISO/IEC 18000-63:2021, Table 6.8 (i.e. before T_{hs}).	M	I	By design
44	6.3.1.2.9	Local regulatory requirements apply to the maximum time between frequency hops and the minimum RF-off time during a hop.	M	I	By design
45	6.3.1.2.10	Local regulations apply for spread-spectrum channelization.	M	I	By design
Key M: mandatory O: optional T: tag I: interrogator					