



ALTA Water Detection Puck Sensor User Guide

Table of Contents

I. ABOUT THE WATER DETECTION PUCK SENSOR	1
ALTA WATER DETECTION PUCK FEATURES	1
EXAMPLE APPLICATIONS	1
II. SENSOR SECURITY	2
SENSOR COMMUNICATION SECURITY	2
DATA SECURITY ON THE GATEWAY	2
iMONNIT SECURITY	2
III. REGISTRATION	3
REGISTERING A WATER DETECTION PUCK	3
IV. SETTING UP THE WATER DETECTION PUCK	4
INSTALLING BATTERIES	4
ANTENNA ORIENTATION	5
MAGNETIC REED SWITCH	5
VI. SENSOR OVERVIEW	6
MENU SYSTEM	6
SUPPORT	10
WARRANTY INFORMATION	10
CERTIFICATIONS	12



I. ABOUT THE WATER DETECTION PUCK SENSOR

The ALTA Wireless Water Detection Puck Sensor detects the presence or non-presence of water. Convenient water tight puck design allows the sensor to be placed anywhere needed whether dry or wet. Note that water levels must be ~ 3mm deep to trigger detection.

The ALTA Wireless Water Detection Puck Sensor detects when water is present by completing the circuit between the two probe points on the bottom of the puck sensor. When water is present the sensor will immediately turn on the radio and transmit the data to the wireless gateway and iMonnit Online Sensor Monitoring and Notification System, allowing the user to immediately receive an SMS text or email alert. The sensor can be configured to detect both the presence and non-presence of water.

ALTA WATER DETECTION PUCK FEATURES

- Wireless range of 1,200+ feet through 12+ walls *
- Frequency-Hopping Spread Spectrum (FHSS)
- Interference immunity
- Power management for longer battery life ** (12+ years on AA batteries)
- Encrypt-RF® Security (Diffie-Hellman Key Exchange + AES-128 CBC for sensor data messages)
- Onboard data memory stores up to 512 readings per sensor:
 - 10-minute heartbeats = 3.5 days
 - 2-hour heartbeats = 42 days
- Over-the-air updates (future proof)
- Free iMonnit basic online wireless sensor monitoring and notification system to configure sensors, view data and set alerts via SMS text and email
- Response time to iMonnit: ~ 3 seconds.

* Actual range may vary depending on environment.

** Battery life is determined by sensor reporting frequency and other variables. Other power options are also available.

EXAMPLE APPLICATIONS

- Water heater tank leak monitoring
- Plumbing leak detection.
- Data center subfloor water detection.
- Water intrusion/flood detection.
- Crawl space water intrusion monitoring
- Reservoir/tank level monitoring

II. SENSOR SECURITY

The ALTA Water Detection Puck has been designed and built to securely manage data from sensors monitoring your environment and equipment. Hacking from botnets are in the headlines, Monnit Corporation has taken extreme measures to ensure your data security is handled with the utmost care and attention to detail. The same methods utilized by financial institutions to transmit data are also used in Monnit security infrastructure. Security features of the gateway include tamper proof network interfaces, data encryption, and bank-grade security.

Monnit's proprietary sensor protocol uses low transmit power and specialized radio equipment to transmit application data. Wireless devices listening on open communication protocols cannot eavesdrop on sensors. Packet level encryption and verification is key to ensuring traffic isn't altered between sensors and gateways. Paired with best-in-class range and power consumption protocol, all data is transmitted securely from your devices. Thereby ensuring a smooth, worry-free, experience.

SENSOR COMMUNICATION SECURITY

Monnit sensor to gateway secure wireless tunnel is generated using ECDH-256 (Elliptic Curve Diffie-Hellman) public key exchange to generate a unique symmetric key between each pair of devices. Sensors and gateways use this link specific key to process packet level data with hardware accelerated 128-bit AES encryption which minimizes power consumption to provide industry best battery life. Thanks to this combination, Monnit proudly offers robust bank-grade security at every level.

DATA SECURITY ON THE GATEWAY

The ALTA gateways are designed to prevent prying eyes from accessing the data that is stored on the sensors. Gateways do not run on an off the shelf multi-function OS (operating system). Instead they run a purpose specific real-time embedded state machine that cannot be hacked to run malicious processes. There are also no active interface listeners that can be used to gain access to the device over the network. The fortified gateway secures your data from attackers and secures the gateway from becoming a relay for malicious programs.

iMONNIT SECURITY

iMonnit is the online software and central hub for configuring your device settings. All data is secured on dedicated servers operating Microsoft SQL Server. Access is granted through the iMonnit user interface, or an Application Programming Interface (API) safeguarded by 256-bit Transport Layer Security (TLS 1.2) encryption. TLS is blanket of protection to encrypt all data exchanged between iMonnit and you. The same encryption is available to you whether you are a Basic user or Premiere user of iMonnit. You can rest assured that your data is safe with iMonnit.

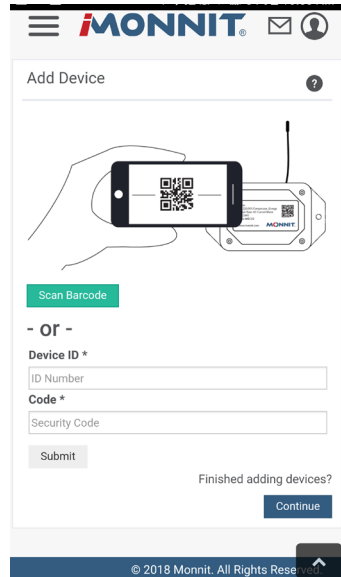
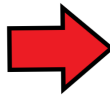
III. REGISTRATION

If this is your first time using the iMonnit online portal, you will need to create a new account. If you have already created an account, start by logging in. For instructions on how to register for an iMonnit account, please consult the iMonnit User Guide viewable at monnit.com/support/documentation.

REGISTERING THE WATER DETECTION PUCK SENSOR

You will need to enter the Device ID and the Security Code from your Water Detection Puck in the corresponding text boxes. Use the camera on your smartphone to scan the QR code on your sensor and gateway. If you do not have a camera on your phone, or the system is not accepting the QR code, you may enter the Device ID and Security Code manually.

- The Device ID is a unique number located on each device label.
- Next you'll be asked to enter the Security Code (SC) on your device. A security code will be all letters and must be entered in upper case, no numbers. It can also be found on the barcode label of your gateway.



When completed, select the "Submit" button.

IV. SETTING UP YOUR WATER DETECTION PUCK

When you are finished adding the Water Detection Puck to your account, the next step is to insert the battery. ALTA Water Detection Puck Sensors will be powered by commercial AA batteries.

INSTALLING BATTERIES



The standard version of this sensor is powered by two replaceable 1.5 V AA sized batteries (included with purchase). The typical battery life is 10 -12 years.

This sensor is also available with a line power option. The line powered version of this sensor has a barrel power connector allowing it to be powered by a standard 3.0–3.6 V power supply. The line powered version also uses two standard 1.5 V AA batteries as backup for uninterrupted operation in the event of line power outage.

Power options must be selected at time of purchase, as the internal hardware of the sensor must be changed to support the selected power requirements.

Place batteries in the device by first taking the sensor and sliding the battery door open. Insert fresh AA batteries in the carriage, then shut the battery door.

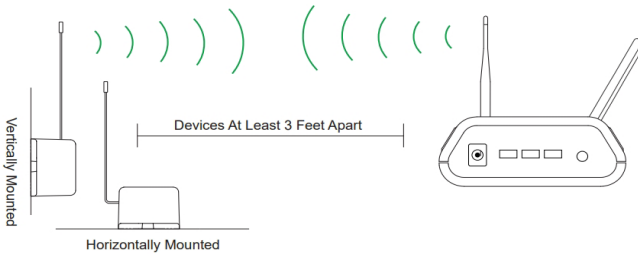
Complete the process by opening up iMonnit and selecting **Sensors** from the main navigation menu. Verify that iMonnit is showing the sensor has a full battery level.

The Water Detection Puck comes equipped with rubber pads on the bottom. There is no mounting necessary for the device. Just place it in the designated space and it's ready to go.

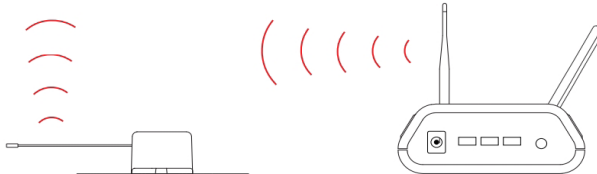
ANTENNA ORIENTATION

In order to get the best performance out of your ALTA Water Detection Puck, it is important to note proper antenna orientation and sensor positioning. Antennas should all be oriented in the same direction, pointing vertically from the sensor. If the sensor is mounted flat on its back on a horizontal surface, you should bend the antenna as close to the sensor housing as possible giving you the most amount of antenna pointing vertical. You should make the antenna wire as straight as possible, avoiding any kinks and curving of the wire. Sensors must be at least 3 ft. away from other sensors and the wireless gateway to function.

More Signal



Less Signal



MAGNETIC REED SWITCH

The Water Detection Puck is alerted when water build-up of at least ~ 3mm occurs. A magnetic reed switch has been installed in the sensor to detect the presence of a magnetic field. Its purpose is to allow you to put the sensor in a low power state.

To activate the low power function, simply place the magnet on the spot indicated on the puck for 2 – 5 seconds; then remove.

To end the low power state, just repeat the same procedure by placing the magnet in the indicated hot spot for a few seconds, then lifting it up.

VI. SENSOR OVERVIEW

Select **Sensors** from the main navigation menu on iMonnit to access the sensor overview page and begin making adjustments to your Water Detection Puck.

MENU SYSTEM




Details - Displays a graph of recent sensor data.

History - List of all past heartbeats and readings.

Events - List of all events attached to this sensor.

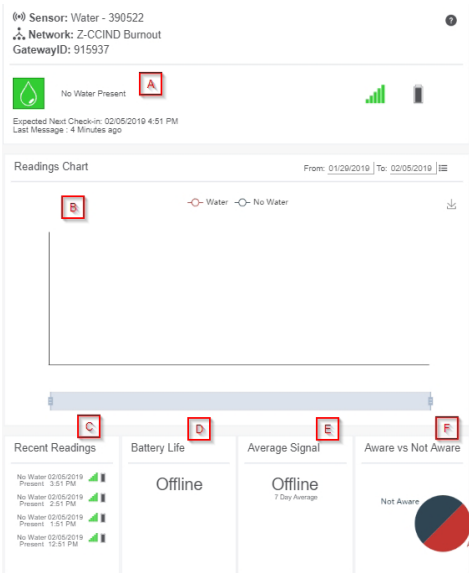
Settings - Editable levels for your sensor.

Directly under the tab bar is an overview of your sensor. This allows you to see the signal strength and the battery level of the selected sensor.

-  indicates the sensor is checking in and within user defined safe parameters.
-  indicates the sensor has met or exceeded a user defined threshold or triggered event.
-  indicates that no sensor readings are being recorded, rendering the sensor inactive.

Details View

The Details View will be the first page you see upon selecting which sensor you would like to modify.



A. The sensor overview section will be above every page. This will consistently display the present reading, signal strength, battery level, and status.

B. This graph charts how the sensor fluctuates throughout a set date range. To change the date range displayed in the graph, navigate up to the top of the Readings Chart section on the right-hand corner to change the from and/or to date.

C. The Recent Readings section below the chart shows your most recent data received by the sensor.

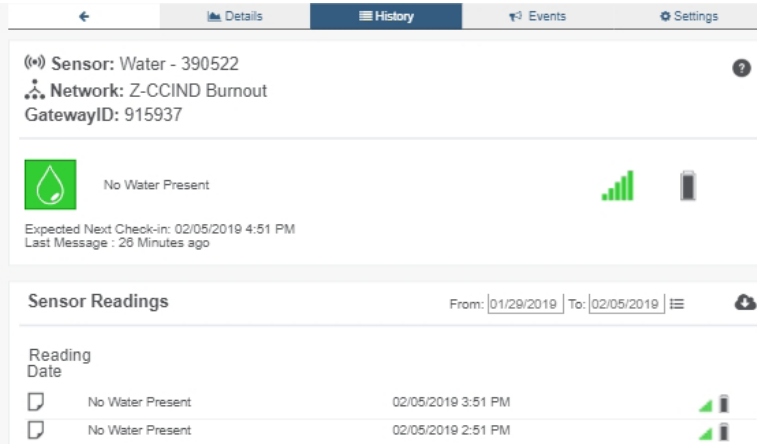
D. Battery Life displays the current battery percentage remaining.


E. The Average Signal shows the most common signal strength of your sensor. Low signal strength could be a sign the placement of your sensor should be adjusted.

F. The pie chart in the Aware or Not Aware Section displays the percentage of aware states your sensor has entered since activation.

History View

Selecting the “History” tab within the tab bar allows you to view the sensor’s data history as time stamped data.



- On the far right of the sensor history data is a cloud icon.  Selecting this icon will export an excel file for your sensor into your download folder.

Note: Make sure you have the date range for the data you need input in the “From” and “To” text boxes. This will be the most recent week by default. Only the first 2,500 entries in the selected date range will be exported.

The data file will have the following fields:

MessageID: Unique identifier of the message in our database.

SensorID: If multiple sensors are exported you can distinguish which reading was from which using this number even if the names for some reason are the same.

Sensor Name: The name you have given the sensor.

Date: The date the message was transmitted from the sensor.

Value: Data presented with transformations applied but without additional labels.

Formatted Value: Data transformed and presented as it is shown in the monitoring portal.

Battery: Estimated life remaining of the battery.

Raw Data: Raw data as it is stored from the sensor.

Sensor State: Binary field represented as an integer containing information about the state or the sensor when the message was transmitted. (See “Sensor State Explained” below).

Gateway ID: The Identifier of the gateway that relayed the data from the sensor.

Alert Sent: Boolean indicating if this reading triggered a notification to be sent from the system.

Signal Strength: Strength of communication signal between the sensor and the gateway, shown as percentage value.

Voltage: Actual voltage measured at the sensor battery used to calculate battery percentage, similar to Received Signal you can use one or the other or both if they help you.

State

The integer presented here is generated from a single byte of stored data. A byte consists of 8 bits of data that we read as Boolean (True (1)/False (0)) fields.

Using a temperature sensor as an example.

If the sensor is using factory calibrations the Calibrate Active field is set True (1) so the bit values are 00010000 and it is represented as 16.

If the sensor is outside the Min or Max threshold, the Aware State is set True (1) so the bit values are 00000010 and it is represented as 2.

If the customer has calibrated the sensor this field the Calibrate Active field is set False (0) AND the sensor is operating inside the Min and Max Thresholds, the bits look like 00000000 this is represented as 0.

If the sensor is using factory calibrations and it is outside the threshold the bit values are 00010010 and it is represented as 18 (16 + 2 because both the bit in the 16 value is set and the bit in the 2 value is set).

Note: These two are the only bits that typically observed outside of our testing procedures.

Settings View

To edit the operational settings for a Water Detection Puck, choose the “**Sensor**” option in the main navigation menu then select the “**Settings**” tab to access the configuration page.

Water Detection Settings



Sensor Name

Water Puck



Heartbeat Interval

60



Aware State Heartbeat

60



Enter aware state when water is

Present



Time to Re-Arm (seconds)

1



Failed transmissions before link mode

2



Save

Default

A. Sensor Name is a unique name you give the sensor to easily identify it in a list and in any notifications.

B. The Heartbeat Interval is how often the sensor communicates with the gateway if no activity is recorded.

C. Aware State Heartbeat is how often the sensor communicates with the gateway while in an Aware State.

D. Enter Aware State When Water Is field allows you to set whether you want to be alerted when water is either Present, Absent, or when there is a State Change.

E. Time to Rearm is the time in seconds after a triggering event that the sensor will wait before re-arming itself.

F. Failed transmissions before link mode is the number of transmissions the sensor sends without response from a gateway before it goes to battery saving link mode. In link mode, the sensor will scan for a new gateway and if not found will enter battery saving sleep mode for up to 60 minutes before trying to scan again. A lower number will allow sensors to find new gateways with fewer missed readings. Higher numbers will enable the sensor to remain with its current gateway in a noisy RF environment better. (Zero will cause the sensor to never join another gateway, to find a new gateway the battery will have to be cycled out of the sensor.)

The default heartbeat interval is 60 minutes or one hour. It is recommended that you do not lower your heartbeat level too much because it will drain the battery.

Finish by selecting the “Save” button.

Note: Be sure to select the “Save” button anytime you make a change to any of the sensor parameters. All changes made to the sensor settings will be downloaded to the sensor on the next sensor heartbeat (check-in). Once a change has been made and saved, you will not be able to edit that sensor’s configuration again until it has downloaded the new setting.

SUPPORT

For technical support and troubleshooting tips please visit our support library online at monnit.com/support/. If you are unable to solve your issue using our online support, email Monnit support at support@monnit.com with your contact information and a description of the problem, and a support representative will call you within one business day.

For error reporting, please email a full description of the error to support@monnit.com.

WARRANTY INFORMATION

(a) Monnit warrants that Monnit-branded products (Products) will be free from defects in materials and workmanship for a period of one (1) year from the date of delivery with respect to hardware and will materially conform to their published specifications for a period of one (1) year with respect to software. Monnit may resell sensors manufactured by other entities and are subject to their individual warranties; Monnit will not enhance or extend those warranties. Monnit does not warrant that the software or any portion thereof is error free. Monnit will have no warranty obligation with respect to Products subjected to abuse, misuse, negligence or accident. If any software or firmware incorporated in any Product fails to conform to the warranty set forth in this Section, Monnit shall provide a bug fix or software patch correcting such non-conformance within a reasonable period after Monnit receives from Customer (i) notice of such non-conformance, and (ii) sufficient information regarding such non-conformance so as to permit Monnit to create such bug fix or software patch. If any hardware component of any Product fails to conform to the warranty in this Section, Monnit shall, at its option, refund the purchase price less any discounts, or repair or replace nonconforming Products with conforming Products or Products having substantially identical form, fit, and function and deliver the repaired or replacement Product to a carrier for land shipment to customer within a reasonable period after Monnit receives from Customer (i) notice of such non-conformance, and (ii) the non-conforming Product provided; however, if, in its opinion, Monnit cannot repair or replace on commercially reasonable terms it may choose to refund the purchase price. Repair parts and replacement Products may be reconditioned or new. All replacement Products and parts become the property of Monnit. Repaired or replacement Products shall be subject to the warranty, if any remains, originally applicable to the product repaired or replaced. Customer must obtain from Monnit a Return Material Authorization Number (RMA) prior to returning any Products to Monnit. Products returned under this Warranty must be unmodified.

Customer may return all Products for repair or replacement due to defects in original materials and workmanship if Monnit is notified within one year of customer's receipt of the product. Monnit reserves the right to repair or replace Products at its own and complete discretion. Customer must obtain from Monnit a Return Material Authorization Number (RMA) prior to returning any Products to Monnit. Products returned under this Warranty must be unmodified and in original packaging. Monnit reserves the right to refuse warranty repairs or replacements for any Products that are damaged or not in original form. For Products outside the one year warranty period repair services are available at Monnit at standard labor rates for a period of one year from the Customer's original date of receipt.

(b) As a condition to Monnit's obligations under the immediately preceding paragraphs, Customer shall return Products to be examined and replaced to Monnit's facilities, in shipping cartons which clearly display a valid RMA number provided by Monnit. Customer acknowledges that replacement Products may be repaired, refurbished or tested and found to be complying. Customer shall bear the risk of loss for such return shipment and shall bear all shipping costs. Monnit shall deliver replacements for Products determined by Monnit to be properly returned, shall bear the risk of loss and such costs of shipment of repaired Products or replacements, and shall credit Customer's reasonable costs of shipping such returned Products against future purchases.

(c) Monnit's sole obligation under the warranty described or set forth here shall be to repair or replace non-conforming products as set forth in the immediately preceding paragraph, or to refund the documented purchase price for non-conforming Products to Customer. Monnit's warranty obligations shall run solely to Customer, and Monnit shall have no obligation to customers of Customer or other users of the Products.

Limitation of Warranty and Remedies.

THE WARRANTY SET FORTH HEREIN IS THE ONLY WARRANTY APPLICABLE TO PRODUCTS PURCHASED BY CUSTOMER. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. MONNIT'S LIABILITY WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLIGENCE OR OTHERWISE SHALL NOT EXCEED THE PURCHASE PRICE PAID BY CUSTOMER FOR THE PRODUCT. UNDER NO CIRCUMSTANCES SHALL MONNIT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES. THE PRICE STATED FOR THE PRODUCTS IS A CONSIDERATION IN LIMITING MONNIT'S LIABILITY. NO ACTION, REGARDLESS OF FORM, ARISING OUT OF THIS AGREEMENT MAY BE BROUGHT BY CUSTOMER MORE THAN ONE YEAR AFTER THE CAUSE OF ACTION HAS ACCRUED.

IN ADDITION TO THE WARRANTIES DISCLAIMED ABOVE, MONNIT SPECIFICALLY DISCLAIMS ANY AND ALL LIABILITY AND WARRANTIES, IMPLIED OR EXPRESSED, FOR USES REQUIRING FAIL-SAFE PERFORMANCE IN WHICH FAILURE OF A PRODUCT COULD LEAD TO DEATH, SERIOUS PERSONAL INJURY, OR SEVERE PHYSICAL OR ENVIRONMENTAL DAMAGE SUCH AS, BUT NOT LIMITED TO, LIFE SUPPORT OR MEDICAL DEVICES OR NUCLEAR APPLICATIONS. PRODUCTS ARE NOT DESIGNED FOR AND SHOULD NOT BE USED IN ANY OF THESE APPLICATIONS.

CERTIFICATIONS

United States FCC

This equipment has been tested and found to comply with the limits for a Class B digital devices, 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 instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular 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 of more of the following measures:

- *Reorient 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.*

Warning: *Changes or modifications not expressly approved by Monnit could void the user's authority to operate the equipment.*

RF Exposure



WARNING: To satisfy FCC RF exposure requirements for mobile transmitting devices, the antenna used for this transmitter must not be co-located in conjunction with any antenna or transmitter.

Monnit and ALTA Wireless Sensors:

This equipment complies with the radiation exposure limits prescribed for an uncontrolled environment for fixed and mobile use conditions. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and the body of the user or nearby persons.

All ALTA Wireless Sensors Contain FCC ID: ZTL-G2SC1. Approved Antennas

ALTA devices have been designed to operate with an approved antenna listed below, and having a maximum gain of 14 dBi. Antennas having a gain greater than 14 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

- *Xianzi XQZ-900E (5 dBi Dipole Omnidirectional)*
- *HyperLink HG908U-PRO (8 dBi Fiberglass Omnidirectional)*
- *HyperLink HG8909P (9 dBd Flat Panel Antenna)*
- *HyperLink HG914YE-NF (14 dBd Yagi)*
- *Specialized Manufacturing MC-ANT-20/4.0C (1 dBi 4" whip)*

Canada (IC)

English

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the Equivalent Isotropically Radiated Power (E.I.R.P.) is not more than that necessary for successful communication.

The radio transmitters (IC: 9794A-RFSC1, IC: 9794A-G2SC1, IC: 4160a-CNN0301, IC: 5131A-CE910DUAL, IC: 5131A-HE910NA, IC: 5131A-GE910 and IC: 8595A2AGQN4NNN) have been approved by Industry Canada to operate with the antenna types listed on previous page with the maximum permissible gain and required antenna impedance for each antenna type 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.

This device complies with Industry Canada licence-exempt RSS standard(s). 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.

French

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la Puissance Isotrope Rayonnée Équivalente (P.I.R.É) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteurs radio (IC: 9794A-RFSC1, IC: 9794A-G2SC1, IC: 4160a-CNN0301, IC: 5131A-CE910DUAL, IC: 5131A-HE910NA, IC: 5131A-GE910 et IC: 8595A2AGQN-4NNN) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne figurant sur la page précédente et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

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.

SAFETY RECOMMENDATIONS

READ CAREFULLY

Be sure the use of this product is allowed in the country and in the environment required. The use of this product may be dangerous and has to be avoided in the following areas:

- *Where it can interfere with other electronic devices in environments such as hospitals airports, aircrafts, etc.*
- *Where there is risk of explosion such as gasoline stations, oil refineries, etc.*

It is responsibility of the user to enforce the country regulation and the specific environment regulation.

Do not disassemble the product; any mark of tampering will compromise the warranty validity. We recommend following the instructions of this user guide for correct setup and use of the product.

Please handle the product with care, avoiding any dropping and contact with the internal circuit board as electrostatic discharges may damage the product itself. The same precautions should be taken if manually inserting a SIM card, checking carefully the instruction for its use. Do not insert or remove the SIM when the product is in power saving mode.

Every device has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (23 cm). In case this requirement cannot be satisfied, the system integrator has to assess the final product against the SAR regulation.

The European Community provides some Directives for the electronic equipments introduced on the market. All the relevant information's is available on the European Community website: <http://ec.europa.eu/enterprise/sectors/rtte/documents/>

Additional Information and Support

For additional information or more detailed instructions on how to use your Monnit Wireless Sensors or the iMonnit Online System, please visit us on the web at monnit.com/support.



Monnit Corporation
3400 South West Temple
Salt Lake City, UT 84115
801-561-5555
www.monnit.com