

# OPERATIONS MANUAL



## INTELLIGUARD® IG-REV-1 RFID Reader

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OP-014 Rev. B

## IntelliGuard® IG-REV-1 Overview

The IntelliGuard IG-REV-1 reader comprises powerful, complete EPC Gen2-compliant RFID reader system for embedded applications. Based on the Speedway Revolution reader from Impinj, this provides proven and reliable performance for IntelliGuard's Smart Cabinet Inventory Systems. IG-REV-1 builds on the market-leading Speedway Revolution reader from Impinj and integrates all the necessary components into a rugged, reliable package. The self-contained industrial design allows it to be integrated into IntelliGuard's customer-facing products, affording high performance with lower system costs. It easily adds RFID capability to IntelliGuard's line of smart cabinets for automated inventory tracking and control, requiring only connections to a power source, digital communication with a host, and an antenna, to provide a complete feature set for EPC Gen2 RFID capability.

This document includes interface, functional, performance, mechanical and environmental specifications.

Host communication specifications (e.g. firmware upgrade and host interface protocol) and operational control are implemented using Impinj's proven Octane SDK and LLRP (low-level reader protocol), based on EPC Global standards. All development tools and documentation are used by IntelliGuard to implement the final system solution and are not provided by IntelliGuard to end users. All operational application development is done by IntelliGuard for IntelliGuard's products and utilizes Impinj's suites of development tools. Further information may be found at [www.impinj.com](http://www.impinj.com). IntelliGuard provides this link as reference only.

The IG-REV is ideal for RFID-tagged inventory control applications requiring fast inventory of large tag populations. Its high performance and reliability allow reading hundreds of tags per second of densely located tagged items typical of IntelliGuard's inventory solutions.

All application-specific functionality and controls for the IG-REV are pre-configured by IntelliGuard, and no end-user controls are provided. The settings and configuration of IntelliGuard's inventory control cabinets are designed to be compliant with local regulations.

*Table 1. IG-REV-1 Key Attributes*

Air Interface	ISO 18000-63 (EPC Global C1G2)
Antenna Ports	Four total, TNC RP RF connectors
Transmit Power	Settable from 10 dBm to 30 dB maximum at the antenna connector
Receive Sensitivity	Ideal -84 dBm (depends on antenna match)
Frequency	UHF 902.75-927.25 MHz, FHSS
Package	Metal Enclosure with mounting brackets
Power Supply	24 VDC, nominal
Dimensions	173 mm by 167 mm by 27 mm overall, not including mounting brackets
Temperature	Operating: -20 to +60 degrees C
Regions	Capable for all major regions
Compliance	Certified for FCC and Canada operation
RoHS	Yes, 2011/65/EU

## **Restriction on Use**

***The IG-REV-1 is intended for use in IntelliGuard's lines of RFID-enabled inventory control cabinets and solutions. All calibrations and settings are performed by IntelliGuard personnel. There are no end-user controls that alter the behavior and performance of this device.***

## IntelliGuard® IG-REV-1 Device Operation

IntelliGuard's lines of-RFID enabled Smart Cabinets utilize the IG-REV-1 in an embedded configuration, controlled by an Intel NUC mini-computer. The software application running on the NUC links to the IG-REV-1 via its Ethernet connection. The control protocol is implemented using the Impinj's Octane SDK in the final system solution. All operational applications are developed using Impinj's suites of development tools, including Octane and LLRP. Further information may be found at [www.impinj.com](http://www.impinj.com). IntelliGuard provides this link as reference only.

In operation, the embedded system interfaces to various sensors which provide input to the User Application to determine when an RFID inventory scan will occur. Specifically, sensors which indicate whether a cabinet door is open or closed, and whether it is locked or unlocked, are monitored by the Application. Following a sequence where access is granted (for instance, via a proximity badge reader), the cabinet door is opened and then closed and locked, the IG-REV-1 is activated for a brief time to read the RFID tags affixed to the products inside the cabinet. The tags' IDs are collected and associated with their specific products. The data are stored in a database for subsequent analysis and reports.

The IG-REV-1 is ISO18000-63-compliant, and is compliant with the EPC Global and RAIN standards. The complete air-interface protocols may be found on the GS1 website at <https://www.gs1.org>

IntelliGuard Smart Cabinets are available in a variety of sizes and configurations. In each case the IG-REV-1 may be set within regulatory constraints to optimize tag reading ability. Typically, the scanning times are adjusted depending upon the number or tagged items within the cabinet, and may range from 5 seconds to 60 seconds. From a User's perspective minimizing the scanning time is desirable. Secondly, the RF transmitted power and receiver sensitivity levels may be adjusted, depending on the type and size of the enclosure.

The embedded system takes inventory of the cabinet each time the cabinet is accessed. The frequency of access will vary depending on the customer's logistics and use, and will typically run between 2 and 5 times per day. Between RFID scans, the IG-REV-1 is idle.

## IntelliGuard® IG-REV-1 Device Description

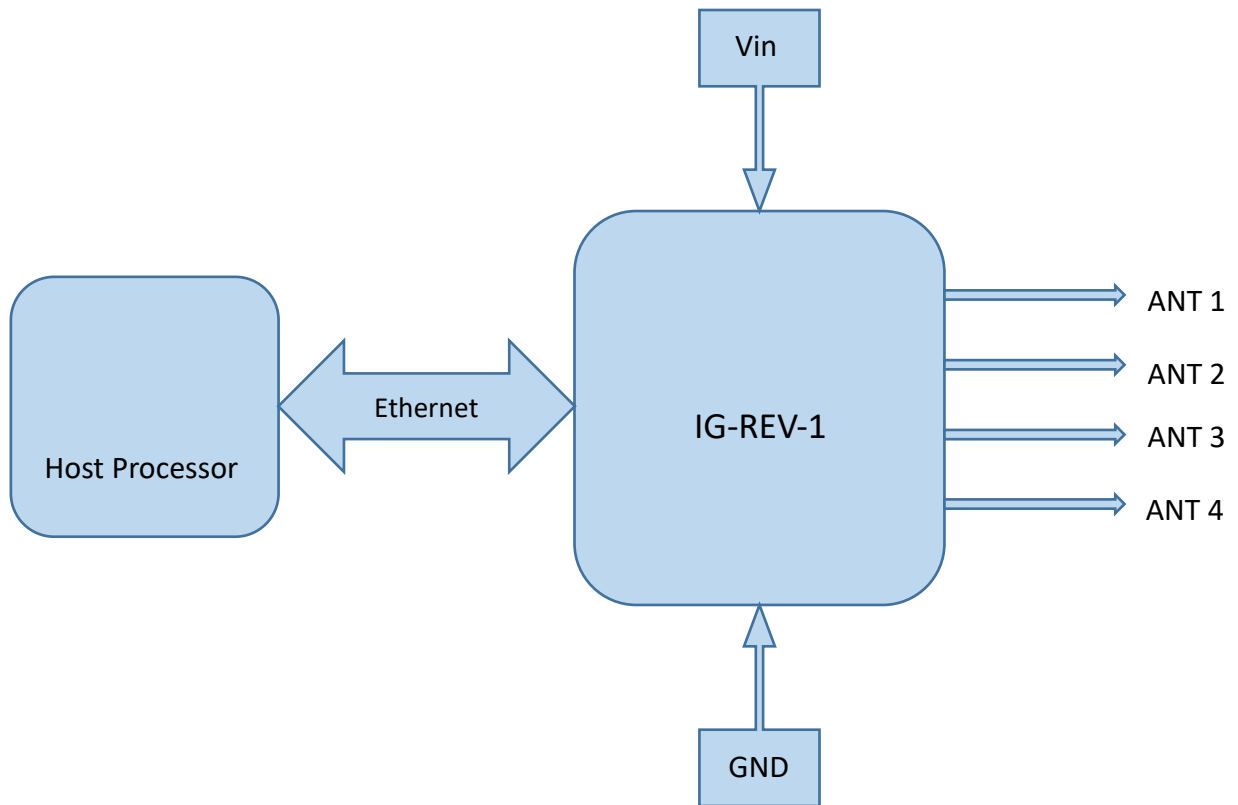
The Intelliguard IG-REV-1 is a self-contained UHF EPC Gen 2 RFID reader. The industrial construction is mountable using included brackets for embedding into IntelliGuard's family of Smart Cabinets. Combined with a host processor, power and ground, and a set of antennas, it forms a complete RFID reader system.

The IG-REV-1 will connect with up to four antennas using reverse polarized TNC RF connectors.

*Figure 1. IG-REV-1 Picture and FCC Label*



*Figure 2. Basic Connections*



*Figure 3. IG-REV-1 Antenna Ports, Power and Status Indicators*



Figure 4. Backside Connections



**Power**

**Ethernet**

**USB1**

**USB2**

**Console**

**GPIO**

**Power** – 24VDC

**Ethernet** – Connection to Host Processor

**USB1** – Not Used

**USB2** – Not Used

**Console** – Not Used

**GPIO** – Not Used

### IntelliGuard® IG-REV-1 Regulatory and Label

The IG-REV-1 Reader has been certified for operation by FCC and Industry Canada in certain specific configurations using the following IDs. Use of these IDs requires specific text be added to product labeling and product Hardware User's Guides.

FCC ID: SOA-REV

IC ID: 22150-REV

## Federal Communications Commission (FCC) Part 15 Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested to be sure it complies with the limits for Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in an installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### *Canada Operation*

*This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.*

*Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

*This radio transmitter 22150-REV has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.*

*Le présent émetteur radio 22150-REV a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.*

## Antennas

The Reader has been tested and certified to operate with planar patch antennas and monopole antennas having a gain not exceeding 6 dBi. Use of other antenna types are not permitted.

**CAUTION: Changes to this product or modifications not expressly approved by the party responsible for compliance could void your authority to operate per FCC Part 15.**

**ATTENTION: Les modifications apportées à ce produit ou modifications pas expressément approuvés par la partie responsable de la conformité peuvent annuler votre droit à utiliser par FCC Part 15.**

## Maximum Permissible Exposure

FCC maximum permissible exposure (MPE) limits require that a minimum of 35 cm separation be maintained between the antennas and personnel working in the area. For additional information on maximum permissible exposure please refer to the following bulletins:

FCC OET Bulletin 65: Evaluating Compliance with FCC Guidelines for Maximum Permissible Exposure to Radiofrequency Electromagnetic Fields

FCC OET Bulletin 56: Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields

*L'exposition maximale admissible d'IC (MPE) limite exige qu'un minimum de 35 cm de séparation soit maintenu entre les antennes et le personnel travaillant dans la région. Pour plus d'informations sur l'exposition maximale admissible veuillez consulter les bulletins suivants :*

*Cnr-102 - Radio Fréquence (RF) Conformité des appareils de radiocommunication aux limites d'exposition (pour toutes les bandes de fréquences)*

Table 3. FCC ID Label Example

