



Canadian Cattle Identification Agency

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

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## INTRODUCTION

The CCIA is a not-for-profit, industry-led organization established in 1998 to create Canada's national identification program for the cattle industry. The CCIA is Canada's national administrator for livestock traceability and animal identification programs. Besides animal identification services, CCIA also provides age verification services for Alberta, including administration and support through a Call Centre and Mobile Field Representative team. CCIA also works with Alberta Agriculture and Rural Development (AARD) to facilitate the receipt and handling of unique Alberta-created, producer premises identification numbers (PID) required by legislation in Alberta.

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

Since 2002, CCIA has allocated more than 65 million unique numbers, making the CLTS one of the most comprehensive national animal identification systems in the world. Today with over 350,000,000 animal identification, premises identification, animal movement and age verification events in the CLTS, the database actively serves its clients as the largest source of traceability data in Canada.

Part of CCIA's role as an administrator for cattle radio frequency identification (RFID) tags in Canada (excluding Quebec) is to assess tags using CCIA's established technical standards, approve and recommend tags (meeting these standards) to CFIA for use/sale in Canada. CCIA also assesses 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 [CCIA Approved Reader List](#). Governments use this list of approved readers as a reference when initiating 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 AARD in the development and implementation of animal traceability initiatives within Alberta.

CCIA follows international traceability standards, including:

- ISO standard for identification numbering scheme for animals
  - ISO 11784 and 11785 standard for livestock identification
- 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:

- Canadian Livestock Dealer's Association
- Livestock Markets Association of Canada
- Canadian Bison Association
- Canadian Cattlemen's Association
- Canadian Sheep Federation
- Alberta Beef Producers
- Alberta Cattle Feeders Association
- Manitoba Beef Producers
- Canadian Veterinary Medical Association
- National Livestock ID for Dairy
- Canadian Meat Council
- British Columbia Cattlemen's Association
- The Fédération des producteurs de bovins du Québec (FPBQ)
- Saskatchewan Stock Growers Association
- Ontario Cattlemen's Association
- Atlantic Canada Beef Producers

Board liaisons:

- Canadian Food Inspection Agency
- Agriculture and Agri-Food Canada
- Alberta Agriculture and Rural Development

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 approved by the CCIA. Requirements are typically indicated by the use of the word “must”.

Recommendations are performance standards the CCIA considers as 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 only runs on battery power).

### **RFID Reader:**

In the context of the CCIA RFID Reader 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 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 (<http://www.ic.gc.ca/app/sitt/reltel/srch/nwRdSrch.do?lang=eng>).

### 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 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.

## APPROVAL 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 Standards Organization (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/ approved 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 the 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 CCIA approved 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 the CCIA. Stationary RFID readers will also be subjected to a field test as determined by the 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 CCIA approved 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 readers should have an output display that is easily viewed in direct sunlight, the display should be back-lit 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 readers should be easily read by either right-handed or left-handed operators.

## Field Testing

All stationary readers will be required to pass a mandatory field evaluation. Field evaluations are conducted on-farm in a non-laboratory environment. Readers will be situated in the livestock handling area where they will be subjected to the normal farm environment. Standard read range testing will be conducted. Stationary readers that pass the laboratory portion of the test will be taken to a cattle ranch and installed in an actual ranch setting. Read range testing will be completed with all currently approved tags. Cattle will be moved past the reader for 100 cycles. Read rates will be recorded and presented to the CCIA Technical Advisory Committee for review and discussion.

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 APPROVAL PROCESS

1. Manufacturers and/or suppliers may request CCIA approval 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 field and laboratory testing. All submitted readers must conform to the specifications as defined in the then current CCIA Reader Standards, Procedures, and Testing Document.
  - a. Stationary panel readers and walk through readers must 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 the CCIA.
3. The CCIA will coordinate and monitor all testing for compliance to the standards as defined in the then current CCIA Reader 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.
  - b. Field testing of readers will have an additional fee(s).
  - 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 \$150.00/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.
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 approval status of the candidate reader to the Canadian Cattle Identification Agency Approved Reader List.
  - a. Approvals will include additional information as determined by the 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 CCIA website.

5. The CCIA, acting reasonably, will have final discretion to approve or reject any application.
6. The CCIA will publish reader attributes of all approved 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  
 300, 5735 – 7 Street N.E. Calgary, AB Canada T2E 8V3  
 Calgary, Alberta T2E 7H7  
 ATTN: Reader Approval 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'Élevage

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 Varembé, 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/>

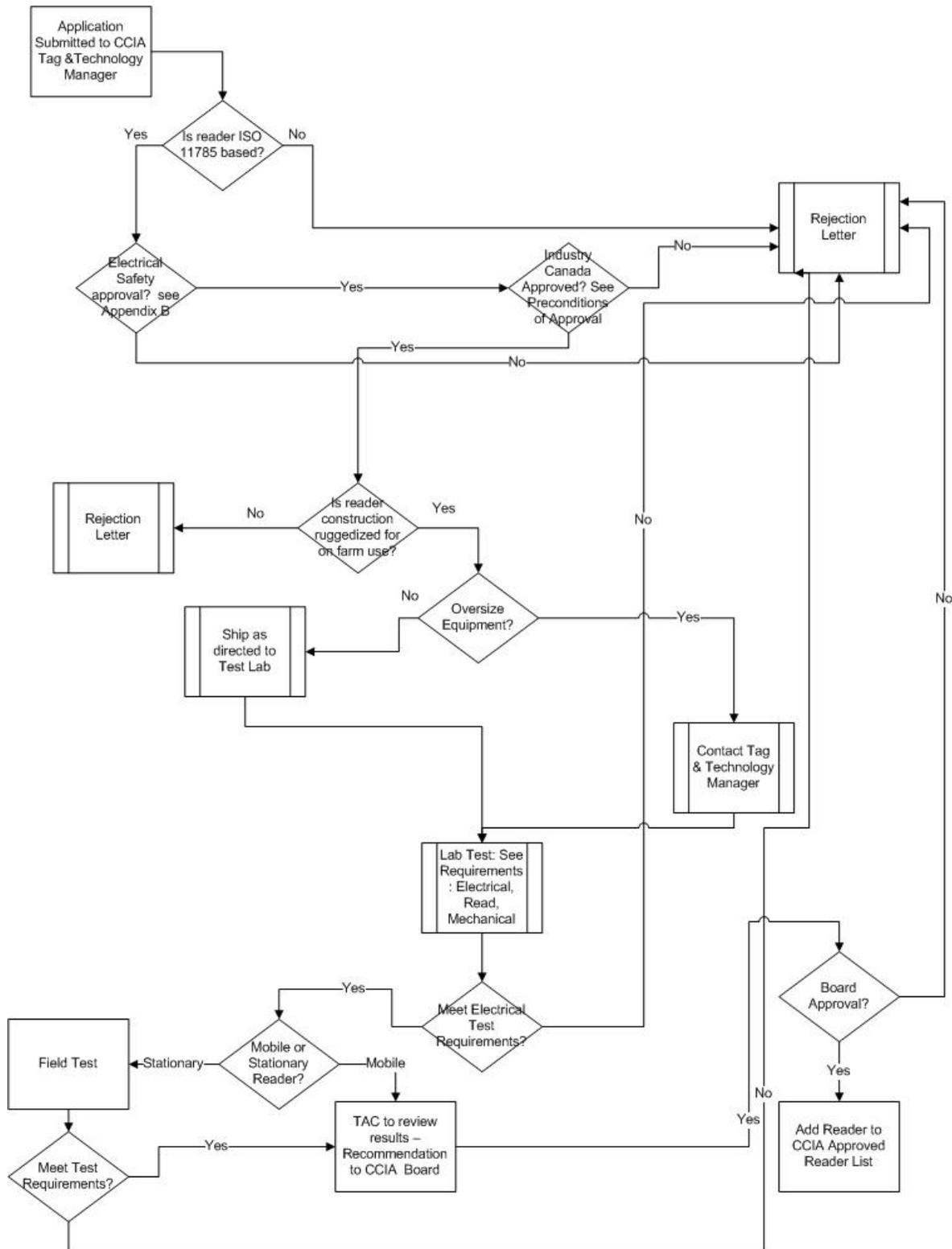
## APPENDIX B: RECOGNIZED ELECTRICAL SAFETY APPROVAL SEALS



## APPENDIX C: FIELD INSPECTION MARKS



## APPENDIX D: APPROVAL PROCESS FLOW CHART



## 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 \$150.00/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.