

# Sense Shield

## User Guide



## Revision History

Date	Version	Notes	Author
01-04-2021	01	New Document	KM
29-07-2021	02	Document updated	KM
25-11-2021	03	Updated FCC	WD

# INTRODUCTION

Congratulations, you are now the proud owner of the Sense IoT Bluetooth Technology Evaluation Kit that will help supercharge your IoT projects.

The IoT devices in this kit are called Sense Shield. As well as harnessing the power of Bluetooth Low Energy (BLE) these intelligent devices include an accelerometer and audio buzzer.

Sense Shield is a BLE tag that is compatible with the Quuppa Intelligent Locating System that allows you to locate and track the Sense Shield tags in an environment equipped with Quuppa Locators.

Other parts of the Quuppa Intelligent Locating system are Quuppa Locators and Quuppa Positioning Engine (QPE) software.

Device can be configured to beacon at standard BLE advertising channels or on QUUPPA proprietary channels only which helps to eliminate signal noise generated by standard BLE devices and provides reliable, high accuracy RTLS solution.

This kit contains:

- 5 Sense Shield IoT devices
- An NFC Programmer with sync cable
- Memory Stick containing Omni-ID Sense Config PC software and electronic version of this user guide

We hope you enjoy using this kit and ‘testing your Senses’.

The Omni-ID team.

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## 1. Tag Operation

Sense Shield is designed for tracking and monitoring applications over BLE on a Quuppa Intelligent Locating System. Sense Shield is pre-programmed with Quuppa firmware and is equipped with an accelerometer, audio buzzer and an LED light to indicate device status.

The Sense Shield has the following features:

- Lanyard clip or Wrist strap
- Push Button
- LED
- Buzzer
- Two-part casing
- Accelerometer
- Pre-programmed with Quuppa firmware
- Replaceable Battery

**Sense Shield with Lanyard Clip**



**Sense Shield with Wrist strap**



Sense Shield has the following built in sensor:

Accelerometer

## 1.1. Activating the Sense Shield

Before using the Sense Shield you must activate and configure it for your Quuppa Intelligent Locating System.

1. Press the button for 1 second to wake the Sense Shield from storage state.
2. Within 30 seconds, send a configuration command to the Sense Shield from the Quuppa Site Planner (QSP) and add the tag to the project. For details, see instructions on Quuppa tag configuration from the Quuppa Customer Portal (QCP).

## 1.2. Sense Shield 2D barcode

There is a 2D barcode located on the underside of the Sense Shield which contains the tags ID number. The 2D barcode can be scanned with either a separate 2D barcode reader or a suitable mobile phone app.

## 1.3. Sense Shield NFC Configurable Settings

Sense Shield settings can be configured via NFC. Omni-ID provides software that works with ST Microelectronics M24LR Discovery NFC PCB tool. For further information refer to Omni-ID 'Sense Config PC App User Guide'.

The following are the configurable parameters:

- Buzzer Volume
  - Low, Medium, High

## 2. Product IO Settings

The Sense Shield is equipped with a bi-colour LED, buzzer and push button for alerts. The following table details the IO configuration:

IO	Function
Output 1	Green LED
Output 2	Red LED
Output 3	Buzzer
Input: Button 2	Button Push

The button press is reported back to Quuppa Positioning Engine (QPE) as 'Button 2'.

The Sense Shield tag enters alarm state when it receives Output 3 activation from Quuppa Positioning Engine (QPE) or 3<sup>rd</sup> party application with Quuppa API.

IO settings for Output 3 can be sent via a Quuppa temporary command with following the states:

- Always Off (turns off alarm state)
- Always On (buzzer profile: 1sec off and on, 0.5sec cycle)
- Blink Slow (buzzer profile: 3sec off and on, 1sec cycle)
- Blink Fast (buzzer profile: 2sec off and on, 1sec cycle)

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**IMPORTANT** Blinking the LED draws a relatively large amount of power. To conserve battery power, only blink the LED when necessary.

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When Output 3 command is activated the following details the function of the Sense Shield tag:

	State	Function
Button	On, blink slow or fast	Silence the buzzer, cancels temporary command and sends button 2 high to QPE
Buzzer	On, blink slow or fast	Sound alarm at configured volume, three volume states (user configurable via PC NFC tool)
Buzzer	Off	Buzzer off

### 3. Sense Shield product range

There are a number of product variants within the Sense Shield Product range all of which are based on the primary product, these are summarised in the table below.

Part Number	Part Name (Model)	Description
CP14827	Shield Quuppa	Sense Shield Quuppa - Wrist Strap
CP14828	Shield Quuppa	Sense Shield Quuppa - Lanyard
CP15011	Lite - Attachment Bracket	Sense Lite - Attachment Bracket
CP15012	Lite - Cable Tie Bracket	Sense Lite - Cable Tie Bracket
CP14934	Lite - Rivet Holes	Sense Lite - Rivet Holes
CP14933	Lite - Adhesive	Sense Lite - Adhesive
CP14932	Lite - Wrist Strap	Sense Lite - Wrist Strap
CP15459	Badge Quuppa	Sense Badge Quuppa - Landscape
CP15460	Badge Quuppa	Sense Badge Quuppa - Portrait
CP15819	Shield Quuppa	Sense Shield Quuppa - Lanyard - ATEX & IECEx
CP15818	Lite Quuppa	Sense Lite Quuppa - Cable Tie - ATEX & IECEx
CP15817	Lite Quuppa	Sense Lite Quuppa - No Attachment Flange - ATEX & IECEx
CP15816	Lite Quuppa	Sense Lite Quuppa - Rivet - ATEX & IECEx
CP15815	Lite Quuppa	Sense Lite Quuppa - Lanyard - ATEX & IECEx
CP15821	Badge Quuppa	Sense Badge Quuppa - Landscape - ATEX & IECEx
CP15820	Badge Quuppa	Sense Badge Quuppa - Portrait - ATEX & IECEx

## 4. Battery Replacement

Sense Shield uses a CR2032 battery that can be replaced.

**WARNING** Only a CR2032 battery should be used with this device. Failure to use a CR2032 battery may result in a malfunction or damage to the battery or device.

### 4.1. Remove the battery

To Remove the battery:

1. Unscrew the case upper and remove from the case lower (Fig 1).
2. Carefully lift the battery from opposite side to the metal clip and slide battery out from battery holder (Fig 2), take note of the correct battery polarity.

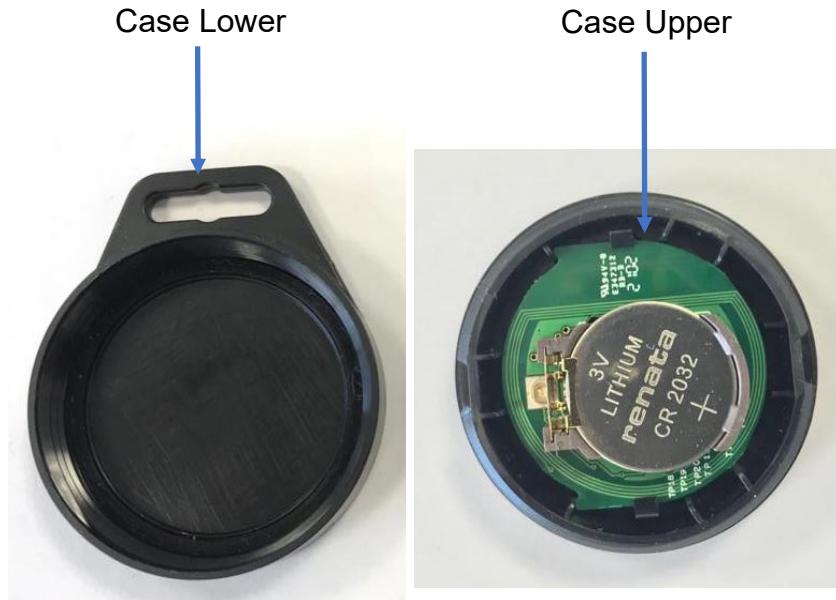


Fig 1 - Sense Shield with Lanyard Clip shown for illustration purposes

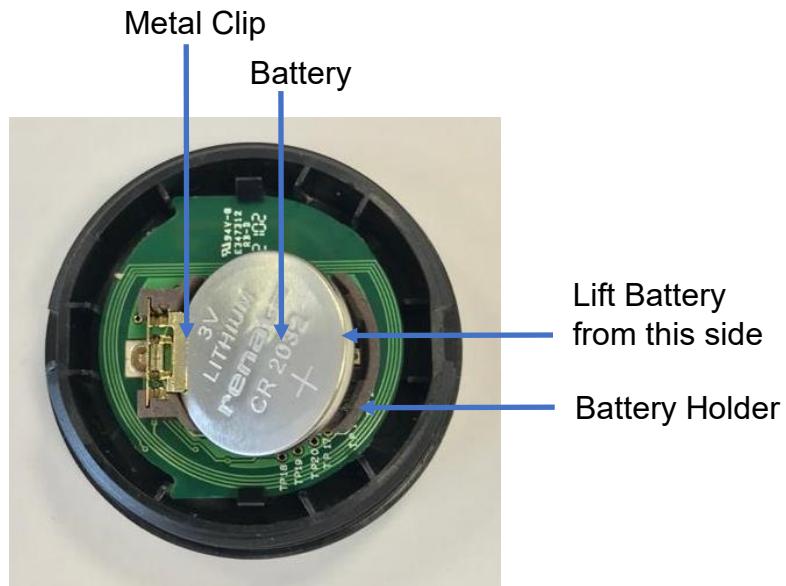


Fig 2

## 4.2. Install the battery

To install the battery:

1. Noting correct battery polarity, place the battery in position by sliding battery under metal clip (Fig 3) and carefully press down into battery holder until battery clips into position (Fig 4).
2. Screw the case upper into the case lower and tighten firmly (Fig 5).

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**WARNING** Make sure the two-part casing is firmly screwed back together to help maintain ingress protection of the tag.

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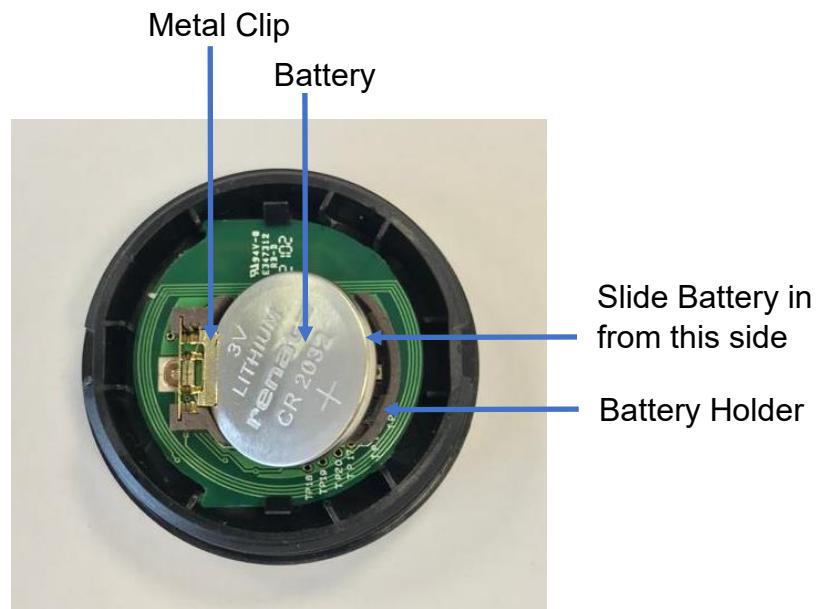


Fig 3 - Sense Shield with Lanyard clip shown for illustration purposes

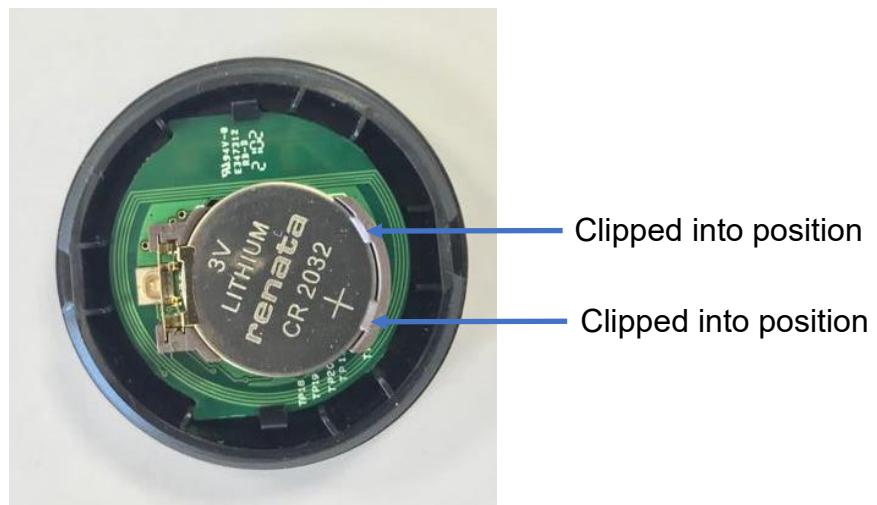


Fig 4



Fig 5 - Sense Shield with Lanyard clip shown for illustration purposes

## 5. Attaching the Sense Shield

Attach the Sense Shield with the aid of COTS clips through the Lanyard clip or directly to personnel wrist when using the wrist strap version.

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**IMPORTANT** For optimal operation do not attach Sense Shield onto a large metallic surface.

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**IMPORTANT** Avoid attaching Sense Shield in a way that the button is permanently pressed down.

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## 6. Care and Maintenance

Your Sense Shield is a product of superior design and craftsmanship and should be treated with care. The following suggestions will help you protect your warranty coverage.

- Do not attempt to open and disassemble the device more than required to replace the battery
- Do not submerge the device in deep water (> 1m)
- Do not use harsh chemicals, cleaning solvents or strong detergents to clean the device. Only use water and soap or a dry cloth to clean the surface of the device
- Do not paint the device
- Keep the device out of reach of small children
- Only use the recommended battery type
- Keep new and used batteries away from children
- If the device does not screw together firmly and securely, stop using the product and keep it away from children
- This product contains a coin/button cell battery. If the coin/button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death
- Seek immediate medical attention if you think that batteries have been swallowed or placed inside any part of the body

## 7. Recycling and Disposal

Always return your used electronic devices, batteries and packaging materials to dedicated collection point. This way you help to prevent uncontrolled waste disposal and promote the recycling of materials.



**Disposal of Electrical and Electronic Equipment.** This crossed-out wheeled-bin symbol indicates that this product should not be treated as household waste. Instead hand it over to the appropriate collection point for the recycling of electrical and electronic equipment in accordance with local environmental regulations for waste disposal.



**Disposal of Waste Batteries.** This product contains a battery. Do not dispose of them with other household waste. Instead, hand them over to the appropriate collection point for recycling. The battery does not contain Mercury (Hg), Cadmium (Cd) or Lead (Pb).

Ensuring correct product and battery disposal prevents potential negative impact on the environment and human health.

## 8. FCC Declaration of conformity 47 CFE 2.1077

Unique Identifier :- Sense Shield

Responsible party :- Omni-ID Inc.

Address :- Omni-ID In., The Piano Works, 333 West Commercial Street, Suite 1500

East Rochester, NY 14445, United States

Tel. +1 (585) 299 5990

### FCC Compliance Statement

This device complies with Part 15 of FCC Rules and standard(s).

Operation is subject to the following two 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.

### FCC WARNING

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

### NOTE

This equipment has been tested and found to comply with the limits for an Intentional radiator, pursuant to Part15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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

## 9. Sense Shield Data Sheet



Intelligent, Powerful IoT Devices

TRUST  
CONFIDENCE  
QUALITY

### [ Products ] you can identify with



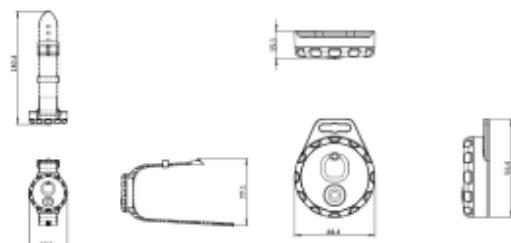
#### Sense Shield

The Omni-ID Sense Shield BLE beacon with Quuppa technology can be used for contact tracing using highly accurate (sub 1 meter) personnel tracking. When a member of staff is found to be Covid-19 positive, the data provided by the device allows simple and reliable identification of personnel who have been in contact with the infected person, enabling organisations to quarantine specific individuals, thus avoiding the need to close down whole operations. Furthermore, the device can be used to implement social distancing rule enforcement and warn members of staff when they are in breach of distance regulations. The system continuously monitors the position of personnel and when two or more persons are in breach of social distancing rules an audible alert is sounded on the devices. The solution can be adapted to individual workplaces and tailored to local regulations. The wearable device comes in 3 variants – lanyard, belt clip and watch strap.

#### Physical Specifications

<b>Material</b>	2 Part durable plastic case
<b>Size</b>	Lanyard or belt clip (mm) - 50.1mm x 44.5mm x 13mm Watch strap (mm) - 44.5mm (bezel size), strap length - 115mm+75mm to buckle mm Lanyard or belt clip (inches) - 1.97" x 1.75" x 0.51" Watch strap (inches) - 1.79" (bezel size), strap length - 4.5"+2.9" to buckle in
<b>Weight (g)</b>	TBC
<b>Attachment</b>	3 versions available - lanyard, belt clip or watch strap

#### Dimensions



Dimensions shown in mm

Measurements shown in mm

#### RF Specification

<b>Radio Protocol</b>	Bluetooth, NFC
<b>Supported Profiles</b>	Quuppa
<b>Battery Type</b>	Replaceable CR2032
<b>Battery Capacity</b>	225mAh
<b>Battery Life</b>	6 months under following conditions - (device moving 10 hours/day (3Hz beacon rate). Device stationary 14 hours/day (0.1 Hz beacon rate). TX power set to 0dBm, Enters alert mode 20 times per day with buzzer & LED activation for 20 seconds at each alert (Blink Slow).
<b>Visual Indicator</b>	Bi-color LED



Intelligent, Powerful IoT Devices



## [ Products ] you can identify with



- Sports stadia and indoor arenas
- Hospitals
- Warehouse facilities
- Ports and mines
- Construction yards

### Configurable Parameters

Tx power

Accelerometer threshold (rate & sensitivity)

Default beacon rate (transmit rate)

Rx rate

Buzzer volume

### Ordering Information

Warranty

One Year

Part Number / Order  
Codes / Order Numbers

CP14827-Wrist Strap

CP14828-Lanyard/Belt Clip

CP15016 -Omni-ID Lanyard accessory

CP15067 -Belt Clip Accessory

### Environmental Specifications

Operating Temperature -10°C to +60°C

IP Rating IP68

### Certifications

CE, FCC, RoHS, NFC, Bluetooth



For product or technology inquiries email: [sales@omni-id.com](mailto:sales@omni-id.com).  
Visit [omni-id.com](http://omni-id.com) to learn more about the complete line of Omni-ID RFID products

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## 10. Sense Lite Datasheet



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### [ Products ] you can identify with



#### Sense Lite

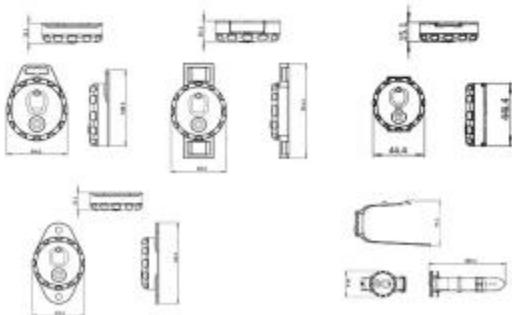
The Sense Lite IoT device with Quuppa platform takes on a similar form factor to the Sense Shield but does not have the buzzer functionality. It is a highly accurate and versatile asset/people tracking device and its rugged case makes it robust enough for a host of industrial applications (apart from those where it may encounter direct heavy impact). The Sense Lite comes in a number of different wearable or attachment options including adhesive, rivets and cable ties for asset tracking or via lanyard or wrist strap if used as a simple personnel tracker.

RF Specification	
Radio Protocol	Bluetooth
Supported Profiles	Quuppa
Battery Type	Replaceable CR2032
Battery Capacity	225mAh
Battery Life	1 year under following conditions - (device moving 10 hours/day (1Hz beacon rate). Device stationary 14 hours/day (0.1Hz beacon rate). TX power set to 0dBm

#### Physical Specifications

Material	2 Part durable plastic case
Size	Lanyard or belt clip (mm) - 50.1mm x 44.5mm x 13mm Watch strap (mm) - 44.5mm (bezel size), strap length - 115mm+75mm to buckle mm Lanyard or belt clip (inches) - 1.97" x 1.75" x 0.51" Watch strap (inches) - 1.79" (bezel size), strap length - 4.5"+2.9" to buckle in
Weight (g)	TBC
Attachment	5 versions available - Wrist strap, lanyard/belt clip, rivet attachment, without attachment flange, cable tie attachment.

#### Dimensions



Dimensions shown in mm

Measurements shown in mm

## [ Products ] you can identify with



- Asset Tracking
- Real time location
- Personnel Tracking

### Configurable Parameters

- Tx power
- Accelerometer threshold (rate & sensitivity)
- Default beacon rate (Transmit rate)
- Rx rate

### Environmental Specifications

Operating Temperature	-20°C to +60°C
IP Rating	IP68

### Certifications

CE, FCC, RoHS, Bluetooth



### Ordering Information

Warranty	One Year
Part Number / Order Codes / Order Numbers	CP14827-Wrist Strap CP15011-Lanyard/Belt Clip CP14934-Rivet Attachment CP14933-Without Mechanical Flange CP15012-Cable Tie Attachment CP15016 -Omni-ID Lanyard accessory CP15067 -Belt Clip Accessory

### Customization Options

This product is available as per the details on this datasheet as a stock item but it is also available as a custom product if required in a specified minimum order quantity (MOQ). Customization options for our products include the following (but please note that not all options may be available on each product):-

IC substitution, RF tuning, higher memory options, custom size, different layout for auto placement, custom or printed release liner, custom adhesives, different overlaminate or protective foils, color options (foam and/or face stock) or custom print.

Please speak to one of our sales or customer service experts to discuss options or MOQ details.

For product or technology inquiries email: [sales@omni-id.com](mailto:sales@omni-id.com).  
Visit [omni-id.com](http://omni-id.com) to learn more about the complete line of Omni-ID RFID products

## 10. Sense Badge Datasheet

PROVISIONAL Datasheet | COMPANY CONFIDENTIAL

**Sense**<sup>IoT</sup>  
Intelligent, Powerful IoT Devices

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QUALITY

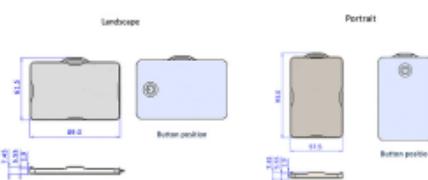
### [ Products ] you can identify with



#### Physical Specifications

Material	2 part durable plastic case
Size	89 x 61.5 x 7.45 mm 3.5 x 2.42 x 0.29 in
Weight (g)	34
Attachment	Lanyard

#### Dimensions



Measurements shown in mm

#### Sense Badge

The Sense Badge IoT device with Quuppa technology is a powerful personnel tracker providing extremely accurate positioning and is simple to use as the credit card style device that can be worn on a lanyard around the users neck or attached to clothing. Designed to hold ISO standard ID cards whilst also being flexible enough for both portrait and landscape orientation. The solution can be adapted to individual workplaces and tailored to local regulations. This may also be ordered with fewer attachment lugs.

#### RF Specification

Radio Protocol	Bluetooth, NFC
Supported Profiles	Quuppa
Battery Type	Sealed prismatic battery, non-replaceable
Battery Capacity	1.3 Ah
Battery Life	5 year under following conditions - (device moving 10 hours/day (1Hz beacon rate). Device stationary 14 hours/day (0.1Hz beacon rate). TX power set to 0dBm)
Default Beacon Rate	0.1 - 50 Hz
Sensors	Accelerometer
Visual Indicator	Bi-color LED



## [ Products ] you can identify with



The Sense Badge device is ideal for applications requiring medium range tracking such as:

- General personnel tracking
- Staff / visitor tracking mustering
- Rate & safety requirements
- Smart office applications
- Process flow monitoring
- VIP & delegate tracking at trade shows / events

### Configurable Parameters

Accelerometer threshold

Default beacon rate

Tx power

Rate and sensitivity

Transmit power

Default beacon rate (in seconds)

### Related System Components

BLE Technology Evaluation Kit

Quuppa technology evaluation / demo kit

### Ordering Information

Warranty

1 year

### Environmental Specifications

Operating Temperature -10°C to +60°C

Shock & Vibration Tolerance MIL-STD-810 F

### Certifications

CE, FCC, RoHS, Bluetooth, Quuppa

