

# Wireless IOT gateway

3.7.3 - BTB1003-kal002



## Intended use

Wireless IoT Gateway is an energy-efficient IoT gateway which transfers data from RuuviTag beacons to the KaltIoT Smart Tracker Service.

The Wireless IoT gateway hardware is based on Iprotoxi's Aistin Gateway.

The Gateway operates on the 4G cellular network and makes an always-on connection to the Service.

### Flow of normal usage:

1. After successful connection to the Service, the gateway scans devices at the configured interval
2. When the Gateway receives data from RuuviTags, the gateway fetches the payload and sends those payload values to the Service
3. If a RuuviTag sends a broadcast with the flag "data available", the gateway will make a connection to RuuviTag, read the data and send it to the Service. The gateway will wait until the Service responds that data was received, then the Gateway will delete old, transferred data from the RuuviTag. After that, the Gateway will send new configuration parameters to the RuuviTag.

When the gateway is transferring data to the Service, the blue LED flashes quickly (1x per second).

The gateway is also able to receive data which is resent by a RuuviTag.

### Currently supported payload:

- Temperature
- Humidity
- Air pressure
- Motion detected (Boolean true/false)
- Current timestamp
- Received signal strength (RSSI value)
- External sensor (when configured)

### Features

- Firmware update Over The Air (OTA)
- 4G NB-IoT / CatM1 (LTE-M) radio connectivity
- Internal sensors (chip temp)
- External or internal antenna variants
- External power supply connector (4.2-8VDC)

### Configurable parameters (default values are in parentheses):

- Scanning interval (60s)
- Scanning listening period (10s)
- Gateway broadcast interval (1s)
- connection timeout (60s)
- MqClient internal statistics (20m)
- MqClient keepalive interval (280s)
- Status update interval (1001s)
- Logger support enabled/disabled (enabled)
- Network mode NB-IOT/LTE-M (LTE-M)
- Network preferred operator manual/auto (auto)
- Network retries before change network mode/operator (2 times)
- Power saving eDRX 0/10/40 (40s)
- Network resurrect timer after reconnect (60s)
- Network idle shutdown timer - modem reboot if connection open but no data (100s)
- Network offline watchdog timer - device reboot if connection offline (3600s)

## Hardware description and technical specification

- Chip: Nordic Semiconductor nRF52840 (SoC) ARM Cortec-M4F
- Memory 1MB Flash, 256KB RAM
- Connectors: external power source for cables 14-22AWG (tinned) 4.2 - 6.5VDC in
- Variants: internal or external antenna (SMA connectory type)
- Indicators: red/blue LED
- Internal battery: 3000mAh Li-Po (re-chargeable)
- Battery life: Varies dramatically depending on configuration and use case.
  - operating only on internal battery: about 2 weeks is typical with power-efficient usage

- with external 6v 50AH battery: about 12 months is typical with power-efficient usage
- SIM card: nano
- Operating Temperature: -30°C - +65°C
- Operating Humidity: 10%-90% RH
- Dimensions
  - With internal antenna: 140mm x 58mm x 32mm (L x W x H)
  - With external antenna: 240mm x 58mm x 32mm (L x W x H)
  - Weight: 140g

## Installation

### SIM card:

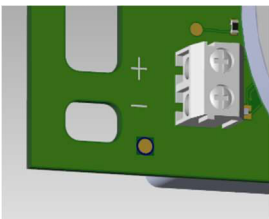
- Disconnect internal battery and external power before removing or inserting SIM card
- Nano SIM card

### Internal battery:

- Pre-charged Internal battery must be connect to gateway by using JT2 connector
- Red wire to positive (+)
- Black wire to negative (-)
- Internal battery is empty when 2.9V DC, It can be re-charged with external Li-Po driver

### External battery connector:

- Support cables between 14-22AWG wires.
- Input voltage to the connector 4.2-6.5V DC (8v max).
- Open wires should be tinned before connection.
- Strain relief must always be used, for example small cable ties.
- Polarity + for positive and – for negative wires
- Screw driver 0,5 x 3.0mm



### Other

- Case is closed by four screws with PH1 screw driver
- Antenna must be always connected when gateway is powered

### External batteries

Zinc air alkaline battery is optimal for IoT solutions.



When installing a battery, the connector cover must be removed from the battery.



When placed in a box, the connectors must facing up



Cabling:

- EU (brown-blue) cables brown is marked as a Load (L, + or positive)
- US (black-white) cables black is marked as a Load (L, + or positive)

## Operating

There are two different user interfaces available

- LED Indicators: red/blue colors

### What the LEDs mean

- RED flash once per four second (1/4s): Gateway offline, not active (check batteries)
- RED flash once per second (1/s): Gateway offline, trying to connect network
- BLUE flash once per second (1/s): Gateway online, Connection online, data transferring ongoing

- BLUE flashes quickly 1-4 times: Gateway online, Connection online, data transferring idle, Those fast flashes indicates RSRQ (received 4G signal quality) level as follows:
  - 1 BLUE flash: RSRQ value between 0-10 (very poor network)
  - 2 BLUE flashes: RSRQ value between 11-20 (poor network)
  - 3 BLUE flashes: RSRQ value between 21-30 (OK network)
  - 4 BLUE flashes: RSRQ value between 31-40 (good network)
  - After those, there is 3 second pause and then RSRQ measurement start again

## Repair / maintenance

### Internal battery

- The batteries are considered hazardous waste and should be disposed of properly
- Li-Po batteries can be recharged with special Li-Po drivers
- It is recommended to not charge Li-Po batteries at temperatures under 0°C, as this may reduce battery life

### Antenna

- Try to avoid operating the gateway when the antenna is disconnected. It causes significantly increased power consumption because the modem increases transmitting power because of poor radio connectivity.

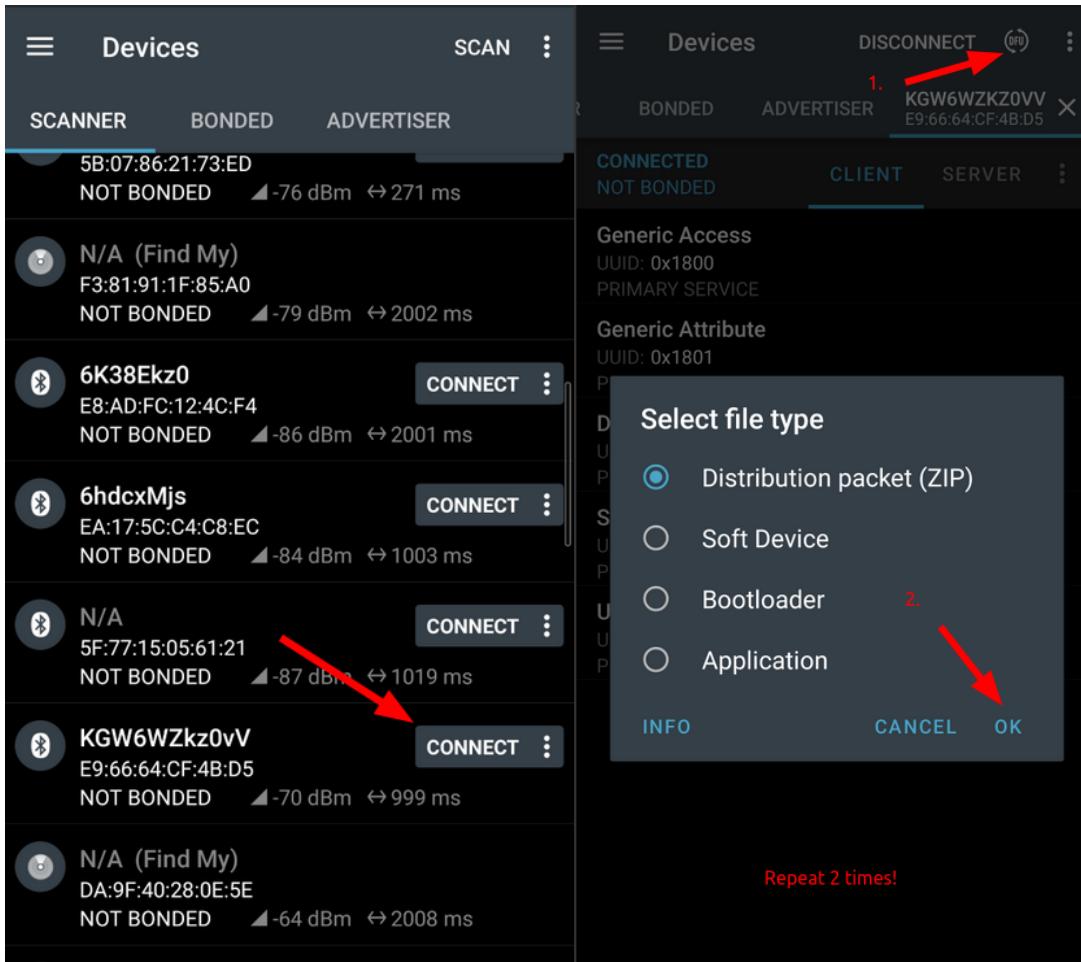
### Rebooting the gateway

- Disconnect both the internal battery and any external power source for at least 5 seconds.

### Updating the gateway

Gateway firmware can be updated by the vendor using Over-The-Air (OTA) method. If you have access to the latest distribution package. For example, using nRF Connect mobile application.

The name of the wireless IoT gateway always starts with the letters KGW.



## EU Declaration of Conformity

## EU Declaration of Conformity

1. **Product model:** Aistin BTB1003

2. **Name and address of the manufacturer or his authorised representative:**

iProtoXi Oy  
Teknologiantie 18  
90590 OULU  
+358 20 1555 533  
info@iprotoxi.fi

3. **This declaration of conformity is issued under the sole responsibility of the manufacturer.**

4. **Object of the declaration:**

Equipment: Sensor Unit  
Brand name: Aistin  
Model/type: BTB1003  
Other descriptive information

5. **The object of the declaration described above is in conformity with the relevant Union harmonization legislation:**

General product safety directive 2001/95/EC  
radio equipment directive 2014/53/EU (RED)  
Electromagnetic Compatibility Directive (EMC) 2014/30/EU,  
Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU,

6. **References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:**

EMC: EN 55032  
EN61000 4-3

RoHS: EN 50581:2012

7. **Signed for and on behalf of:**

Oulu 30.11.2020

iProtoXi Oy

  
\_\_\_\_\_  
Janne Kallio, CEO