pozyx®

Accurate Positioning

Wearable Tags:

Wearable Tracking Tag
Wearable Interactive Tag

USER MANUAL

v1.2, 2022-02-10

Contents

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1 Foreword

Please read this manual carefully before using the product. Do also read and follow instructions from "operator" or "licensee" applicable to the specific installation.

For best possible performance, continuous satisfactory safe operation, read and understand these instructions thoroughly before operating your equipment.

2 Disclaimer

The information, instruction, and parts listed are applicable and current on the date when issued. Pozyx reserves the right to make changes without prior notice.

3 Note to Operator

It is the operator's responsibility to see that any person involved with the use or operation of this equipment follows all safety and operational instructions. Under no circumstances should this equipment be used if the equipment is faulty or the operator does not completely understand the operation of the equipment.

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4   About this Manual

4.1   Audience

This manual is intended for users of the Wearable Tags in conjunction with the Pozyx Enterprise System. Any other use outside of the system is deemed incompliant and will void any warranties of the tag, system, or any Pozyx hardware.

4.2   Copyright

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4.3   Revision History

Release Date	Revision	Remarks
2021-05-21	1.0	Initial release
2022-01-07	1.1	Text corrections and certification data
2022-02-10	1.2	Text corrections, updated cover page and addition of figures 1 & 2

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5 Overview

The Pozyx Wearable Tag **tracks people** as part of the Pozyx infrastructure. Tags send their location data to Pozyx Anchors that in turn process the information and send it to the Gateway to make a stream of real-time coordinates available. The Wearable Tag has been designed to make it easy for personnel to carry it around, with clip-on, bracelet, and lanyard options. It comes in two variants, a standard *Tracking* version and an *Interactive* version that features a push button and a status LED.

Figure 1 Wearable Tracking Tag

Figure 2 Wearable Interactive Tag

The Wearable works within the **Pozyx Enterprise system** and requires an infrastructure of Anchors, switches, and a Gateway to accurately and correctly translate positions in a stream of real-time coordinates.
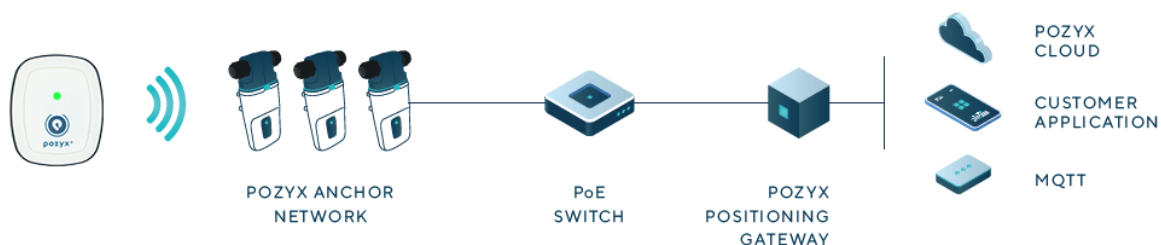

Figure 3 Pozyx Enterprise System Architecture

The Pozyx architecture comprises three main parts:

•   A **network of anchors and tags**. This network consists of two types of devices: tags and anchors. The tag is a *mobile* device used to track the positions of an asset or person in real time. An anchor is a signal capturing device on a *fixed*, well-known position.
•   A **local gateway**. This device is the positioning server and connects to the Anchors via Ethernet. It gathers all the data received from the Anchors and transforms it into a position. By connecting to the gateway, users can receive the real-time positioning data.

- The Pozyx **web application**. The web application is a visual interface to configure and manage the Pozyx system. It can be run locally from the gateway itself or from the Pozyx cloud.

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6   General Technical Specifications

For extensive technical specifications, please consult the **Pozyx Wearable Tag Datasheet**.

Parameter	Information
UWB protocol	TDoA
Power	3V / 600 mAh battery
Battery Type	CR2450 coin cell
Memory	4kbit EEPROM via NFC
Sensors	Accelerometer (3-Axis 2g 10bits, (1.6 to 25Hz))
Connectivity	UWB/NFC
Dimensions	50 x 42 x 15
Weight	21 g
Ingress protection	IP65 (tracking variant only)
Autonomy	17 months at 1 Hz 2.5 months at 10 Hz

7   Using Tags

7.1   Carrying Tags

The Wearable Tags are designed to be used by personnel and come with a variety of options to make it easy to carry the tag.

Figure 4 (left to right) Wearable tracking tag with a clip-on, Wearable Interactive tags with bracelet, and eyelet for lanyard

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Any Wearable Tag carrying option can easily be changed by swapping the components of the back cover:

Figure 5: (left to right)Wearable tag with no accessories, clip-on, and eyelet for lanyard

To change the tag to a clip-on, lanyard eyelet, or bracelet strap version, take the following steps:

1. Use a spring bar tool and place it on either side opening of the top part
2. Carefully push the telescopic end of the spring bar in and gently lift the spring bar tool up to remove both the spring bar and the plastic part.
3. Take the clip-on, eyelet, or strap and place the spring bar inside.
4. Place either edge of the part with the eyelet inside in the back cover of the Wearable Tag.
5. Use the spring bar tool to push in the other telescopic end and carefully press the part down into place, let the telescopic end push against the case and push down until you hear a click.

7.2   Replacing the Battery

The Wearable Tag uses a 3V / 650mAh CR2450 coin cell battery that can easily be replaced.

1. Turn over the Wearable Tag with the back facing up towards you.
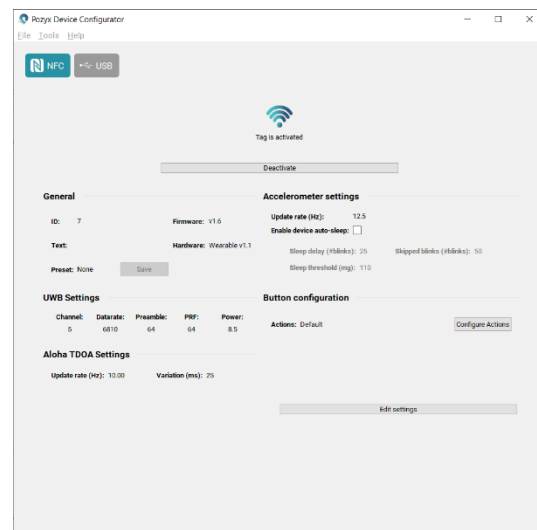2. Use a Torx T6 screwdriver and remove the 4 screws to lift the back cover.
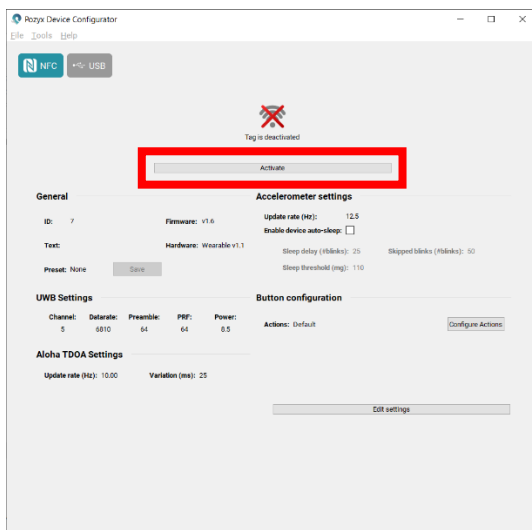
3. Remove the battery from the battery holder.

4. Place the new CR2450 coin cell battery in the battery holder, positive side up.

5. Make sure the PCB is well aligned on the pins inside the casing again and put the back cover in place.

6. Tighten the 4 screws again to fix the back cover.

7.3   Initializing Tags

To start using Wearable Tags in your Pozyx Enterprise setup, each tag needs to be activated though an NFC reader and the Pozyx Device Configurator.
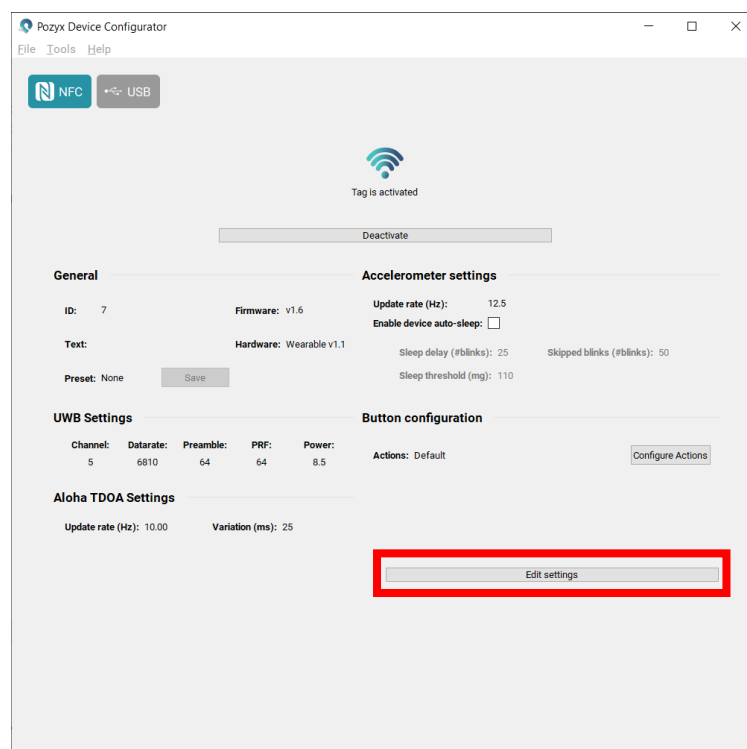
1. Download the Pozyx Device Configurator from the Pozyx website:

    a. https://pozyx.io/products-and-services/device-configurator/

2. Install the Pozyx Device Configurator.

3. Connect an NFC reader to your computer.

4. Place the Industrial Tag face down on the reader, with the back facing you.

5. Open the Pozyx Device Configurator and select **Activate** to activate the Tag

7.4   Modifying Tags

A number of Tag settings can be modified using the Pozyx Device Configurator. It can be used to change the tag's positioning protocol (TDOA or TWR), its ID, its UWB settings, and its positioning parameters such as update rate and more.

1. Place the Wearable Tag face down on the NFC reader, with the back facing you.

2. Open the Pozyx Device Configurator and select **Edit settings** at the bottom of the screen.

3. The settings can now be modified

The following settings can be modified:

- **General settings**
  - *ID:* the ID will be used throughout our whole application stack, in the web application and in the MQTT stream.
  - *Text:* assigns a text label to a tag that is visible in the web app
  - *Presets:* allow you to save a combination of settings in a preset, which you can easily apply to a different tag. The saved settings are: Aloha TDOA settings, Accelerometer settings and Button configuration

- **Aloha TDOA settings**
  - *Update rate:* allows you to change the number of times per second a new positioning transmission is sent. One position transmission is called a '**blink'**. The variation is a parameter to reduce the possibility of packet collisions between multiple tags. Keeping this to **10 ms** should be fine in most cases.
  - *Variation*
- **Accelerometer settings**
  - *Update rate:* allows to change the accelerometer update rate. The accelerometer is configured independently from the positioning update rate (= TDOA update rate), but we recommend that the TDOA update rate and the update rate of the accelerometer are roughly aligned as **one TDOA blink can contain a maximum of 28 accelerometer measurements**. This means that e.g. if we have an accelerometer update rate of 25 Hz and a TDOA update rate of 0.5 Hz, 50 measurements will need to be sent in one blink. If this situation occurs, the tag will throw away the first 22 measurements and only transmit the last 28 measurements. If you don't want to lose any accelerometer updates, make sure your update rates comply to the following formula: (Accelerometer update rate (Hz))/(TDOA update rate (Hz)) < 28
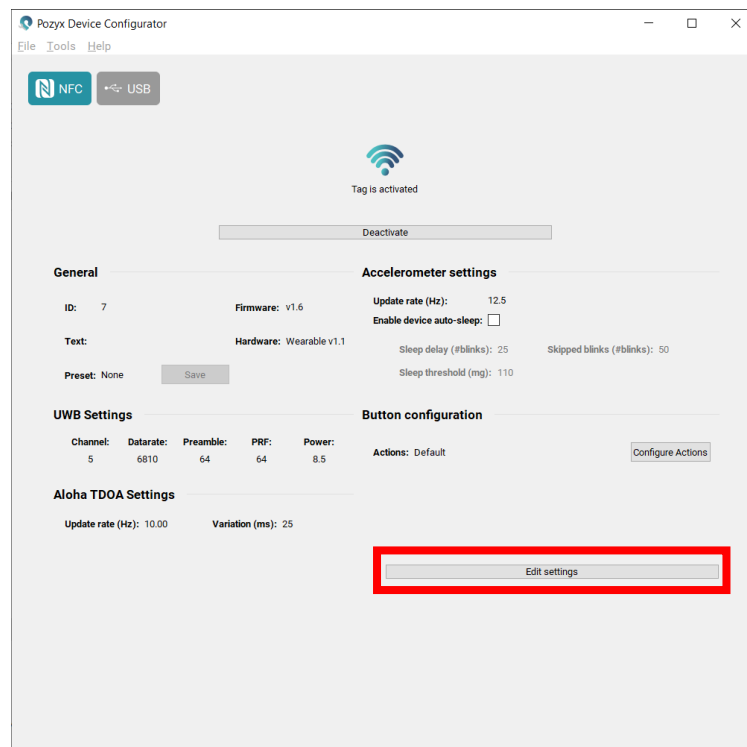 - *Auto sleep:* allows you to change the sleep settings. The accelerometer can also be used to control a sleep functionality. When the tag is sleeping it will decrease its update rate to save battery life. The sleep mode functionality is configurable by the following settings:
    - **Sleep delay**: the tag can only go into sleep mode if it is not moving for at least a number of blinks equal to the sleep delay.
    - The **sleep threshold** setting determines the amount of movement required for the tag to remain active.
    - **Skipped blinks** gives the number of blinks that will be left out and not sent when the tag is in sleep mode.

7.5   Configuration of the Button (Interactive variant)

The Wearable Tag *Interactive variant* includes extra settings for the button and LED configuration. The button can be used to:

- Turn the Tag on- and off
- Cycle between states
- Send out events

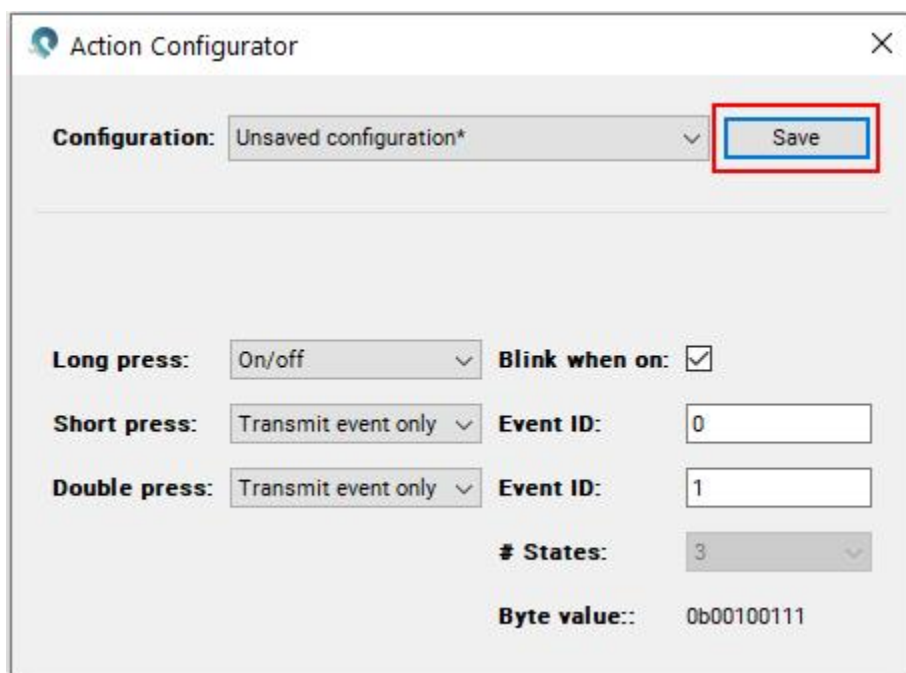1. To change the button configuration, start by pressing Edit Settings:

2. After pressing the Edit Settings button you have the option to select one of the preconfigured button configurations in the Actions field:
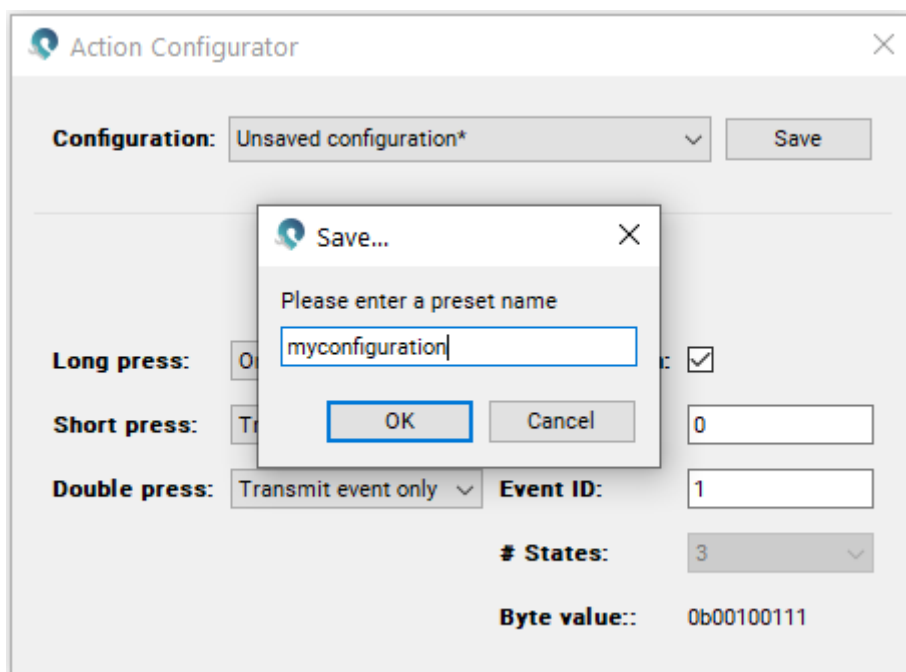
- **Off (LEDs on):** When you select this button configuration the button will be disabled but the LED will still blink to indicate that the tag is powered on.
- **Off (LEDs off):** When you select this button configuration the button will be disabled and the LED will no longer blink. You won't have an indication about whether the tag is powered on or off.
- **Default:** See the Action Configurator section for information about the default button behavior.

You can also change the button behavior completely by pressing the Configure Actions button. When you click on this button you will get a pop up in which you can create a new button configuration. More information about this screen can be found below in the Action Configurator section.
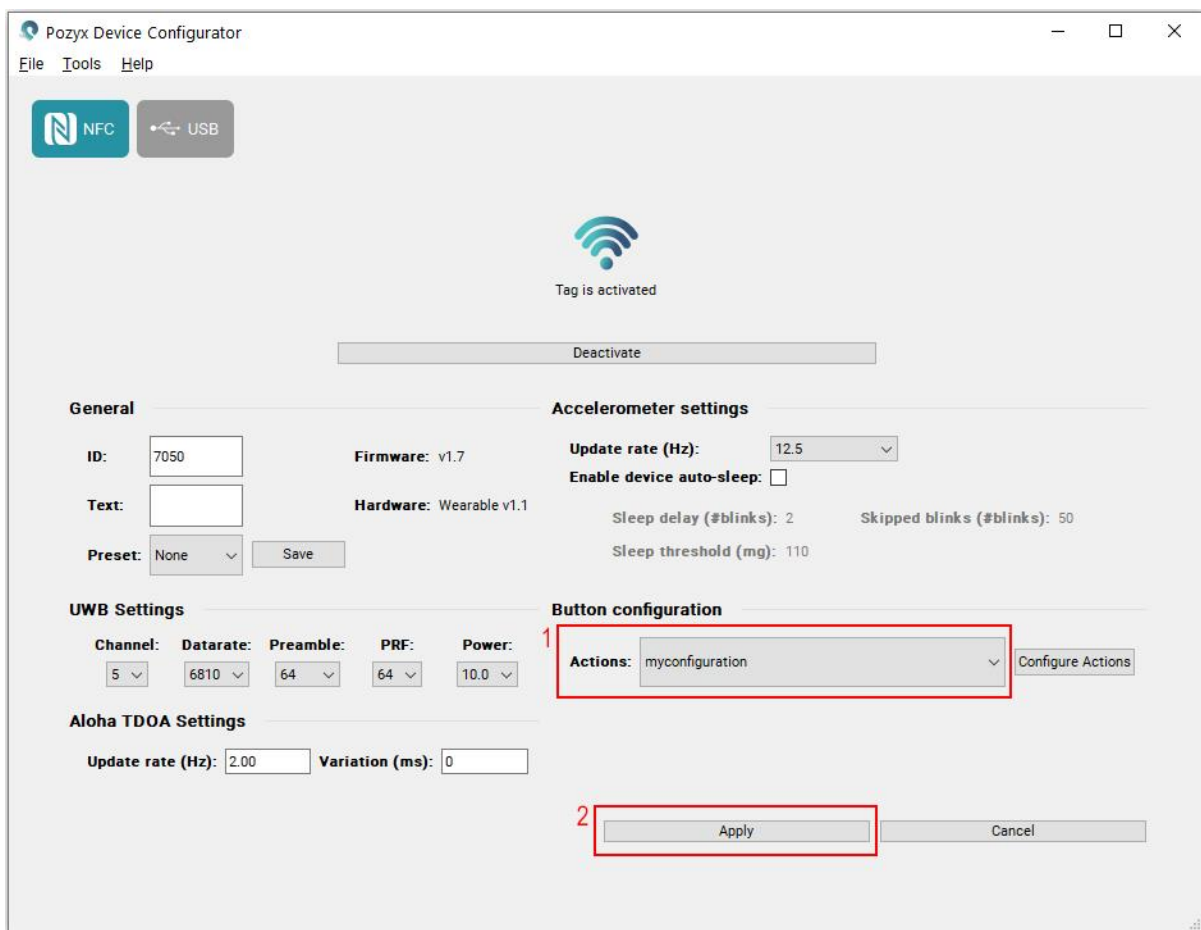
After configuring the button behavior you'll need to press the save button:
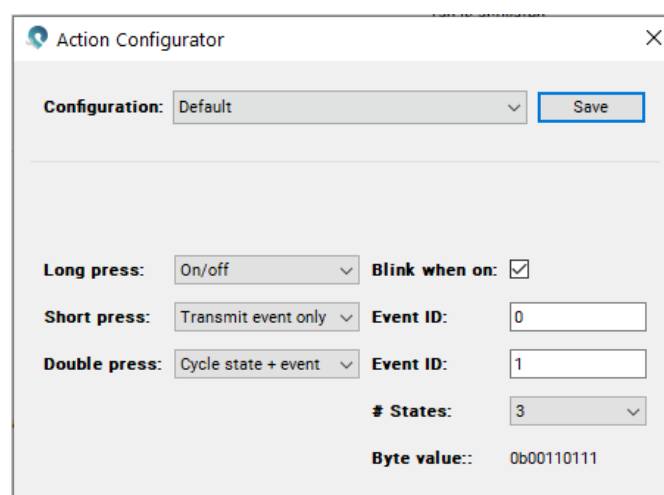
Give it a name:

And then select your new configuration on the main screen and click Apply:

Action configurator

By default the button behavior will be configured as follows:

- Long pressing the button will turn the tag on/off.

- Short pressing the button will send out an event (with ID 0). This event is visible in the MQTT stream.
- Double pressing the button will put the tag in the next state and also send out an event (with ID 1). This event is visible in the MQTT stream.

Long, short, and double pressing are defined as:

Press Type	Description
Long Press	Press and hold the button for 3 seconds
Single Press	Push the button for less than 1 second
Double Press	Push the button twice in half a second

LED Behavior

Depending on the button configuration the following table gives the LEDs behavior per action:

Press Type	Action	
Long Press	Power on	Green LED lights up for 1 second
	Power off	Red LED lights up for 1 second
Single Press	Transmit event only	Green LED blinks 1 time
Double Press	Transmit event only	Green LED blinks 2 times
Single/Double Press	Cycle state + event	Color of the state gets blinked. State 1: Green State 2: Blue State 3: Red

Battery Impact

Lower TDOA update rates provide the best battery life. The same is true for the accelerometer update rate; the more updates that are sent the more the tag will use its battery capacity. Disabling the LED to blink every second will also slightly improve the battery life.

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8   Disposal

When the product reaches end of life, dispose it properly in accordance with local laws and regulations.

Disposal of the packaging material
(EU directive 94/62/EC on packaging and packaging waste)
This marking indicates that the product's packaging material can be recycled.

Disposal of this product

(EU directive 2012/19/EU on Waste Electrical & Electronic Equipment)
This marking on the product, accessories or literature indicates that the product and its electronic accessories (e.g. AC/DC convertors) should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.
Household users should contact either the supplier where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling.
Business users should contact their supplier and check the terms and conditions of the purchase contract. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.

Please contact the local municipal office for information on the nearest recycling station.

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9 Regulatory Information

9.1 FCC Compliance Statement

This device complies with Part 15 of the FCC Rules:
Operation is subject to the following 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.

CAUTION: Changes and Modifications not expressly approved by Pozyx NV can void your authority to operate this equipment under Federal Communications Commission rules.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. 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 radiocommunications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The device complies with the requirements set forth in CFR 47 Sections 2.1091 for an uncontrolled environment.

9.2 ISED Compliance Statement

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s).
Operation is subject to the following two conditions:
1. This device may not cause interference.
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.
- l'appareil ne doit pas produire de brouillage
- l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The device has been found to be compliant to the requirements set forth in Industry Canada RSS-102 for an uncontrolled environment.

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