



Accurate Positioning

# Wearable Tags:

Wearable Tracking Tag

Wearable Interactive Tag

USER MANUAL

v1.4, 2022-05-12



# Contents

<b>Contents</b> .....	<b>2</b>
<b>1 Foreword</b> .....	<b>3</b>
<b>2 Disclaimer</b> .....	<b>3</b>
<b>3 Note to Operator</b> .....	<b>3</b>
<b>4 About this Manual</b> .....	<b>4</b>
4.1 Audience .....	4
4.2 Copyright .....	4
4.3 Revision History.....	4
<b>5 Overview</b> .....	<b>5</b>
<b>6 General Technical Specifications</b> .....	<b>7</b>
<b>7 Using Tags</b> .....	<b>8</b>
7.1 Carrying Tags.....	8
7.2 Replacing the Battery .....	9
7.3 Activating Tags .....	9
7.4 Configuring Tags.....	10
7.5 Configuration of the Button (Interactive variant only) .....	12
<b>8 Ordering information</b> .....	<b>17</b>
<b>9 Disposal</b> .....	<b>17</b>
<b>10 Regulatory Information</b> .....	<b>18</b>
10.1 FCC Compliance Statement .....	18
10.2 ISED Compliance Statement.....	18
10.3 CE Compliance Statement.....	19
10.4 UKCA Compliance Statement .....	19

## 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.



## 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

All rights reserved. No part of this document may be reproduced or transmitted in any way or shape be it, electronic, mechanical, photocopying, recording, or otherwise, without the express prior written permission of the publisher.

For information on getting permission for reprints and excerpts, contact POZYX NV. The content and illustrations are subject to change without prior notice.

### 4.3 Revision History

Release Date	Revision	Remarks
2021-05-21	1.0	<i>Initial release</i>
2022-01-07	1.1	<i>Text corrections and certification data</i>
2022-02-10	1.2	<i>Text corrections, updated cover page and addition of figures 1 &amp; 2</i>
2022-05-12	1.3	<i>Update Technical specifications</i>
2022-06-29	1.4	<i>Update Technical specifications</i>



## 5 Overview

A Pozyx Wearable Tag **tracks people** as part of the Pozyx infrastructure. Tags send their location data to Enterprise Anchors that in turn process the information and send it to the Positioning Server 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 optional 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 Tags work within the **Pozyx Enterprise system** and require an infrastructure of anchors, switches, and a Positioning Server to accurately and correctly translate positions in a stream of real-time coordinates.

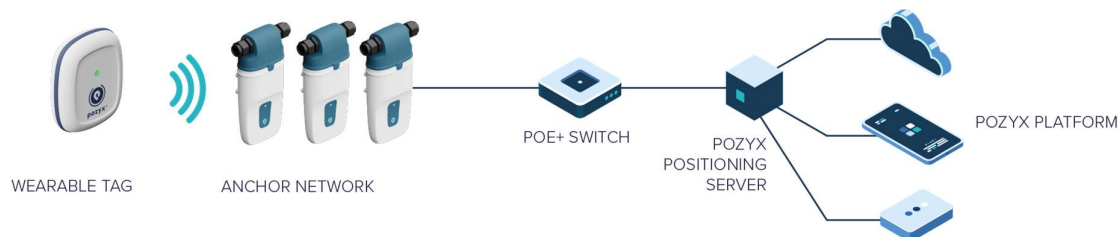


Figure 3 Pozyx Enterprise System Architecture

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 **Positioning Server**. This device 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 Positioning Server, 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 RTLS system. It can be run locally from the Positioning Server itself or from the Pozyx cloud.



## 6 General Technical Specifications

General specifications:

Parameter	Information
<b>Supported UWB channels</b>	Channel 5, Channel 2 (for licensed customers in Europe)
<b>UWB bandwidth</b>	> 500 MHz
<b>UWB data rate</b>	6.81 Mbps
<b>UWB Transmit power density</b>	< -41.3 dBm/MHz
<b>UWB protocol</b>	TDoA
<b>Battery Type</b>	CR2450 coin cell (3V/620mAh)
<b>Sensors</b>	3-axis Accelerometer
<b>Accelerometer update rate</b>	1.6/12.5/25Hz
<b>Connectivity</b>	UWB, RFID/NFC
<b>Dimensions</b>	50 x 42 x 15
<b>Weight</b>	23 g
<b>Ingress protection</b>	IP65 (Tracking variant) IP20 (Interactive variant)
<b>Certifications</b>	CE, FCC, ISED, UKCA
<b>Operating conditions</b>	-25 to +55 °C
<b>Storage conditions</b>	-30 to +70 °C

Battery lifetime Tracking Tag:

Update rate (Hz)	Default(*)	Auto-sleep (**)
<b>0.2</b>	5 years	>5 years
<b>0.5</b>	31 months	>5 years
<b>1</b>	21 months	>5 years
<b>10</b>	3 months	22 months

Battery lifetime Interactive Tag:

Update rate (Hz)	Default(*)	Auto-sleep (**)
<b>0.2</b>	4.5 years	5 years
<b>0.5</b>	26 months	>5 years
<b>1</b>	18 months	>5 years
<b>10</b>	3 months	22 months

(\*) Lifetimes valid at room temperature under controlled conditions

(\*\*) Auto-sleep feature enabled, value for a tag being static 90% of the time and with a static blink rate configured to 0.1 Hz



## 7 Using Tags

### 7.1 Carrying Tags

The Wearable Tags are designed to be used by persons 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



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





## 7.2 Replacing the Battery

The Wearable Tag uses a 3V/620mAh 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 to remove the 4 screws, and lift the back cover.



3. Remove the board from the top shell
4. Push the coin cell out of the battery holder.
5. Place a new CR2450 coin cell battery in the battery holder, positive side up.
6. Place the board back in the top shell. Make sure the board is well aligned on the pins inside the casing and put the back shell in place.
7. Tighten the 4 screws again to fix the back shell.

## 7.3 Activating Tags

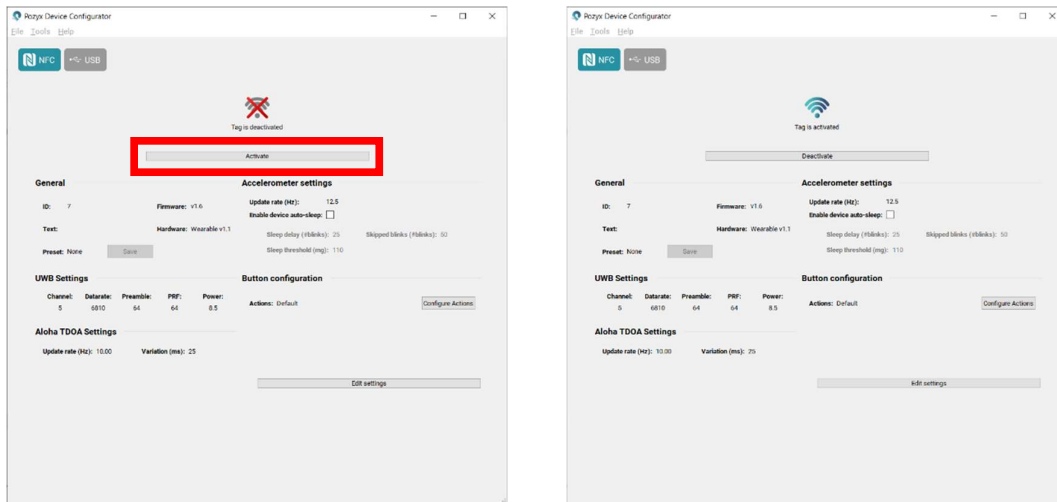
To start using Wearable Tags in your Pozyx Enterprise setup, each tag needs to be activated through a NFC reader and the Pozyx Device Configurator application. The application can also be used to change the tag ID, the tag UWB settings, and the tag positioning parameters such as update rate and more.

The procedure to activate a tag is:

1. Download the Pozyx Device Configurator from the Pozyx website:  
<https://pozyx.io/products-and-services/device-configurator/>
2. Install the Pozyx Device Configurator.



3. Connect a NFC reader to your computer.
4. Start the Pozyx Device Configurator application.
5. Place the Wearable Tag face down on the reader, with the back facing you.
6. Open the Pozyx Device Configurator and select **Activate** to activate the Tag



Once activated the display will change. The same procedure can be used to deactivate a tag.

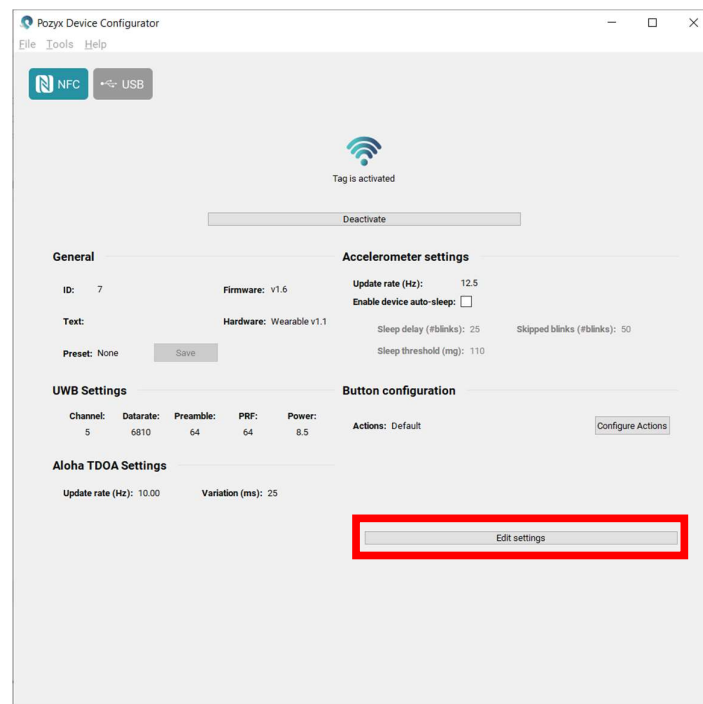
## 7.4 Configuring Tags

A number of Tag settings can be modified using the Pozyx Device Configurator. Examples are the tag ID, the tag UWB settings, and the tag positioning parameters such as update rate and more.

The procedure to configure a tag is:

1. Connect a NFC reader to your computer and open the Pozyx Device Configurator application.
2. Place the Wearable Tag face down on the NFC reader, with the back of the tag facing you.
3. Open the Pozyx Device Configurator and select **Edit settings** at the bottom of the screen.

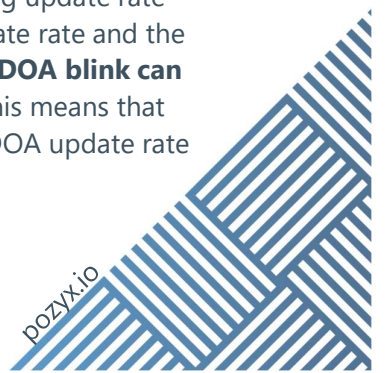




4. The settings can now be modified

The following settings can be modified:

- **General settings**
  - *ID*: the ID will be used throughout the whole RTLS 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: UWB settings, 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**'.
  - *Variation*: 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.
- **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.

The latest information on the Tag configuration can be found at <https://docs.pozyx.io/enterprise/configuring-the-tags>.

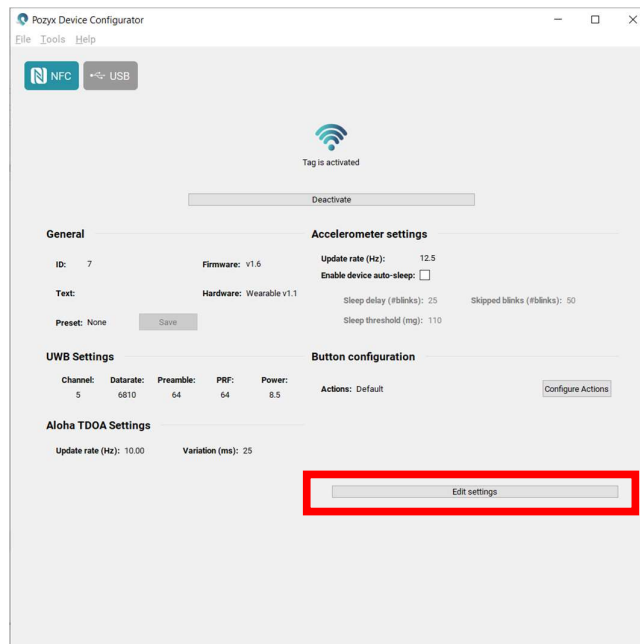
## 7.5 Configuration of the Button (Interactive variant only)

The Wearable Interactive Tag 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:



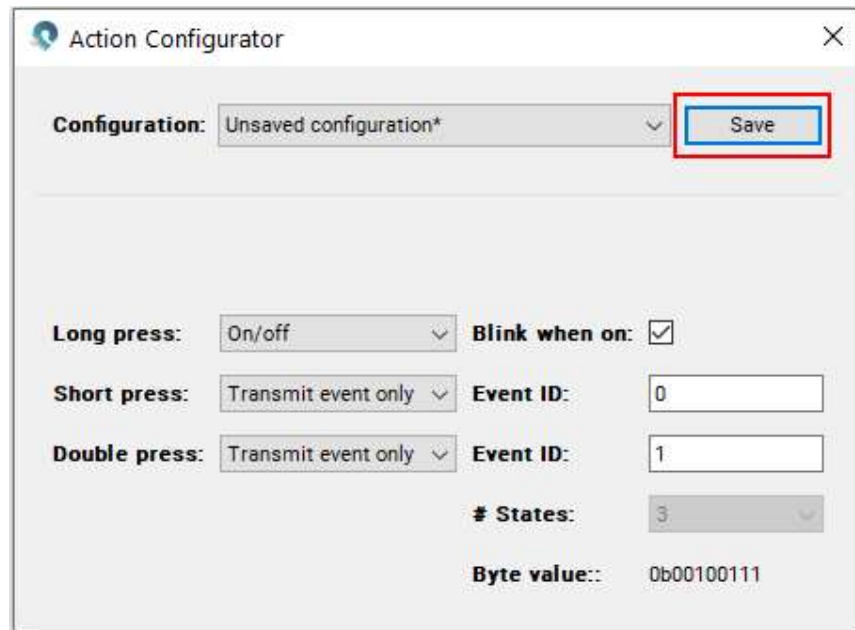


2. After pressing the Edit Settings button you have the option to select one of the preconfigured button configurations in the Actions field:
  - **Off (LEDs on):** When you select this button configuration the button will be disabled but the LED will still blink to indicate that the tag is powered on.
  - **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.

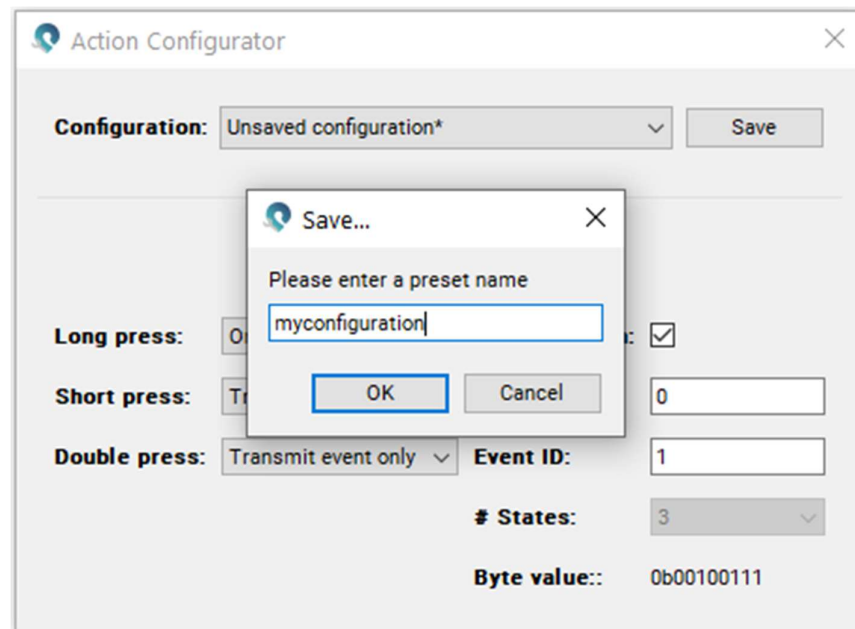
The button behavior can be changed completely by pressing the Configure Actions button. When you click on this button you will get a pop up in which you can create a new button configuration. More information about this screen can be found below in the Action Configurator section.

After configuring the button behavior you'll need to press the save button:



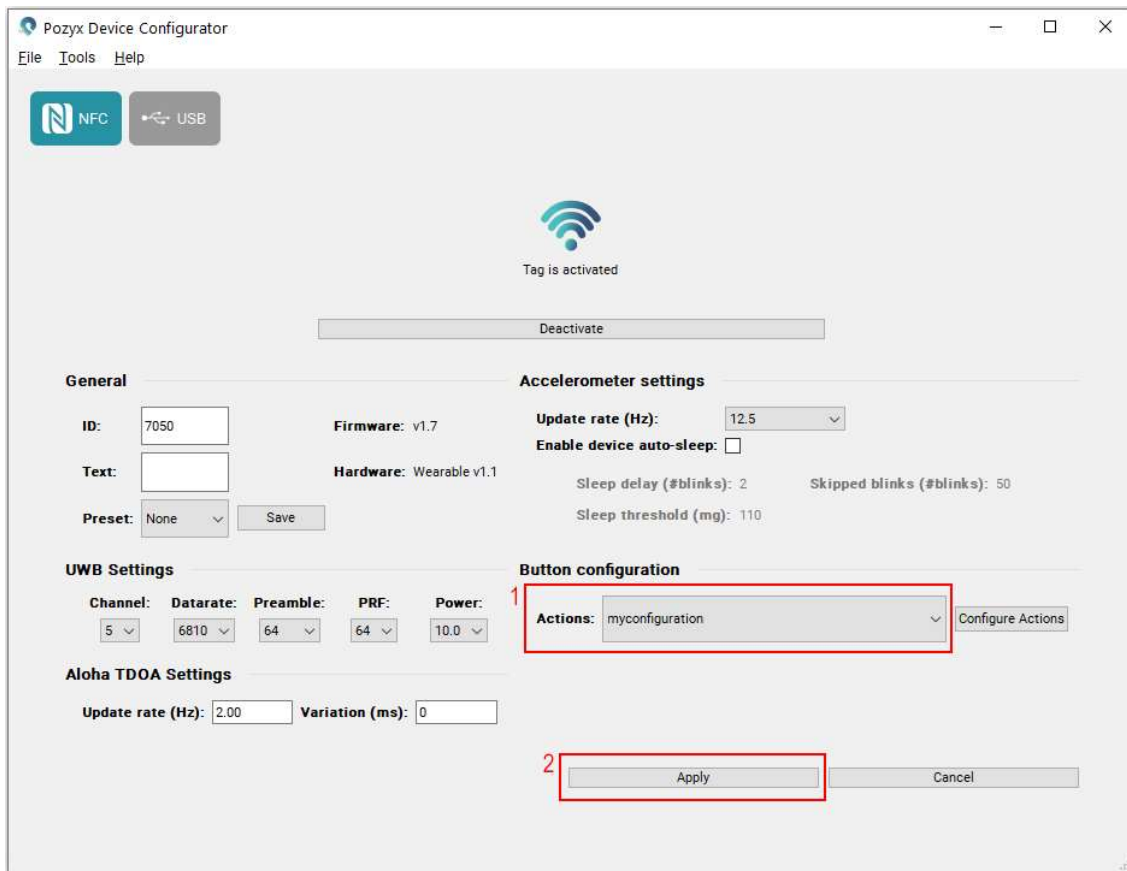


Give the configuration a name:



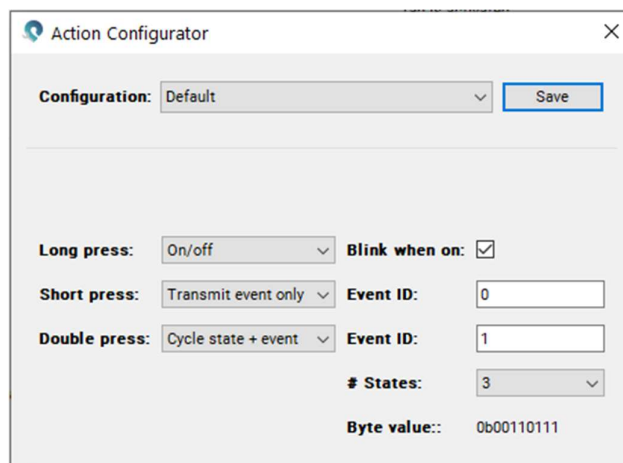
And then select your new configuration on the main screen and click Apply:





## 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.





## 8 Ordering information

Part Number	Description
21-001-0001	Wearable Tracking Tag
21-001-0002	Wearable Tracking Tag with lanyard
21-001-0003	Wearable Tracking Tag with wristband
21-001-0005	Wearable Tracking Tag with tile
21-002-0001	Wearable Interactive Tag
21-002-0002	Wearable Interactive Tag with lanyard
21-002-0003	Wearable Interactive Tag with wristband
21-002-0005	Wearable Interactive Tag with tile

## 9 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.*

## 10 Regulatory Information

### 10.1 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 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 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. 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 or 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.

The device complies with the requirements set forth in CFR 47 Sections 2.1093 for an uncontrolled environment.

### 10.2 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. This equipment should be installed and operated with minimum distance of 5 mm between the radiator and your body.

### 10.3 CE Compliance Statement

The manufacturer, Pozyx NV, Vrijdagmarkt 10/201, 9000 Gent, Belgium declares that the products:

- 21-001-0001: Wearable Tracking Tag
- 21-001-0002: Wearable Tracking Tag with lanyard
- 21-001-0003: Wearable Tracking Tag with wristband
- 21-001-0005: Wearable Tracking Tag with tile
- 21-002-0001: Wearable Interactive Tag
- 21-002-0002: Wearable Interactive Tag with lanyard
- 21-002-0003: Wearable Interactive Tag with wristband
- 21-002-0005: Wearable Interactive Tag with tile

are conform to the following Directives:

- 2014/53/EU (Radio Equipment Directive)
- 2011/65/EU (ROHS), amended by 2017/2102/EU and 2015/863/EU

See the CE Declaration of Conformity for full details on the applied standards.

### 10.4 UKCA Compliance Statement

The manufacturer, Pozyx NV, Vrijdagmarkt 10/201, 9000 Gent, Belgium declares that the products:

- 21-001-0001: Wearable Tracking Tag
- 21-001-0002: Wearable Tracking Tag with lanyard
- 21-001-0003: Wearable Tracking Tag with wristband
- 21-001-0005: Wearable Tracking Tag with tile
- 21-002-0001: Wearable Interactive Tag
- 21-002-0002: Wearable Interactive Tag with lanyard
- 21-002-0003: Wearable Interactive Tag with wristband
- 21-002-0005: Wearable Interactive Tag with tile

comply with the requirements of the following regulations:

- Radio Equipment Regulations 2017 (S.I. 2017/1206)
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (S.I. 2012/3032)

See the UKCA Declaration of Conformity for full details on the applied standards.

