



Monnit 4G LTE Cellular Gateway User Guide

For 4G LTE CAT-M1/NB1 Cellular Gateway

IMPORTANT!

For best results, please wait to power on your LTE Cellular Gateway until after you have registered an account on iMonnit and added your gateway and sensors to the online system.

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I. ABOUT THE LTE CELLULAR GATEWAY

Monnit's LTE Cellular Gateway allows you to control settings for your sensors without needing additional IT infrastructure. All you need is a power source to monitor environment and equipment using Monnit's industry-leading devices. The 4G LTE Cellular Gateway communicates with sensors and iMonnit® to deliver data alerting you to conditions in a surrounding area.

LTE Cellular Gateways operate using the 4G LTE CAT-M1/NB1 cellular technology. The LTE Cellular Gateway is a specialized device with an incredible range. This advanced wireless IoT (Internet of Things) gateway accommodates multiple vertical IoT application segments and remote wireless sensor management solutions. Your gateway is equipped with the 24-hour backup battery.* Your standard Monnit Wireless Sensors will continue to communicate with the iMonnit system via cellular transmission in the event of a power outage. The LTE Cellular Gateway is ideal for applications without an existing wired internet connection or where existing infrastructure is dedicated to other resources.

* Actual time may vary depending on usage.

MONNIT LTE CELLULAR GATEWAY FEATURES

- True plug & play, no hassles for internet configuration set-up
- No PC required for operation
- Low-cost cellular service packages
- Remote software upgrade capability
- Local status LEDs with transmission and online status indicators
- Up to 50,000 sensor message memory
- AC power supply
- 24 hour battery backup in event of power outage
- Wireless Range: 250 – 300 ft. (non line-of-sight / indoors through walls, ceilings & floors) *

* Actual range may vary depending on environment.

EXAMPLE APPLICATIONS

- Remote Location Monitoring
- Shipping and Transportation
- Agricultural Monitoring
- Vacant Property Management
- Vacation Home Property Management
- Construction Site Monitoring
- Data Center Monitoring

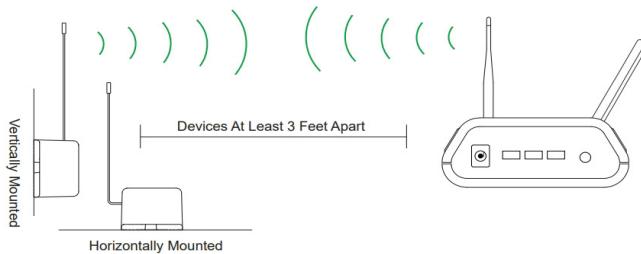
II. HOW YOUR GATEWAY WORKS

Your Monnit LTE Cellular Gateway manages communication between your sensors and iMonnit. When running, the gateway will periodically transmit data on a heartbeat. The gateway will store information received from sensors until its next heartbeat.

The Monnit LTE Cellular Gateway is a cellular gateway. It uses cellular towers to relay data received from sensors to iMonnit. Sensors communicate with the gateway, then the gateway relays information to the cloud.

For your wireless sensors to work optimally, orient all antennas for your sensor(s) and gateway(s) the same direction (typically vertical). Sensors must also be at least three feet away from other sensors and the wireless gateway in order to function properly.

More Signal



Less Signal



III. GATEWAY SECURITY

Security is paramount for the LTE Cellular Gateway when it comes to managing your environment and equipment. Great care and attention to detail has been taken to keep the exchange of data secure on the gateway and in gateway communications.

DATA SECURITY ON THE GATEWAY

Even when the data is at rest, the LTE Cellular Gateway is designed to prevent prying eyes from accessing the data. The Monnit LTE Cellular Gateway does not run on an off the shelf multi-function OS (operating system). Instead it runs a purpose specific real-time embedded state machine that can't be hacked to run malicious processes. It also provides 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.

GATEWAY COMMUNICATION SECURITY

Communication between your LTE Cellular Gateway and iMonnit is tightly secured by packet level encryption. The gateway and server establish a unique key using ECDH-256 for data encryption. The packet level data is encrypted end to end removing additional requirements to configure specialized cellular VPN's. The gateway can still operate within a VPN if it is present. Because all traffic is initiated from the gateway there is no special IP configuration needed for the gateway allowing it to operate with any 4G LTE CAT M1/NB1 enabled SIM provider.

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 of Premiere user of iMonnit. You can rest assured that your data is safe with iMonnit.

IV. GATEWAY 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 GATEWAY

You will need to enter the **Device ID** and the **Security Code** from your LTE Cellular Gateway in the corresponding text boxes. Use the camera on your smartphone to scan the QR code on your Gateway. If you do not have a camera on your phone, or you are accessing the online portal through a desktop computer, 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, no numbers. It can also be found on the barcode label of your gateway.

When completed, select the “**Submit**” button.

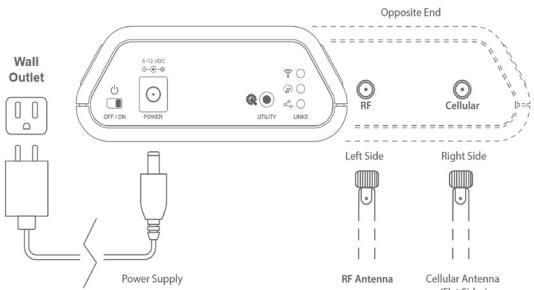


IMPORTANT: Add the gateway and all sensors to the iMonnit portal so that on boot, the gateway can download and whitelist the sensors from the account.

V. USING THE LTE CELLULAR GATEWAY

USING THE LTE CELLULAR GATEWAY

1. Connect your antennas to the gateway as seen in the below diagram.



2. Plug the power supply cord into an outlet.

3. After the three LED lights switch to green, your network is ready to use.

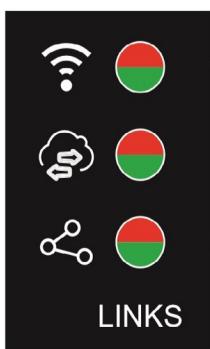
UNDERSTANDING THE GATEWAY LIGHTS

The gateway will enter three stages as it powers on:

Power-on stage: The gateway will analyze electronics and programming. The LED lights will flash red and green, before all becoming green for one second. In case of failure, the light sequence will repeat after ten seconds. Please contact technical support if the lights aren't green after two minutes.

Connection stage: The gateway will attempt to settle all operational connections. As the gateway first connects to the network, all other lights will be dark. A blinking green light indicates the gateway is attempting to make a tower connection. A flashing red light is a signal the cellular connection has encountered a problem.

Operational stage: All of the lights will remain green while powered externally, unless there is an issue. A blinking cellular link light is a signal that the gateway has encountered an issue in the cellular network.



Steady Green: Communication with sensors is OK.

Blinking Green: Active communication with sensors.

Steady Red: Sensor communication problem.

Steady Green: Last communication with Monnit's server was OK.

Blinking Green: Active communication with Monnit's server

Steady Red: Last communication with Monnit's server was unsuccessful.

Steady Green: Connected to the cellular network

Triple Blinking Green: Cellular Network Offline

Double Blinking Green: Scanning for Tower

Single Blinking Green: Activating Data Session

Blinking Green / Red: Low cellular signal

Blinking Red: Cellular connection error

LTE CELLULAR GATEWAY SETTINGS

The LTE Cellular Gateway will receive data from all sensors assigned to the network and within range, then return this data to the server in a series of heartbeats.

You can access gateway settings by selecting “Gateways” in the main navigation panel. Choose the LTE Cellular Gateway from the list of gateways registered to your account. Select the “Settings” tab to edit the gateway:

Settings

General Commands

Gateway Name A

Heartbeat Minutes (default: 15) B

IMSI C

ICCID D

IMEI E

Poll Rate Minutes (default: 0) F

Force Transmit on Aware G

Save

A. The **Gateway Name** field is where you assign your gateway a unique title. By default, the gateway name will be the type followed by the Device ID.

B. The **Heartbeat Minutes** configures the interval that the gateway checks in with the server. The default is fifteen minutes. So every fifteen minutes your gateway will report to the server.

C. The Global System for Mobile Communications utilizes a fifteen digit **IMSI** (International Mobile Subscriber Identity) number as the primary mode to identify the country, mobile network, and subscriber. It is formatted as MCC-MNC-MSIN. MCC is the Mobile Country Code. MNC is the Mobile Network Code attached to the cellular network. MSIN is a serial number making the IMSI unique to a subscriber.

D. The **ICCID** is the nineteen-digit unique identification number corresponding to the cellular SIM card. It is possible to change the information contained on a SIM (including the IMSI), but the identity of the SIM itself remains the same.

E. **IMEI** (International Mobile Equipment Identity) is a number exclusive to your 4G LTE Cellular Gateway to identify the gateway to the cell tower. The Global System for Mobile Communications network stores the IMEI numbers in their database (EIR - Equipment Identity Register) containing all valid cellular equipment.

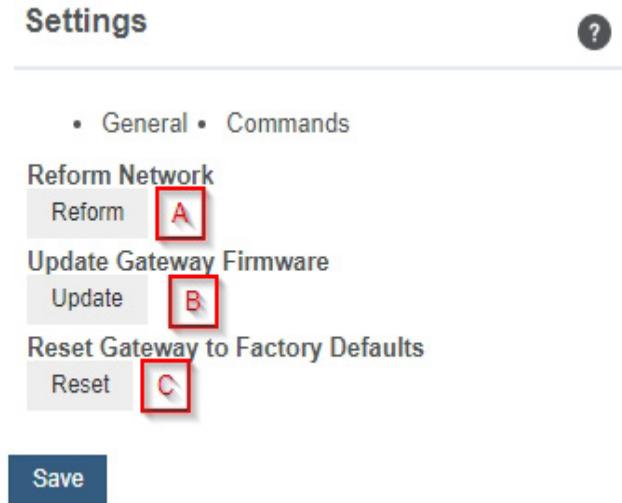
F. The **Poll Rate Minute** setting only applies if you are using Monnit Control or Monnit Local Alert. Here's how it works: to conserve cellular data, your gateway has a set heartbeat (meaning it only exchanges data with the iMonnit server once every fifteen minutes by default). If you are using Monnit Control or Monnit Local Alert, you may want to control equipment or receive local alerts more frequently. If you were to increase your gateway heartbeat, you would increase your data usage substantially.

Setting a poll rate allows your gateway to check for priority incoming messages more frequently—while using a fraction of the data of a regular message exchange. Your gateway asks the iMonnit server if there are any priority incoming messages, and if there are, they are exchanged immediately. If not, no messages are exchanged until your gateway has its next regular heartbeat.

G. **Force Transmit on Aware** means that if the sensors reach an aware state outside of the heartbeat interval, the gateway will immediately relay that data to the server instead of waiting the extra time it would take to reach the next heartbeat minute.

Commands

Choose the bullet for **Commands** located just under the Settings title to access the commands page.



A. Selecting the **Reform Network** command will trigger the gateway to remove all sensors from the internal whitelist, and then request a new sensor list from the server. This command will force all sensors to reinitialize their connection with the gateway.

Reforming the network cleans up communication when multiple networks are in range of each other so they are all in sync. This is especially useful if you must move sensors to a new network, and would like to clear these sensors from the gateway's internal list. Reforming the network will place a new list of sensors that will continue to exchange data.

B. If there are updates available for your gateway firmware, the **Update Gateway Firmware** button will appear, giving you the option to select it and install the latest firmware.

C. Choosing the **Reset Gateway to Factory Defaults** button will erase all your unique settings and return the gateway to factory default settings.

SUPPORT

For technical support and troubleshooting tips, please visit our support knowledge base 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 contact you within about 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 (Product) 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.

(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 Cellular Gateways:

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 23 cm between the radiator and the body of the user or nearby persons.

Monnit 4G LTE Cellular Gateway models starting with MNG-9-LTE-CCE and MNG-9-ELTE-CCE also contain module: FCC ID: XPY2AGQN4NNN

The system antenna(s) used with the device must not exceed the following levels:

- 3.67 dBi in 700 MHz, i.e. LTE FDD-12 band
- 10 dBi in 850 MHz, i.e. LTE FDD-5 band
- 6.74 dBi in 1700 MHz, i.e. LTE FDD-4 band
- 7.12 dBi in 1900 MHz, i.e. LTE FDD-2 band

All Monnit Wireless Sensors and Gateways Contain FCC ID: ZTL-RFSC1

Approved Antennas

The following antennas are approved for use with Monnit devices (required antenna impedance is 50 ohms.)

- Hyperlink HG905RD-RSP (5.1 dBi Rubber Duck)
- Pulse W1063 (3.0 dBi Rubber Duck)
- ChangHong GSM-09 (2.0 dBi Rubber Duck)
- Specialized Manufacturing MC-ANT-2014 OC (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.È) 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.

European Union - Directive 1999/5/EC

Monnit and ALTA 2G, 3G and 4G LTE Cellular Gateways have been evaluated against the essential requirements of the 1999/5/EC Directive.

Hereby, Monnit Corp., declares that Monnit and ALTA 2G, 3G and 4G LTE Cellular Gateways are in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

In order to satisfy the essential requirements of 1999/5/EC Directive, Monnit and ALTA 2G, 3G and 4G LTE Cellular Gateways are compliant with the following standards:

EN 60950-1:2006 +A11:2009, +A1:2010 +A12:2011, +A2:2013/IEC 60950-1:2005 EN 62311: 2008	Electrical Safety RED Article 3.1a
EN 301 489-1 V1.9.2 (2011-09) EMC/ RED Article 3.1b EN 301 489-3 V1.4.1 (2002-08) EN 301 489-7 V1.3.1 EN 301 511 V9.0.2	EMC/ RED Article 3.1b
ETSI EN 300 220-2 V3.1.1 (2017-02)	RF spectrum Efficiency RED Article 3.2

The conformity assessment procedure referred to in Article 10 and detailed in Annex IV of Directive 1999/5/EC has been followed with the involvement of the following Testing Body.

*Testing Body:
NEMKO CANADA INC
303 River Road
Ottawa, ON, Canada*

*Manufacturer:
Monnit Corp.
3400 South West Temple
Salt Lake City, UT 84115*

There is no restriction for the commercialisation of Monnit and ALTA 868MHz and 433MHz wireless products in all the countries of the European Union.



WARNING: ISM and WCDMA/HSPA/GSM/GPRS/EDGE antennas are considered integral to the Monnit Cellular Gateway and should remain fixed with 3 meters of the device during operation.

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.

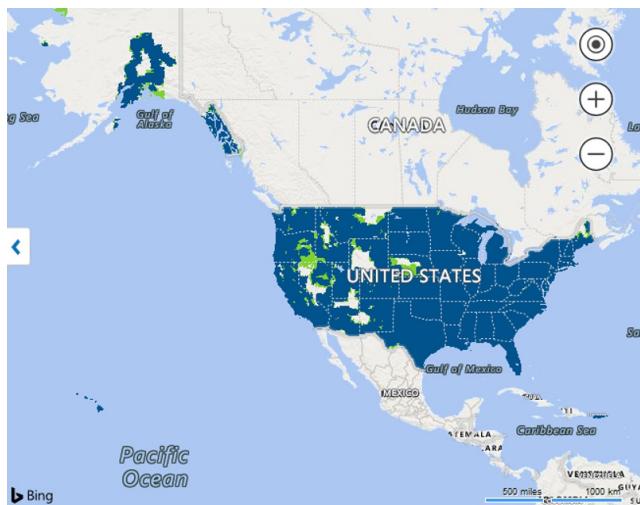
Every device has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (23 cm). In case this requirement cannot be satisfied,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

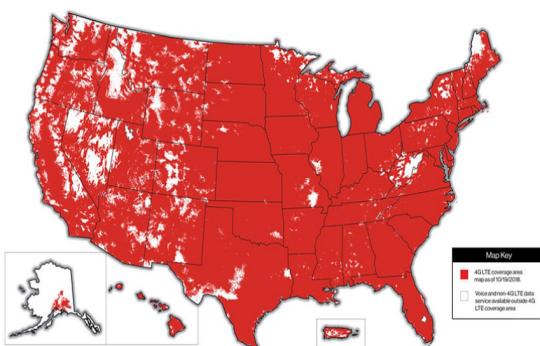
For additional information or more detailed instructions on how to use your Monnit Wireless Sensors or the iMonnit Online System, please visit us on the web at monnit.com/support.

Coverage Maps:



This map shows an approximation of wireless data coverage in the United States, Puerto Rico, and U.S. Virgin Islands.

Current as of 04/12/2019



Current as of 04/12/2019

MONNIT®

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