Beacon IT001 (TWHBC01 module) User Manual

IT001 is a broadcast protocol based on the bluetooth BLE protocol. It is usually installed in a suitable location, and it will broadcast continuously or periodically to its surrounding environment

The IT001 beacon allows to create Bluetooth® Low Energy (Bluetooth LE) 5.0 solutions. Besides basic Bluetooth LE advertising functionality via radio transmission, the TWHBC01 beacon allows additional functionality thanks to the add-on hardware components: a green and a red LED, a push button and an accelerometer with built-in thermometer. Depending on the casing not all hardware components may be present or can be used. The accelerometer can be configured for detection of specific events. Currently the following events are supported: free fall, single tap, double tap, activity/movement and flip-flop.
There are two aspects concerning the TWHBC01 beacon firmware.
On the one hand there is a firmware implemented as a release HEX file with functionality as described in this document. A major objective in the implementation is low current consumption hence long battery lifetime. There are many parameters that affect the behavior of the firmware. The release firmware has default values for these parameters.

Firmware Functionality
TWHBC01 beacon can be in five modes:
• Transport & Warehousing
• Configuration
• Operational Active
• Operational Active_Alarm
• Operational Passive_Alarm
By Operational mode we refer to the actual mode that is configured and can be either Operational Active, Operational Active_Alarm or Operational Passive_Alarm.

Transport & Warehousing mode
As its name suggests, this mode is meant for the beacon to be silent for a long period and only to be woken up when needed. Therefore this mode has no advertising broadcast.
Wake-up can occur on possible events:
• Accelerometer event
• Short press on push button
On wakeup the beacon goes to the configured Operational mode.

Operational Active mode
In this mode the beacon does an undirected advertising (broadcast) with frame content defined by the configuration parameters. The broadcast can be either connectable or non-connectable. When it is connectable, the beacon reverts to Configuration mode on connection by a (central) client, where a new configuration can be uploaded. The connectable option should only be used for testing purposes.
Based on configuration settings, the push button and/or accelerometer can be enabled.
On occurrence of the alarm state, which is triggered by either a long press of the push button or on accelerometer event, the beacon stops advertising for a given period (alarm duration timer), after which it restarts normal broadcast.

Operational Active_Alarm mode
This mode is similar to the Operational Active mode, except that during the alarm state the beacon broadcasts an alarm frame instead of being silent.
On occurrence of the alarm state, the beacon starts an undirected alarm broadcast for a given period (alarm duration timer), after which it restarts normal broadcast.

Operational Passive_Alarm mode
This mode is similar to the Operational Active_Alarm mode, except that the beacon is silent until an event occurs.

Configuration mode
This mode is used for testing and configuration. In this mode the beacon does undirected connectable advertising. This mode is entered when the Operational mode is connectable and a (central) client connects. When connected the (central) client can interact with the Configuration Service in the beacon. The only way to leave the Configuration mode is by uploading and activating a valid TLV file.

Alarm broadcast
The broadcast in the alarm state of modes Operational Active_Alarm and Operational Passive_Alarm consists of just one frame type and can be either connectable or non-connectable1.

Behavior on reset
On reset the beacon checks whether valid TLV configuration file is present in flash. If so its configuration values are used. If no TLV file is present or is erroneous, the beacon uses the default configuration.
To show which of these is the case the beacon flicks LEDs just after startup:
• Twice green LED when TLV content is used.
• Green LED followed by red LED when TLV configuration is not supported.
• Twice red LED when TLV configuration is supported but TLV data are erroneous.

Product specification

	
Item Part Number	IT001
Communication Protocols	BLE 5.0 iBeacon Eddystone URL, UID, TLM AltBeacon Quuppa NFC Forum Tag Type 5
Dimensions (mm)	47.9x11.1
Battery type	CR2032 Replaceable
Battery lifetime	up to 5 years
Transmision Range	up to 150 meters
Operating & Storage temp.	-30°C up to +60°C

Product usage scenario:

Asset tracking and location in an industrial environment.

People flow management, secure access control, People monitoring in certain areas.

Product installation method

The beacon can be stuck onto objects with a strong adhesive surface on it's backside. For removable versions, the Beacon can be supplied with an extra strong Velcro surface

FCC WARNING

This device complies with part 15 of the FCC Rules. 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.

Any 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 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 installation. 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 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 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.

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

IC Caution:

Radio Standards Specification RSS-Gen, issue 5

- English:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

This device may not cause interference.

This device must accept any interference, including interference that may cause undesired operation of the device.

RF exposure statement:

The equipment complies with IC Radiation exposure limit set forth for uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

- French:

Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes:

Cet appareil ne doit pas causer d'interférences.

Cet appareil doit accepter toutes les interférences, y compris celles susceptibles de provoquer un fonctionnement indésirable de l'appareil.
Déclaration d'exposition RF:
L'équipement est conforme à la limite d'exposition aux radiations de la IC établie pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.