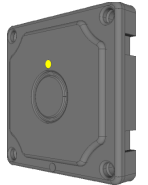


## iBS05 Specification

### Waterproof Sensor Beacon

iBS05 is a small IPx7 beacon/ tag for multi-purpose. One major usage is for location tracking and with different sensor options, it can also be used for sensor monitoring purposes. iBS05 supports **Bluetooth® Low Energy( BLE)** in Bluetooth 5. It works with INGICS beacon gateway to locate the beacon location and to monitor the sensor status. The typical battery usage time is over 3 years in default settings.



### Features

#### General

- ARM Cortex™-M4 32-bit processor
- Powered with one CR2032 battery
- Long battery life: 3.4 year in typical beacon setting
- Android APP for configuration
- Panic/alarm button
- Power on/off button
- Size: 38mmX38mmX9mm

#### Environment

- IPx7 waterproof
- Rugged, 2M of drop protection
- Operating temperature: -20°C to 60°C

#### BLE

- 2.4GHz frequency band
- Support Bluetooth Low Energy in **Bluetooth 5** standard
- Maximum transmit power +4dBm
- Receiver sensitivity: -97 dBm @1Mbps, 0.1% BER
- On board PCB antenna
- >100M range in open space

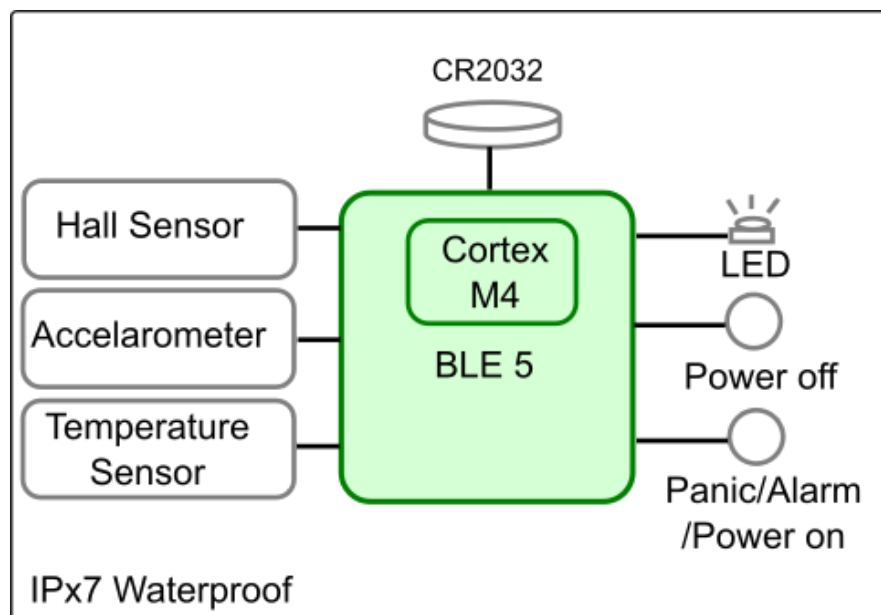
#### Certification

- Bluetooth
- CE/FCC/TELEC/NCC

### Applications

- Location tracking
- Activity monitoring
- Sensor network
- Building automation
- Security
- Access control
- Industrial automation
- Health and wellness monitoring

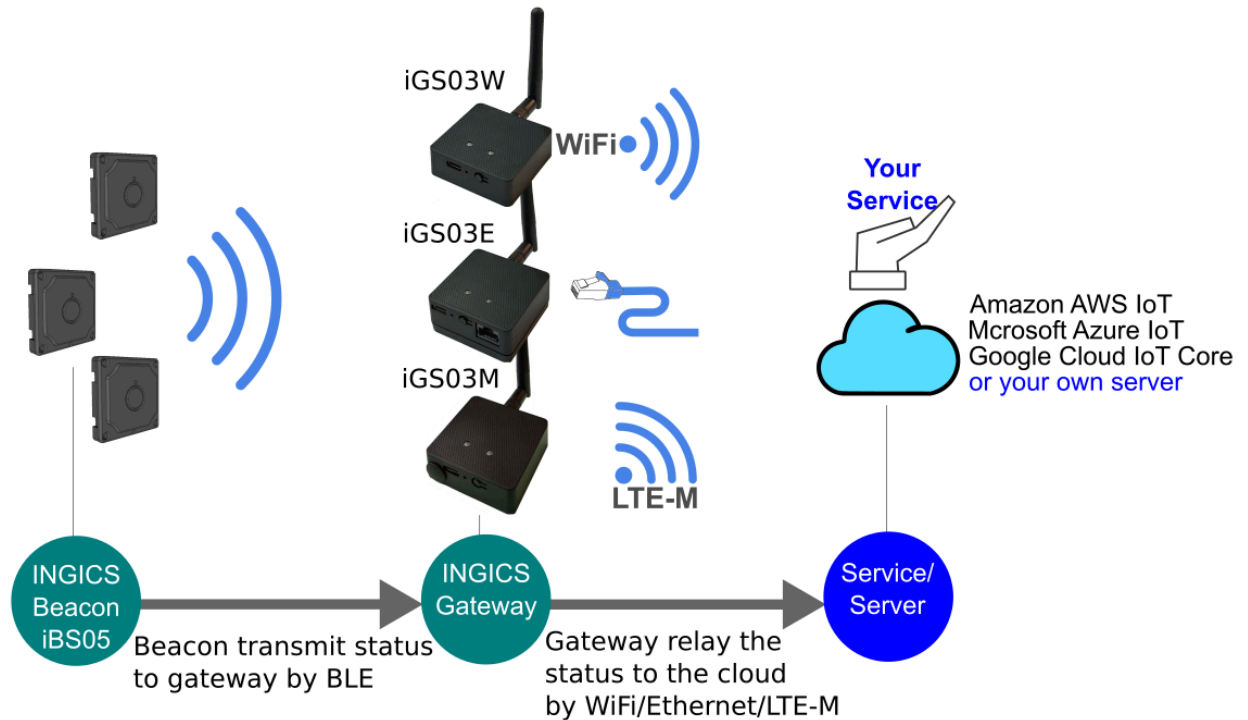
### Block Diagram



# INGICS TECHNOLOGY

## Typical Usage

Works with the latest iGS03W, iGS03E, or iGS03M beacon gateway( or iGS01S/iGS02E) to receive the beacon message and send it to the cloud server. Users can access and manage the data anytime, anywhere.



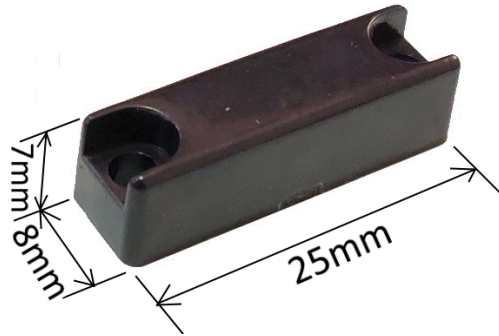
Note: iGS03W/E/M are the 3rd generation of beacon gateway in WiFi/Ethernet/LTE-M interface.

## Models

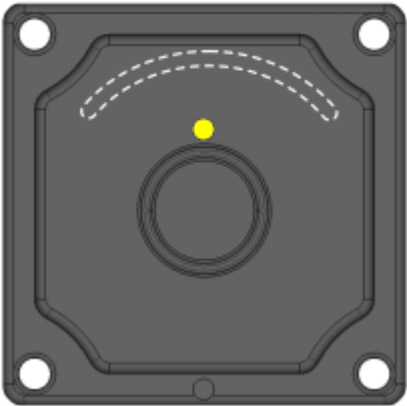
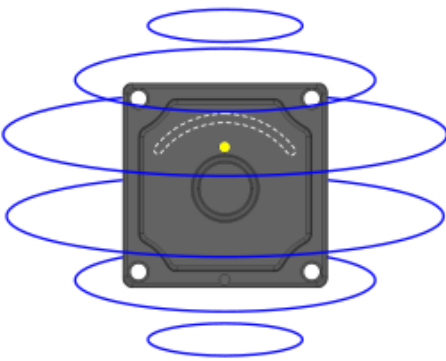
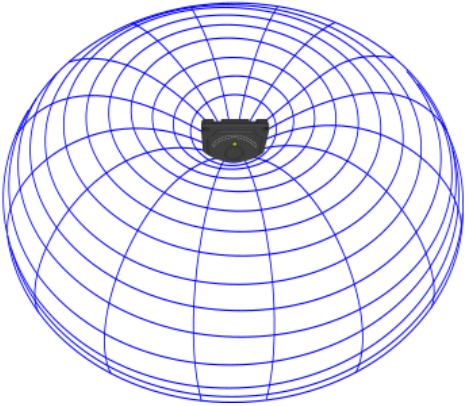
Model Name	Description	Advertising interval	Note
iBS05	Basic beacon for tracking the position of people or assets.	User configurable from 100ms~60 min. Default: 5 s	
iBS05G	Beacon with accelerometer for motion event detection	User configurable from 100ms~60 min. Default: 5 s	Sensor status change( still->motion, motion ->still) will trigger a series of transmission to inform the status change.
iBS05H	Beacon with hall sensor for open/close detection.	User configurable from 100ms~60 min. Default: 30 s	Sensor status change( magnet moving closer or moving away) will trigger a series of transmission to inform the status change
iBS05T	Beacon with temperature sensor for environment monitoring	User configurable from 100ms~60 min. Default: 30 s Sensor updated at 0.5X (advertising interval), min.10s	
iBS05RG	Beacon with accelerometer for activity monitoring	Not configurable. Fixed at 300 ms	Every 300 ms, it will broadcast 3 records of accelerometer value(one record in 100ms). Each record has an x,y,z axis acceleration value.

# INGICS TECHNOLOGY

Magnet (only for iBS05H)



Antenna

Antenna Position	Radiation Direction	Radiation Pattern
		

BLE Payload Format

iBS05/iBS05H/iBS05T/iBS05G

Prefix (5 Bytes)	MFG Code (2 Bytes)	Beacon Code/ Type (2 Bytes)	Tag Batt (2 Bytes)	Event Status (1 Byte)	Temperat ure (2 Bytes)	Triggered Count (2 Bytes)	User (2 Bytes)	Sub Type (1 Byte)	Reserved (3 Bytes)
02010612FF	2C08	83BC	XXXX	XX	FFFF	FFFF	00XX	XX	000000

\* Endianness: little endian

Field	Description
MFG Code	Manufacturer vendor code, fixed to <b>0x082C</b>
Beacon Code and Type	Magic Code to identify packet format, fixed to <b>0xBC83</b>
Tag Batt	batt voltage of tag in 0.01v unit
Event Status Bitmask	<b>8-bit bitmask --</b> <b>0x00: sensor inactive</b> <b>0x01: button (05,05H,05T,05G)</b>

# INGICS TECHNOLOGY

	<b>0x02: moving (05G)</b> <b>0x04: hall sensor (05H)</b>
Temperature	Temperature in 0.01 C unit (signed 16bit) -- only applied for iBS05T
Triggered Count	iBS05H -- hall sensor triggered count, 16-bit rounding
User	16-bit user configurable content
Subtype	0x30: iBS05 0x31: iBS05H 0x32: iBS05T 0x33: iBS05G

## iBS05RG

Prefix (5 Bytes)	MFG Code (2 Bytes)	Beacon Code/Type (2 Bytes)	BATT/ACT (2 Bytes)	Accel 1X,Y,Z (6 Bytes)	Accel 2 X,Y,Z (6 Bytes)	Accel 3 X,Y,Z (6 Bytes)	Reserved (2 Bytes)
02010612FF	2C08	86BC	XXXX				XXXX

Field	Description
MFG Code	Manufacturer vendor code, fixed to <b>0x082C</b>
Beacon Code and Type	Magic Code to identify packet format, fixed to <b>0xBC86</b>
Tag Batt / Act	Bit[13]: Button pressed, bit[12]: ACT/INACT, bit[0-11] BATT voltage of tag in 0.01v unit
Accel X, Y, Z	raw data, 2 byte for each axis in 0.04G unit

## Specification

### Absolute Maximum Rating

Supply Power	CR2032 battery X1
Storage Temperature	-40° to 85° Celsius

### Recommendable Operation Condition

Operating Temperature	-20° to 60° Celsius
Humidity	Max 95%, Non condensing, relative humidity
VDD	+3V by CR2032 battery

IPx7	30min.@1 Meter water
------	----------------------

## Average Current Consumption

iBS05	6uA*, in default 5s transmit period@1Mbps..
iBS05G	10.9uA*, in default 5s transmit period@1Mbps.. (assume 120 times of active event in one day)
iBS05H	2.6uA*, in default 30s transmit period@1Mbps.. (assume 120 times of active event in one day)
iBS05T	3.1uA*, in default 30s transmit period@1Mbps..
iBS05RG	60.75uA*, in default 300ms transmit period w/ power saving (working at 12H/day)

\* Measured with Panasonic CR2032 battery.

## Battery Life Simulation

iBS05	3.4 yr*, in default 5s transmit period@1Mbps.
iBS05G	1.8 yr*, in default 5s transmit period@1Mbps.. (assume 120 times of active event in one day)
iBS05H	>7 yr*, in default 30s transmit period@1Mbps.. (assume 120 times of active event in one day)
iBS05T	6.6 yr*, in default 30s transmit period@1Mbps.
iBS05RG	4 month**, in default transmit period and power saving (working at 12H/day).

\* Calculated with one piece of CR2032 battery with 220mAH capacity. Considering the battery discharge characteristic, only 80% of capacity is used for calculation. This value is just for reference and may be varied with component tolerance and different environments.

\*\* w/ power saving mode, the iBS05RG will stop advertising the G-value when the value is not changed for a certain time. When the value changes over the threshold, it will start to advertise again.

## Accelerometer Characteristic

Acceleration range	+2G, +4G(default), +8G, +-16G
Resolution	+2G: 4mg +4G: 8mg +8G: 16mg +-16G: 32mg
Offset Accuracy	+40mg

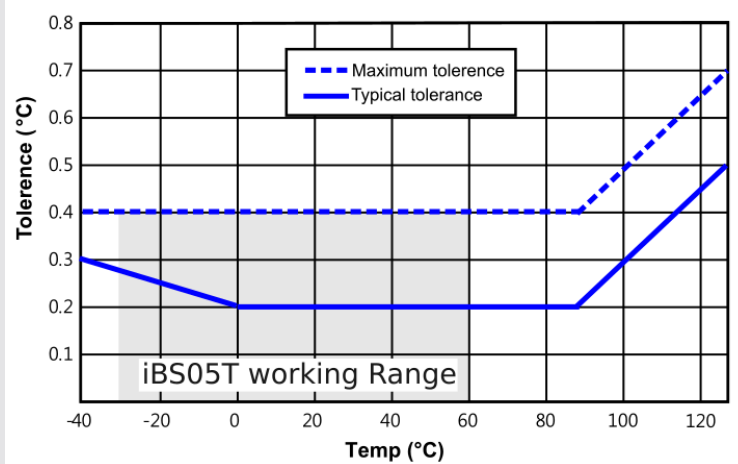
## Hall Sensor Characteristic

Operation point	Typ : 0.9mT( N or S)
Release point	Typ : 0.5mT( N or S)
Hysteresis width	Typ: 0.4mT( N or S)

## Temperature Sensor Characteristic

# INGICS TECHNOLOGY

## Temperature accuracy



The accuracy of the sensor chip used in iBS05T.

## Response time

Typ. : TBC

## Long term Drift

max.<0.03 °C/yr

## BLE RF Specification

### Transmit Power

Default: 0 dBm; Max.: +4 dBm.

### Frequency band

2.400 – 2.483 GHz

### Antenna

on board PCB antenna

### Range

>100M in open space

## Marking

Model	MAC
Serial Number	QR
MAC(6 digits)	Code

Model: **[5]**iBS05; **[H]**iBS05H; **[G]**iBS05G; **[T]**iBS05T

Serial Number: <Y><M><SN>

<Y> Year code; 1:2021, 2:2022, ...

<M> Month code; 1:Jan, 2:Feb, ..., A:Oct, B:Nov, C:Dec

<SN> Sequence Number

MAC(6 digit): The last 6 digits of MAC address

MAC QR Code: Full MAC address(12 digits) in QR code

## Example

iBS05

SN:00001, manufactured in Apr, 2021.

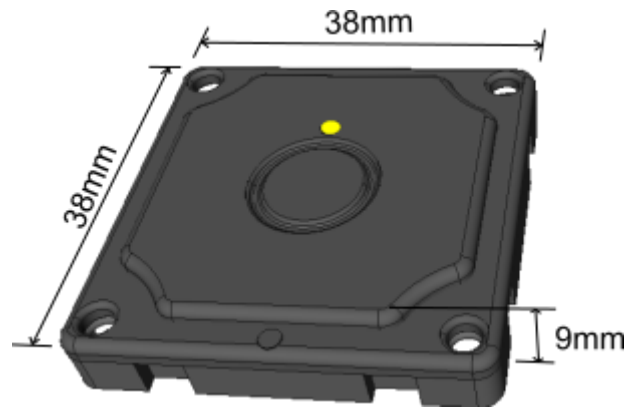
The last 6 digit of MAC is 7F97EA

The full MAC is E715577F97EA



## Dimension

# INGICS TECHNOLOGY

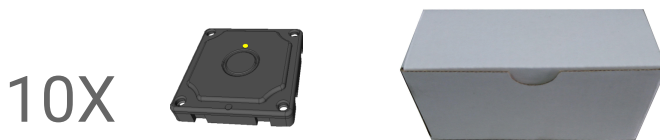


Dimensions L x W x H	38 mm x 38 mm x 9 mm
Weight	12g ( w/ 1xCR2032 battery)

## Packaging

### iBS05/T/G

One package box(size: 100mmX43mmx47mm) contains 10 units of iBS05.



### iBS05H

One package box(size: 100mmX43mmx47mm) contains 8 units of iBS05H and 8 pieces of magnet.



## Waste Electrical and Electronic Equipment

Our product is compliant with the WEEE directive for re-use/recovery/recycling. This cross-out wheeled-bin symbol is a reminder 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.

Since our product is not sold directly to the end user and generally it is a part of our customer's solution, our customer is recognized as a professional seller. Our customer has the responsibility to comply with the requirement of the directive too. To help our customers, when necessary, we will provide a WEEE compliant assessment report for registering and communicating with the local authorities and recycling agency.

## Recycling



## Certification

### Bluetooth SIG Qualification

Model number: iBS05/iBS05H/iBS05T/iBS05G

Declaration ID: D048813

Description: Beacon

### Japan MIC Regulatory

201-210714

### FCC Regulatory

2AH2IIBS05

## NCC Regulatory

iBS05 CCAH21LP6550T2  
iBS05H CCAH21LP6552T6

iBS05T CCAH21LP6553T8  
iBS05G CCAH21LP6551T4

## CE Regulatory

iBS05 series have been tested and complies with the essential requirements of the DIRECTIVE 2014/53/EU, DIRECTIVE 2014/35/EU and DIRECTIVE 2014/30/EU. The copy of the CE Conformity of Declaration is listed in the following page..

## UKCA Regulatory

iBS05 series have been tested and complies with the essential requirements of the Radio Equipment Regulation 2017 with reference to the Standards applied listed in the following page.

## Statement

### Federal Communication Commission Interference Statement

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 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.

**FCC Caution:** To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

**FCC Radiation Exposure Statement** This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

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.

### Industry Canada Statement

This device complies with Industry Canada licence-exempt RSS standard. Operation is subject to the following two conditions: (1) this device may not cause interference, and (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 : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### IC Radiation Exposure Statement

This equipment complies with IC RSS-102 radiation exposure limit set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Cet équipement est conforme aux CNR-102 d'Industrie Canada. Cet équipement doit être installé et utilisé avec une distance minimale de 20 centimètres entre le radiateur et votre corps. Cet émetteur ne doit pas être co-localisées ou opérant en conjonction avec autre antenne ou émetteur. Les antennes utilisées pour cet émetteur doivent être installés et fournir une distance de séparation d'au moins 20 centimètre de toute personne et doit pas être co-située ni fonctionner en conjonction



avec une autre antenne ou émetteur.

## NCC 警語

「取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。」

## DECLARATION OF CONFORMITY

EU RED - DIRECTIVE 2014/53/EU -  
EU-LOW VOLTAGE DIRECTIVE 2014/35/EU -

This declare that the following designated product

**Sensor Beacon**

**Model No.: iBS05, iBS05H, iBS05T, iBS05G**

**Brand Name: INGICS**

.....  
(Product identification)

complies with the essential requirements of the EU RED - DIRECTIVE 2014/53/EU, EU-LOW VOLTAGE DIRECTIVE 2014/35/EU and meet the limitation of the relevant test standard(s) listed below:

EMC	Radio Spectrum	Safety
EN 301 489-1: V 2.2.3 (2019-11)	EN 300 328 (V 2.2.2, 2019-07)	IEC 62368-1:2014/COR1:2015
EN 301 489-17: V 3.2.4 (2020-09)		and EN 62368-1:2014/A11:2017
		<b>Health</b>
		EN 62479(2010)

.....  
(Identification of regulations / standards)

This declaration is issued for  
**INGICS TECHNOLOGY.**  
**2F., No.15-2, Changshou St.,**  
**Shulin Dist., New Taipei City 238,, Taiwan, R.O.C.**

.....  
(Name / Address)

Furthermore we declare that our product will be produced in correspondence with all requirements according to the Directive 2014/53/EU and LOW VOLTAGE DIRECTIVE 2014/35/EU

Name: J.K.Fan

Title: President

Signature 

Date: 2021. 10. 28

## UK DECLARATION OF CONFORMITY (DoC)

Hereby we,

Name of Manufacturer: INGICS TECHNOLOGY CO.,LTD.  
Address: 2F.,No.15-2, Changshou St., Shulin Dist.  
Post Code & City: New Taipei City 238  
Country: Taiwan(R.O.C)  
Telephone Number: +886-2-26868632

Declare that this DoC is issued under our sole responsibility and that this product:

Product Description: Sensor Beacon  
Type Designation(s): IBS05, iBS05H, iBS05T, iBS05G  
Trademark: INGICS  
Batch / Serial Number: After 1C00001



**Is in conformity with the Radio Equipment Regulation 2017 with reference to the following Standards applied:**

Radio Equipment Regulations 2017

EN 301 489-1:V 2.2.3(2019-11)

EN 301 489-17:V 3.2.4(2020-09)

EN 300 328(V 2.2.2, 2019-07)

IEC 62368-1:2014/COR1:2015 and EN 62368-1:2014/A11:2017

EN 62479(2010)

Signed for and on behalf of:

2024. 06.11  
Date of issue

J.K.Fan, President

Name, Function, Signature



## Revision History

DATE	REVISION	CHANGES
Feb 15, 2021	0a	Initial release
May 30, 2021	0b	<ol style="list-style-type: none"> <li>1. Add iBS05T model</li> <li>2. Adjust the default setting of the advertising interval and the battery life accordingly..</li> <li>3. Remove the free fall detection on iBS05G.</li> <li>4. Add Marking section</li> <li>5. Update block diagram</li> <li>6. Add iBS05T temperature accuracy figure</li> </ol>
July 1, 2021	0c	Update packaging information
Aug 22, 2021	0d	<ol style="list-style-type: none"> <li>1. Update the certification schedule</li> <li>2. Update the working temperature range</li> <li>3. Update the dimension</li> <li>4. Add Antenna section</li> </ol>
Oct 28, 2021	01	<ol style="list-style-type: none"> <li>1. Update packaging section</li> <li>2. Update certification section</li> <li>3. Add WEEE information section</li> </ol>
Dec 30, 2021	01a	<ol style="list-style-type: none"> <li>1. Add magnet information for iBS05H</li> <li>2. Add iBS05H packaging with magnet</li> </ol>
Dec 1, 2022	01b	<ol style="list-style-type: none"> <li>1. To avoid mis-understanding, in Accelerometer Characteristic sector, change Sensitivity to Resolution</li> </ol>
Jun 19, 2023	01c	<ol style="list-style-type: none"> <li>1. Change IP67 to IPx7 to meet real tested item.</li> <li>2. Add BLE Payload Format section</li> <li>3. Add dimension figure in Dimension section</li> <li>4. Modify the battery life of iBS05H from 7.7 years to &gt;7 years</li> </ol>
Aug 15, 2023	01d	<ol style="list-style-type: none"> <li>1. Add iBS05RG model</li> <li>2. Add the current consumption and battery life information.</li> </ol>
Jun 11, 2024	01e	Add UK DOC