



## **RFID Transceiver Standards, Procedures, and Testing Document Radio Frequency Identification (RFID)**

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## TABLE OF CONTENTS

<b>INTRODUCTION .....</b>	<b>3</b>
<b>DEFINITIONS AND USE OF TERMS .....</b>	<b>6</b>
<b>PRECONDITIONS FOR SUBMISSION.....</b>	<b>7</b>
Industry Canada .....	7
Electrical Safety.....	7
<b>APPROVAL CRITERIA – RFID READERS .....</b>	<b>8</b>
RFID Reader Types .....	8
Read Requirements .....	9
Electrical Requirements .....	9
Physical Requirements.....	10
Field Testing.....	10
<b>CCIA READER APPROVAL PROCESS .....</b>	<b>11</b>
<b>CCIA RFID READER – APPLICATION FORM.....</b>	<b>13</b>
<b>APPENDIX A: REFERENCES .....</b>	<b>14</b>
<b>APPENDIX B: RECOGNIZED ELECTRICAL SAFETY APPROVAL SEALS.....</b>	<b>15</b>
<b>APPENDIX C: FIELD INSPECTION MARKS .....</b>	<b>16</b>
<b>APPENDIX D: APPROVAL PROCESS FLOW CHART .....</b>	<b>17</b>
<b>APPENDIX E: FEE SCHEDULE.....</b>	<b>18</b>

## INTRODUCTION

The Canadian Cattle Identification Agency (CCIA) was established in 1998 and is a not-for-profit, industry-initiated and led, database management organization that administers the identification program for beef cattle, bison, sheep and pending regulation, goats and cervid in Canada with the exception of Quebec, where CCIA only administers bison and goats.

Fully implemented on July 1, 2002, the CCIA has become a world leader in animal identification. By creating national standards on individual animal identification, tags, tag distribution, and data reporting, CCIA has implemented a sustainable identification system that is fully supported by the Canadian livestock industry.

Part of CCIA's role as a Responsible Administrator for beef cattle, sheep, bison, goats and cervid radio frequency identification (RFID) tags in Canada (excluding Quebec where CCIA only administers bison and goats) is to assess tags using the National Identification Device Methodology Advisory Committee (NIDMAC) Testing Framework to establish technical standards, recommend tags (meeting these standards) to the Minister of Agriculture for approval and use/sale in Canada. CCIA also assesses transceivers (electronic tag readers) using specific technical standards and posts a list of electronic tag readers that have met these standards on the CCIA website at

<https://www.canadaid.ca/wp-content/uploads/2020/10/CCIA-Reader-List-October-2020.pdf>

Governments use this list of tested readers as a reference when initiating and administering traceability support programs for industry participants.

CCIA has assisted in the development and works in the regulatory scheme of the federal regulatory framework for traceability, including:

- *Health of Animals Act*
- Part XV of the *Health of Animals Regulations*
- *Agriculture and Agri-Food Administrative Monetary Penalties Act*

CCIA has also worked in collaboration with Alberta Agriculture and Forestry (AF) in the development and implementation of animal traceability initiatives within Alberta.

CCIA follows international standards, including:

- ISO standard for identification numbering scheme for animals
  - ISO 11784 and 11785 standards for livestock identification
  - ISO 3166 for country codes as used for animal identification devices
- Federal regulations for specifications for individual identifiers

CCIA is governed by:

- *Canada Corporations Act, Part II*

- By-Laws as approved by Industry Canada
- The common law

CCIA is governed by a Board of Directors. Board Members represent a wide spectrum of industry groups and associations:

- Alberta Beef Producers
- Alberta Cattle Feeders' Association
- Beef Farmers of Ontario
- British Columbia Cattlemen's Association
- Canadian Bison Association
- Canadian Cattlemen's Association
- Canadian Livestock Dealers Association
- Canadian Meat Council
- Canadian Sheep Federation
- Canadian Veterinary Medical Association
- Les Producteurs de bovins du Québec
- Livestock Markets Association of Canada
- Manitoba Beef Producers
- Maritime Beef Council
- Saskatchewan Stock Growers Association

*Members Pending Amended Regulations*

- Canadian Cervid Alliance
- Canadian National Goat Federation

*Associate Member*

- Canadian Beef Breeds Council

Head office location:

Calgary, Alberta



This document will define the current CCIA Standards and Specifications for RFID peripheral reading devices for RFID technologies. Procedures and guidelines have outlined procedures involving approval requests, approval notification, and advertising. These Standards and Specifications are subject to change from time to time at CCIA's discretion to deal with changing technology, market, environmental, and other conditions. The CCIA will endeavor, where possible, to provide the industry with as much lead-time notice as is practicable in the event of changes to the Standards and Specifications.

## DEFINITIONS AND USE OF TERMS

This document contains both requirements and recommendations.

Requirements are minimum performance standards that must be met for readers to be listed by CCIA. Requirements are typically indicated by the use of the word “must”.

Recommendations are performance standards CCIA considers important, but which are not obligatory to obtain approval. Recommendations are typically indicated by the use of the word “should”.

### **Ruggedized:**

Equipment, in this case readers and their associated accessories that are designed to reliably operate in harsh usage environments and conditions, such as strong vibrations, extreme temperatures and wet or dusty conditions typically seen on farms and ranches across Canada. They are designed from inception for the type of rough use typified by these conditions, not just in the external housing but in the internal components as well.<sup>1</sup>

Readers must have the *equivalent* of an IP 54 rating on both the reader and the power supply for all stationary readers, and for mobile readers (but not power supply if unit runs on battery power).

### **RFID Reader:**

In the context of the CCIA Transceiver Standards, Procedures and Testing Document, an RFID Reader is comprised of two components: the reader portion and the antenna portion. The entire reader must be submitted for testing. Readers or antennae individually will not be tested.

Readers may be submitted with accessory antennae and the secondary antennae will be tested along with the primary antenna. Testing of secondary antennae will be completed with only a surcharge rather than being considered a new test. This applies only when the accessory antennae are tested at the time of the primary reader/antenna lab test.

<sup>1</sup> Adopted from the Wikipedia definition for ruggedized computers.

## PRECONDITIONS FOR SUBMISSION

### INDUSTRY CANADA

All reader models submitted for testing must be certified by Industry Canada under RSS-210. Reader models that include an ancillary transmitter such as Bluetooth or Wi-Fi must also have Industry Canada certification for the ancillary transmitter. Certification shall be verified by checking the Radio Equipment List: (<https://sms-sgs.ic.gc.ca/equipmentSearch/searchRadioEquipments?execution=e1s1&lang=en>).

### ELECTRICAL SAFETY

The power supplies for all readers submitted for testing must be suitable for the intended use and have the appropriate Canadian recognized Electrical Safety Standards approval. See APPENDIX B for a listing of appropriate approval agencies. Approval shall be evidenced by an accepted sticker or marking on the outside of the power supply in accordance with the Canadian Electrical Code.

All external power supplies intended for possible outside use must have an *equivalent* Ingress Protection rating of 54 or higher. This is not required for power supplies that are only to be used as chargers for re-chargeable batteries in mobile readers.

## LISTING CRITERIA – RFID READERS

The standard defined herein will be implemented and upheld for all manufacturers supplying RFID readers into the CCIA system. The specifications for RFID reader technology described in this document are aligned with the International Organization of Standardization (ISO) and Standards Council of Canada (SCC). To purchase copies of specifications, please contact one of these organizations. (Contact information is available in Appendix A of this document.)

An inspection process will be put in place by the CCIA to ensure that RFID readers entering the marketplace maintain the same quality and characteristics as the submitted/ listed reader. Reader inspections will be conducted in the following circumstances:

- in the event of a complaint directed at a specific reader or installation

OR

- at random at CCIA's discretion

### RFID READER TYPES

The CCIA distinguishes between stationary readers and mobile readers. Stationary readers are defined as not requiring direct human intervention in order to operate. There are three types of Stationary readers that the CCIA recognizes:

1. Panel RFID readers are those that have up to two sides associated to the antenna:
2. Walk through RFID readers are those that have at least three sides associated to the antenna.
3. Head gate or Neck Extender Readers are those that have short range, directional, rod style antennae that are attached directly to a squeeze head gate or neck extender.

Stationary readers are intended to be installed and operated in fixed locations. Important requirements include increased read range and automated operation. Most, if not all, stationary readers will have separate transceivers and antennas. Size, weight, power consumption and ease of use are not considerations for CCIA approval at this time, but these characteristics as well as others may be published by CCIA.

Mobile readers are intended to be used in applications where stationary readers are not practical. In addition to read range, other important requirements include mobility, versatility, and ruggedness.

Head gate/neck extender readers are specialized readers attached permanently to the head gate or neck extender. These readers must be very rugged and work in close proximity to metal. Their antennas are generally directional in nature.



## READ REQUIREMENTS

All RFID readers must be capable of reading both FDX-B and HDX transponders.

Stationary RFID readers must be capable of reading all approved CCIA transponders. Stationary readers must be able to read the CCIA Standard FDX-B and CCIA Standard HDX transponders at a minimum distance of 75 cm at optimal orientation under field conditions. All test results will be published by CCIA.

Head gate/neck bar readers are also stationary RFID readers, head gate/neck bar readers must be able to read CCIA Standard FDX-B and CCIA Standard HDX transponders at a minimum distance of 20 cm at optimal orientation under field conditions. Head gate/neck bar antennae should be directional by design, with the strongest field strength being in an arc of 90° facing forward from the squeeze/chute when installed.

Mobile RFID readers must be capable of reading all approved CCIA transponders at a minimum distance of 10 cm from the exterior surface of the reader antenna at optimal orientation under field conditions. To ensure consistency of results, read distance will be tested using reference transponders

Mobile RFID readers should have an output display that is easily viewed in direct sunlight, the display should be backlit for better visibility, and tag numbers displayed should be readable at arm's length.

Readers must display by default setting, the ISO 11784 Standard output sequence:

**124 000 XXX XXX XXX**

- Where 124 is the country code of the identifier (numerical code only)
- 000 is the reserved field
- XXX XXX XXX is the 9-character unique identifier assigned by the Administrator

## ELECTRICAL REQUIREMENTS

Stationary panel RFID readers must generate a minimum magnetic field strength of -10 dBA/m, measured at 75 cm from the centre of the panel or loop for panel and loop antennas, and from the end of the rod for rod antennas. Stationary panel RFID readers must generate a minimum magnetic field strength of -10 dBA/m, measured at 75 cm from the centre of the panel or loop for panel and loop antennas, and from the end of the rod for rod antennas. Head gate/neck bar RFID readers must generate a minimum magnetic field strength -10 dBA/m, measured at 20 cm from the inside edge of the antenna anywhere in its read zone.

Walk through RFID readers must generate a minimum magnetic field strength of -10 dBA/m, measured at midpoint of the antenna from the centre of the frame or loop.

Mobile RFID readers must generate a minimum magnetic field strength of 3 dBA/m, measured at 7 cm from the external surface of the antenna in the most favorable direction.

The carrier frequency of all readers must be within 134.2 kHz +/- 134 Hz.

## PHYSICAL REQUIREMENTS

Readers will be used in an on-farm environment. Build quality should be ruggedized, suitable to resist moisture, temperature extremes, dust as well as rough handling and storage. Power supplies, chargers, cords should also be designed with farm use in mind. All readers must have an *equivalent* Ingress Protection of 54 or higher. Readers that do not have third party certification will be verified by the CCIA.

Mobile RFID readers should be easily read by either right-handed or left-handed operators.

## FIELD TESTING

Stationary readers that are physically too large to be accommodated in the test laboratory will need to be set up and tested off site. Handling fees incurred will be charged back to the proponent at cost. Please contact the Tag and Technology Manager well in advance to discuss the logistics of oversize reading equipment.

## CCIA READER LISTING PROCESS

1. Manufacturers and/or suppliers may request CCIA listing of ISO 11785 compliant readers by completing the CCIA ISO 11785 Reader- Application Form in full and including the technical specifications of the reader. Please refer to APPENDIX D.
  - a. Applications will be reviewed in the order that they are received.
  - b. All applications must include verification of certification for radio-frequency transmission by Industry Canada under RSS-210, “Low Power License-Exempt Radio Communication Devices”.
2. Upon acceptance of the completed application form, the CCIA Tag and Technology Manager may request the submission of readers for laboratory testing. All submitted readers must conform to the specifications as defined in the current CCIA Transceiver Standards, Procedures, and Testing Document.
  - a. Stationary panel readers and walk through readers may be submitted for field demonstration and lab testing.
  - b. Mobile readers will be submitted for lab testing only.
  - c. All demonstrations and testing timelines will be determined at the discretion of CCIA.
3. CCIA will coordinate and monitor all testing for compliance to the standards as defined in the then current CCIA Transceiver Standards, Procedures, and Testing Document. Fees are detailed in Appendix E.
  - a. A fee will be applied to all applications to address testing and administration costs. All fees must be paid for in full prior to initiation of testing.
  - c. Readers and associated equipment deemed too large for testing in the laboratory environment will be subject to additional fees for handling and set-up at secondary site.
  - d. Applications with technical problems, where extended time/communications are required, will be billed at laboratory cost of \$175.00/hr.
  - e. Readers will be issued for testing at no charge to the CCIA. The CCIA will not be responsible for damage to readers or power supplies caused by deficiencies in design or shipping.
4. Upon completion of all field demonstrations and laboratory testing, the CCIA Technical Advisory Committee and Board of Directors will review applications and test results. The CCIA will provide the applicant with a copy of the application form, indicating listing status of the candidate reader to the Canadian Cattle Identification Agency Reader List.
  - a. Listings will include additional information as determined by CCIA.
  - b. Rejected applications will include notification of deficiencies that must be corrected before re-submitting. Upon completion of the trials, results from corrected deficiencies will be reviewed at the next available meetings of the CCIA Technical Advisory Committee and Board of Directors.
  - c. All test results will be published on the CCIA website.

5. CCIA, acting reasonably, will have final discretion to approve or reject any application.
6. CCIA may publish reader attributes of all listed readers. These attributes will include but not be limited to:
  - Temperature operating range
  - Storage limit/memory
  - Display characteristics
  - Data transfer options
  - IP rating
  - Software options
  - Expected battery life
  - Power supply options
  - Weight
  - Results of demonstrations and lab tests
  - Links to product information
  - Certifications received



## CCIA RFID READER – APPLICATION FORM

Ship/Mail forms to:

Tag & Technology Manager  
Canadian Cattle Identification Agency  
7646 – 8<sup>th</sup> Street NE. Calgary, AB Canada T2E 8X4  
ATTN: Reader Listing Request

Date: \_\_\_\_\_

Supplier Name: \_\_\_\_\_

Address: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Phone/Fax: ph:(\_\_\_\_\_) \_\_\_\_\_ fax:(\_\_\_\_\_) \_\_\_\_\_

Reader Name/Model Number: \_\_\_\_\_

Mobile Reader Laboratory Test:	\$1250.00
Stationary Reader Laboratory Test:	\$2500.00 (one or two antennae)
Additional Antennae Test*:	\$500.00 each
Stationary Reader Field Test:	\$600.00 plus 175.00/hr. Engineer travel charge

*\*See Page 17 for additional information*

### FOR CCIA USE ONLY:

	YES	NO
Pre-Certification Requirements .....	_____	_____
Read Requirements .....	_____	_____
Electrical Requirements .....	_____	_____
Interface Requirements .....	_____	_____
Environmental Requirements .....	_____	_____
Regulatory Requirements .....	_____	_____
Stationary .....	_____	_____
Mobile .....	_____	_____

Notification Date: \_\_\_\_\_ Comments Attached: YES NO

## APPENDIX A: REFERENCES

AIM USA (Automatic Identification Manufacturers)

634 Alpha Drive

Pittsburgh, PA 15238 USA

Phone: 412-963-8588

Fax: 412-963-8753

URL: <http://www.aimusa.org>

Services Canada and U.S. – Authorized strategic partner for ANSI and ISO specifications and is a standards creator for ISO, ANSI, and industry specific standards.

Electronic Commerce Council of Canada (ECCC)

Phone: 416-510-8039

URL: <http://www.eccc.org/>

For confirmation that the ISO and ANSI standards are in compliance with Canadian standards. ECCC is a partner of Standards Council of Canada (SCC).

International Committee for Animal Recording (ICAR)

Institut de l'Elevage

149 rue de Bercy,

Paris 75012, France

URL; <http://www.icar.org>

International Organization for Standards (ISO)

ISO Central Secretariat:

International Organization for Standardization (ISO)

1, rue de Varembe, Case postale 56

CH-1211 Geneva 20, Switzerland

Telephone +41 22 749 01 11; Fax +41 22 733 34 30

Standards Council of Canada (SCC)

270 Albert Street, Suite 200

Ottawa, ON K1P 6N7

Phone: 613-238-3222

Fax: 613-569-7808

URL: <http://www.scc.ca/>

## APPENDIX B: RECOGNIZED ELECTRICAL SAFETY APPROVAL SEALS





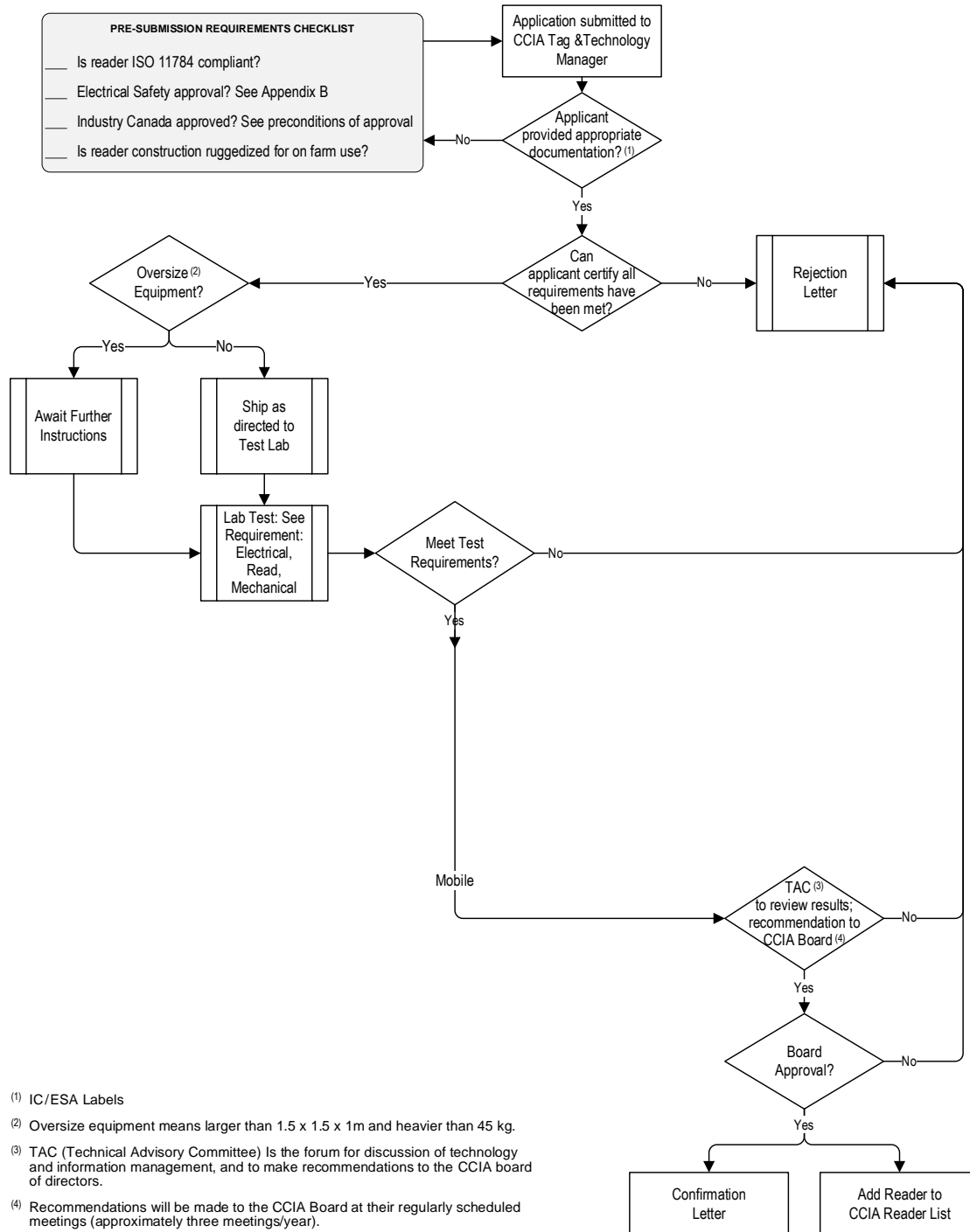
## APPENDIX C: FIELD INSPECTION MARKS





## APPENDIX D: APPROVAL PROCESS FLOW CHART

### CCIA RFID Reader Listing Process



## APPENDIX E: FEE SCHEDULE

Mobile Reader Laboratory Test:	\$1250.00
Stationary Reader Laboratory Test:	\$2500.00 (one or two antennae)
Additional Antennae Test*:	\$500.00 each
Stationary Reader Field Test:	\$600.00 plus 175.00/hr. Engineer travel charge
Update verification for IC or CSA certifications	\$500.00
Administration Fee	\$500.00

Applications with technical problems, where extended time/communications are required, will be billed at laboratory cost of \$175.00/hr.

\*Additional antenna testing must be completed during the reader testing in the laboratory. Post laboratory testing, additional antennae submitted for approval will be treated as a new test.