

ผนวก ค.

มาตรฐานRFID เกี่ยวกับสัตว์



สำนักหอสมุด



International Committee for Animal Recording

International Agreement on Recording Practices, Section 1.1, Appendix B

Conformance evaluation of RFID devices

Part 2: ISO11784/11785-conformance of transceivers

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Conformance evaluation of RFID devices

Part 2: ISO11784/11785-conformance of transceivers

Introduction

For many years, ICAR has accepted responsibility for standardisation of identification systems used in animal recording. One of the main principles of recording is individual animal recognition.

The International Organisation for Standardisation (ISO) published two standards dealing with aspects of radio frequency identification (RFID) of animals: ISO 11784 (referring to code structure) and ISO 11785 (dealing with technical concepts).

As manufacturers of RFID-systems distribute their products throughout many countries, there is a need to assure users that these products comply with existing ISO standards.

The ICAR Sub-Committee on Animal Identification has defined a procedure for testing the compliance of RFID transceivers with ISO standards 11784 and 11785. Test procedures as laid down in this document, have to be carried out following the directives as defined by ICAR and recognised by ISO/WG3.

Scope

This document specifies the procedures to verify the compliance of RFID-transceivers with the operating characteristics as laid down in the ISO standards 11784 and 11785. The result of the procedure is a report, declaring that the tested transceiver complies with the operating characteristics as laid down in the ISO standards 11784 and 11785.

This document sets out the procedures for evaluating synchronising transceivers. Another document ("Conformance evaluation of RFID devices, Part 3: Conformance test for non-synchronising transceivers for reading ISO 11784/11785 transponders") deals with non-synchronising transceivers, which read at least FDX-B and HDX transponders.



References

The titles of standards referred to in this document are as follows:

ISO 11784	Agricultural equipment – Radio frequency identification of animals - Code structure
ISO 11785	Agricultural equipment – Radio frequency identification of animals - Technical concept
ISO 3166	Codes for the representation of names of countries

The latest version always applies.

Definitions

Approval reference number	A 9-digit number representing the year (4 digits), the type of device tested ("02" for transceivers according to this document) and the running number (3 digits) referencing the transceivers tested successfully that year, e.g. "2002-02-001".
Country code	A 3-digit numeric code representing the name of a country in accordance with ISO 3166.
ISO Transceiver	Transceiver that reads at least both ISO FDX-B and ISO HDX transponders as defined in ISO 11784/11785.
ISO Transponder	RFID device that transmits its transponder code according to ISO 11784/11785 when activated by an ISO transceiver.
Manufacturer code	A 3-digit number granted by ICAR to a transponder manufacturer.
Reference transponder	Transponder that is used to test an ISO transceiver. Reference transponders will be selected by ICAR from different types and manufacturers and published.
Transceiver manufacturer	The company that submitted the application for the transceiver conformance test.
Transponder code	Code as programmed in the transponder and defined in ISO 11784 (Table 1) and ISO 11785.



Description of procedures for transceiver conformance tests.

1 Application

- 1.1 A manufacturer can apply for a conformance test for an ISO transceiver. The application shall consist of a letter and an application form (Annex 1), which should be sent to the Chairman of the ICAR Sub-Committee on Animal Identification. The manufacturer shall receive a confirmation within two weeks. By signing the application form the manufacturer agrees to follow the directives as defined by ICAR.
- 1.2 The application form can be obtained from the Chairman of the ICAR Sub-Committee on Animal Identification or the ICAR secretariat or via the Internet (www.icar.org).
- 1.3 The test centres, where the tests are performed will be chosen by ICAR. Test centres have to be approved and contracted to undertake the tests, by ICAR. The manufacturer has a once only, right to refuse the test centre chosen by ICAR.
- 1.4 The manufacturer is required to send a transceiver and all the necessary accessories to the test centre. The manufacturer shall ensure that the equipment is able to display or store the transponder codes during the test.
- 1.5 The test centre will submit the transceiver to the test procedures described in section 2. The conformance test is performed by reading reference transponders as described in section 2. All reference transponders must be readable by the transceiver under test. The codes read by the transceiver under test must agree with the codes of the reference transponders.
- 1.6 The test centre will prepare a confidential report of the results of the test and will send 2 copies of the report to the Chairman of the ICAR Sub-Committee on Animal Identification.
- 1.7 The Chairman of the ICAR Sub-Committee on Animal Identification will inform the manufacturer about the test result and send him/her a copy of the test report. The Board of ICAR will inform the manufacturer of ICAR's final decision concerning the test results. A copy of this letter will be sent to the Chairman of the Sub-Committee and to the secretariat of ISO/TC23/SC19/WG3.
- 1.8 ICAR will make publicly available, a list of products tested successfully, together with the approval reference number. A photograph of the transceiver may be included in the list.
- 1.9 ICAR will do everything within its power to protect the integrity of this procedure with regard to the ISO standards 11784 and 11785.



2 Description of the transceiver conformance test procedure

2.1 Physical appearance

A photograph of the transceiver will be taken and included in the final test report. Additionally, weight and dimensions will be noted in the test report. Also, the device serial number will be noted in the test report.

2.2 Frequency of activation field

The frequency of the transceiver's activation field will be measured. This shall be within the limits as defined in ISO 11785.

2.3 Functional test

Ten reference transponders of the HDX type and ten reference transponders of the FDX-B type will be read by the transceiver under test, without code errors. The displayed or stored transponder code will be compared with the listed known codes of those reference transponders.

Additionally, the transceiver's performance will be assessed against all of the next code occurrences:

- a. If bit one of the transponder code (animal bit, ISO 11784, table 1) is equal to zero (no animal code), the transceiver has to react in a clear and unmistakable way.
- b. The reading of the manufacturer/country code and the identification code shall not be affected by the content of the trailer bit flag (bit sixteen, ISO 11784, table 1) and/or the content of the 24 trailer bits.
- c. The reading of the manufacturer/country code and the identification code shall not be affected by the reserved bits (bits 2 to 15, ISO 11784, table 1).
- d. The transceiver will be tested for correct CRC calculation.

All these tests will be carried out by presenting the transceiver under test with special transponders containing a code abnormality according to the cases described above.

2.4 Timing of the activation field:

Since an ISO transceiver will be capable of reading both FDX-B and HDX transponders according to the dual adaptive timing protocol as described in ISO 11785, clause 6, the timings of the activation field in the following four different cases will be checked.

1. *No transponder in the activation field:*

The timing of the on/off switching of the activation field shall be according to fig.1/1. The periods the activation field is switched on shall have a length of 50 ms. In between these periods the activation field shall be switched off for 3 ms. Every tenth activation cycle shall have a fixed pattern of 50 ms activation period and a fixed pause of 20 ms.

2. *HDX transponder present in the activation field:*

After placing a HDX transponder in the activation field, the transceiver shall switch off the activation field for 20 ms (fig. 1/2) and read the identification code. The period the activation field is switched on remains 50 ms.



3. FDX-B transponder present in the activation field:

After placing a FDX-B transponder in the activation field, the period the activation field is switched on shall have a length of 50 ms and shall be extended to a maximum of 100 ms if the transceiver cannot validate the FDX-B signal correctly the first time (fig. 1/3). Both situations shall be tested by using a synchronised noise generator and loop antenna. This noise generator and antenna will be capable of generating a noise disturbance, high enough to prevent the transceiver under test from reading the transponder. The noise generator shall be synchronised with the transceiver's activation field pattern and can be controlled by the operator. The start moment of the noise signal will be such that the reading of the transmitted transponder code will be disturbed after a part of the code is received by the transceiver under test. The time period the noise signal is present during an activation cycle, can be varied by the operator externally. This will be done in such a way that the transceiver under test is challenged to extend the activation period to a maximum of 100 ms. The periods the activation field is switched off shall be 3 ms. Also in this case, every tenth activation cycle shall have a fixed pattern of 50 ms activation period and a fixed pause of 20 ms.

4. HDX and FDX-B transponder present in the activation field:

After simultaneously placing a HDX and a FDX-B transponder in the activation field (fig. 1/4), the activation period shall be 50 to 100 ms, dependent of the receiving conditions of the FDX-B signal. The switching off periods of the activation field always shall be 20 ms. The test with the noise generator, as described in the paragraph above, shall be repeated here. Again, every tenth activation cycle shall have a fixed pattern of 50 ms activation period and a fixed pause of 20 ms.

In all measurements the timings must be within the tolerance limits $-0/+1$ ms.

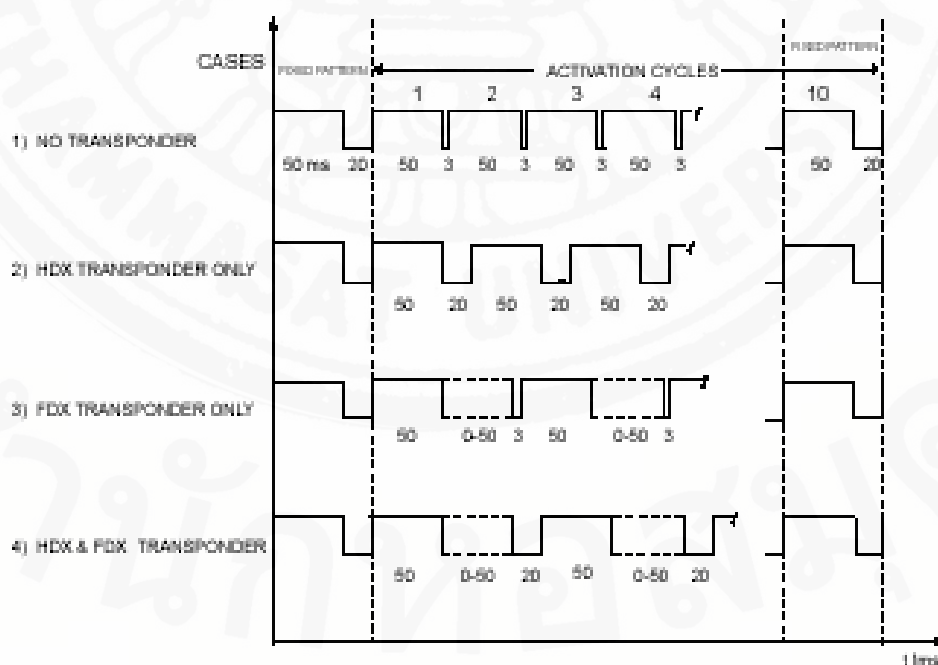


Figure 1: ISO Transceiver Timing description



2.5 Test on wireless synchronisation

As described in ISO11785, clause 6, a mobile transceiver must be able to detect the presence of other transceivers through the reception of their activation signals. If another activation signal is present, the mobile transceiver under test shall wait for the rising edge of that next activation signal and only activate during a fixed period of 50 ms.

To perform this test, a test generator will generate an activation field with a fieldstrength of 100 dBuV/m, measured at 1m distance from the test antenna. The timing of the activation field shall be according to the 4 cases of ISO transceiver timing mentioned in Figure 1. The mobile transceiver under test shall be located at a distance of 1 m from the test antenna with both antennas in optimal orientation for maximum magnetic coupling (fig. 4). The activation periods of the test generator shall be monitored on an oscilloscope via an auxiliary output which will deliver a digital signal, indicating when an activation signal is generated. A RF pick up coil will be connected to a second input channel of the oscilloscope. This coil shall be located in the vicinity of the mobile transceiver under test. When the test generator is switched on, the synchronisation of the mobile transceiver under test is checked.

Additionally, the mobile transceiver under test must end its activation period shortly after the activation field of the test generator has ceased. This is essential to prevent interfering with HDX transponder transmissions. An alternative is that the transceiver under test ends the activation period within 50 msec after the activation of the test generator's field. In this way it is also possible to prevent interfering with HDX transponder transmissions without the detection of the ceasing of the test generator's field. The test is carried out by placing pick up coils in close proximity to the test generator's antenna and the antenna of the mobile transceiver under test. From the moment the field strength of the test generator has fallen below 40 dB, the time interval is measured between this moment and the moment the field strength of the mobile transceiver under test has fallen below 40 dB. It is expected that this time interval would be less than 1 msec.

3 Test equipment

- 10 FDX-B reference transponders
- 10 HDX reference transponders
- Test transponders with codes necessary to perform the functional tests as described in section 2.3.
- Test set up for activation field frequency measurement
- Test set up for activation field timing measurement
- Oscilloscope
- Spectrum analyser or EMI receiver
- Calibrated reference antenna
- Uncalibrated reference antenna or pick up coil
- Activation field test generator
- Synchronised noise generator



Frequency measurement test set up (Figure 2):

Since ISO transceivers produce an intermittent activation field, a frequency counter cannot be used for the frequency measurement. An alternative is a spectrum analyser or an EMI receiver, suitable for making high accuracy carrier frequency measurements.



Figure 2: Test setup

Test set up for activation field timing measurement (Figure 3):

Figure 3 illustrates a test set up. The activation field of the transceiver is sensed by a reference antenna and displayed on an oscilloscope screen. The reference antenna will be placed close to the transceiver antenna to make the emitted RF signal visible on the oscilloscope. By placing transponders in the activation field, the timing of changes can be observed.

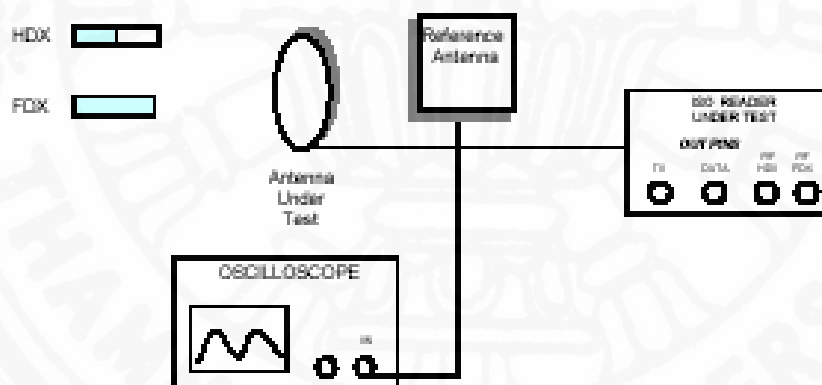


Figure 3: Transceiver Timing Setup

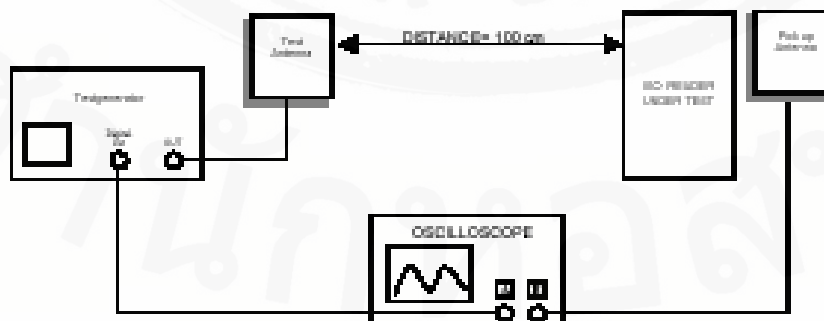


Figure 4: Test setup for Wireless Synchronisation test

**4 Conditions for the right to use an ICAR approval for ISO-Transceivers**

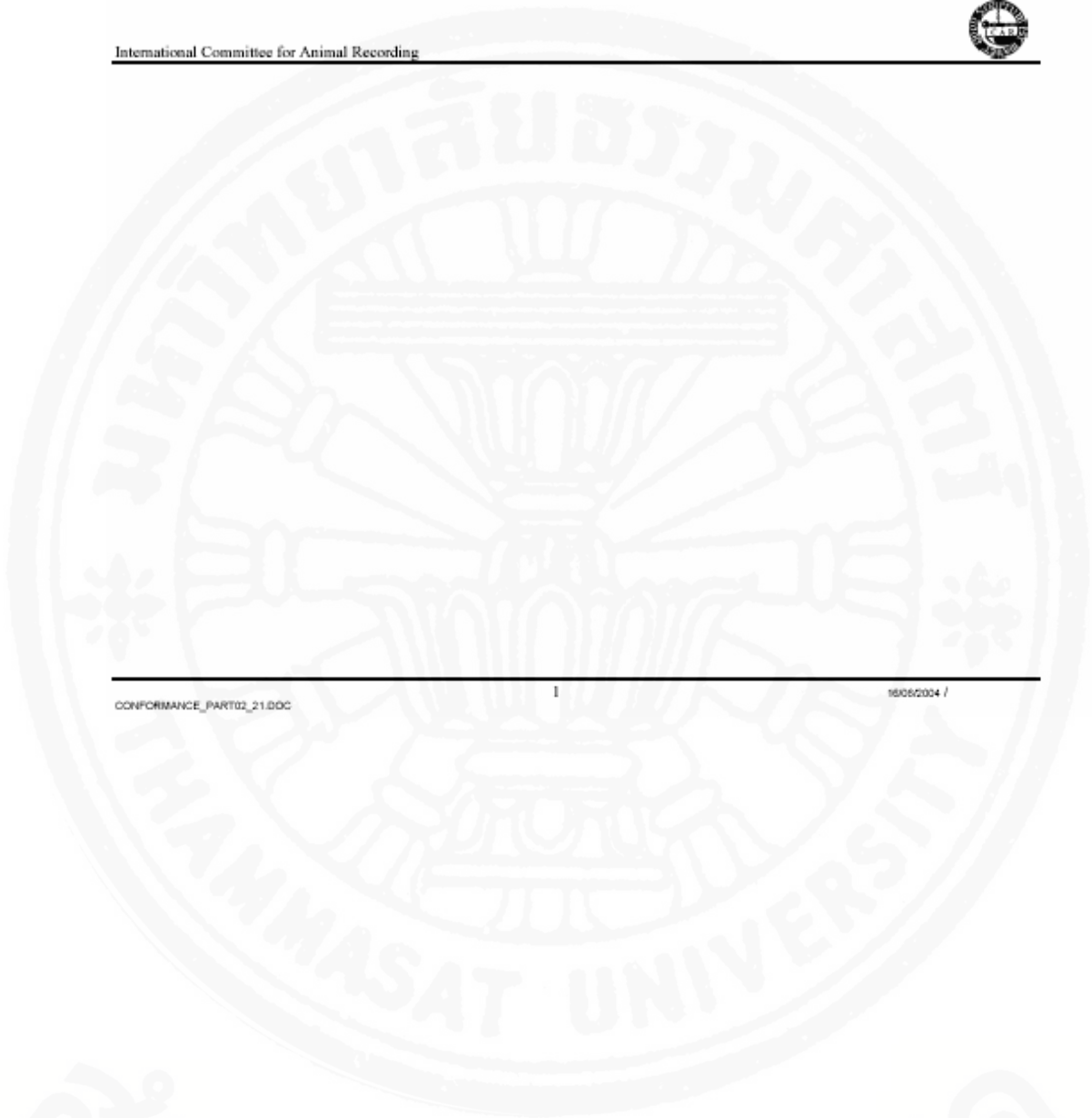
- 4.1 Following successful participation in a test, ICAR will grant a certificate together with an approval reference number.
- 4.2 Certifying a transceiver as an ISO-Transceiver confirms the compliance of the transceiver with the code structure and the technical concepts given in ISO 11784 and ISO 11785. It is not a certification of product quality and performance of the transceiver.
- 4.3 The manufacturer is allowed to only use his/her certificate in relation to the type of transceiver that has been successfully tested and approved by ICAR.
- 4.4 ICAR has the right to periodically conduct an unannounced test whether a specific manufacturer fulfils the conditions set out in section 4. The manufacturers will provide ICAR, on request, with the necessary information to verify the conditions outlined under paragraphs 4.1 to 4.2. The right to use the certificate may be withdrawn when one or more of the conditions mentioned above are not fulfilled.
- 4.5 In cases of disputes regarding these conditions above or the use of a certificate, the decision of ICAR will be binding.
- 4.6 ICAR reserves the right to distribute an advice notice regarding any manufacturer that distributes transceivers in conflict with the prescribed use described on the certificate.



International Committee for Animal Recording

Annex I: Application form

Application form for ICAR transceiver conformance test			
ICAR Approval Date:		Date:	
<i>Company Name</i>		<i>Address</i>	
Transceiver Type:	ISO 11784/11785 technology:	Additional technologies:	
	ISO <input type="checkbox"/>	ISO + <input type="checkbox"/> <i>Destron/Fecora</i> <input type="checkbox"/>
	 <i>Datamars</i>	<input type="checkbox"/>
	 <i>Trovan</i>	<input type="checkbox"/>
		<i>Other configurations:</i>	<input type="checkbox"/>
Portable transceiver:	<input type="checkbox"/>		
Stationary transceiver:	<input type="checkbox"/>		
Physical Characteristics:			
<i>Dimensions (l x w x h):</i>		<i>Weight:</i>	
<i>Separate Antenna:</i>	No <input type="checkbox"/> Yes <input type="checkbox"/>		
<i>Serial comm.</i>	No <input type="checkbox"/> Yes <input type="checkbox"/>		If yes, provide specs
Device serial number:			
Photograph of the Device:			
<p><i>The undersigned agrees to abide to all conditions set forth within ICAR's document "Conformance evaluation of RFID devices, Part 2: ISO11784/11785 - conformance of portable transceivers"</i></p>			
Date:	Name:	Position:	



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