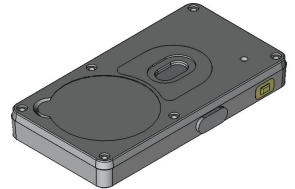


## iBS09/ R/ PIR/ IR Specification

### iBS09/ R/ PIR/ IR Sensor

iBS09 is an IPX7 waterproof Bluetooth® beacon which supports various sensors, including PIR for human detection, TOF for consumable detection, and IR for occupancy detection. It supports **Bluetooth® Low Energy( BLE)** in Bluetooth 5.

The typical battery usage time is 2.6~5.6 years in default settings for different models



### Features

#### General

- Powered by one CR2450 battery or USB port( 5V, type-C)
- Battery life( default settings.):  
iBS09: 4.9~5.6y  
iBS09R: 3.1~3.6y  
iBS09PIR: 3.8~4.4y  
iBS09IR: 2.6~3y
- Android and iOS APP for monitoring sensor data
- Power on/off by a single button
- Main unit Size:  
34.8mmx66.8mmx8.4mm(iBS09/ iBS09R/iBS09IR)  
34.8mmx66.8mmx16.2mm( iBS09PIR)

#### Environment

- IPX7
- Operating temperature:  
-20°C to 60°C
- Operating humidity: 0 to 95%RH

#### Certification

- Bluetooth
- FCC/Japan Giteki ( MIC)
- CE/NCC

#### Sensor

- iBS09R: ToF sensor for distance measurement from 1 cm to 300 cm.
- iBS09PIR: Passive Infrared SensorPIR sensor for human detection within the 5M range
- iBS09IR: Infrared(IR) proximity sensor for object detection from 1cm to 50cm.

#### BLE

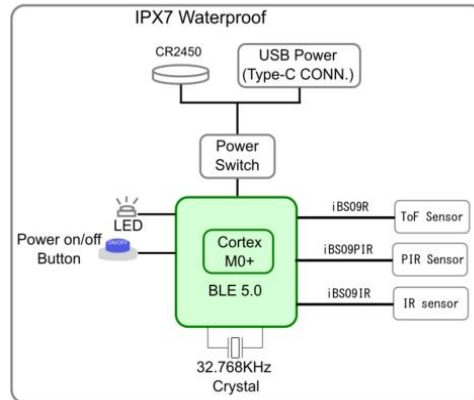
- 2.4GHz frequency band
- Support Bluetooth Low Energy in **Bluetooth 5** standard
- Maximum transmit power +8dBm
- Receiver sensitivity: -96.5 dBm @1Mbps, 0.1% BER
- On board PCB antenna
- >100M range in open space

### Applications

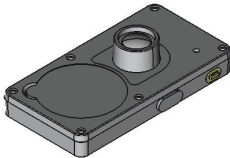
- Trash can monitoring
- human detection
- Consumables monitoring
- Inventory monitoring
- Industrial automation

# INGICS TECHNOLOGY

## Block Diagram



## Models

| Model                | iBS09                                                                              | iBS09R                                                                                                                                        | iBS09PIR                                                                            | iBS09IR                                                                             |
|----------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                      |  |                                                              |  |  |
| FOV                  | NA                                                                                 | 30° *1                                                                                                                                        | 110° X 110°                                                                         | 45° *2                                                                              |
| Application          | Beacon                                                                             | Distance detection                                                                                                                            | Human detection                                                                     | Object detection                                                                    |
| Detection distance   | NA                                                                                 | <b>Low:</b> 1cm~160cm<br><b>Mid:</b> 1cm~210cm<br><b>High:</b> 1cm~300cm<br><b>Ultra Low Power:</b> 1cm~100cm<br><b>Proximity:</b> 50cm<br>*3 | 10cm~5M                                                                             | 1cm~50cm<br>( measured with A4-sized white 88 paper)                                |
| Default ADV Interval | 5s                                                                                 | 30s                                                                                                                                           | 30s                                                                                 | 30s                                                                                 |
| Battery life *4      | 4.9~5.6y                                                                           | <b>Low:</b> 3.1~3.6y<br><b>Mid:</b> 2~2.3y<br><b>High:</b> 1~1.2y<br><b>Ultra Low Power:</b> 4.5~5y<br><b>Proximity:</b> 1.1~1.2y             | 3.8~4.4y                                                                            | 2.6~3y                                                                              |

\*1 The maximum detection angle varies depending on the object size. Under the 'ToF Mode: High' setting, it can detect a white wall up to 5 meters.

\*2 Recommended placement: Perpendicular to the Device Under Test

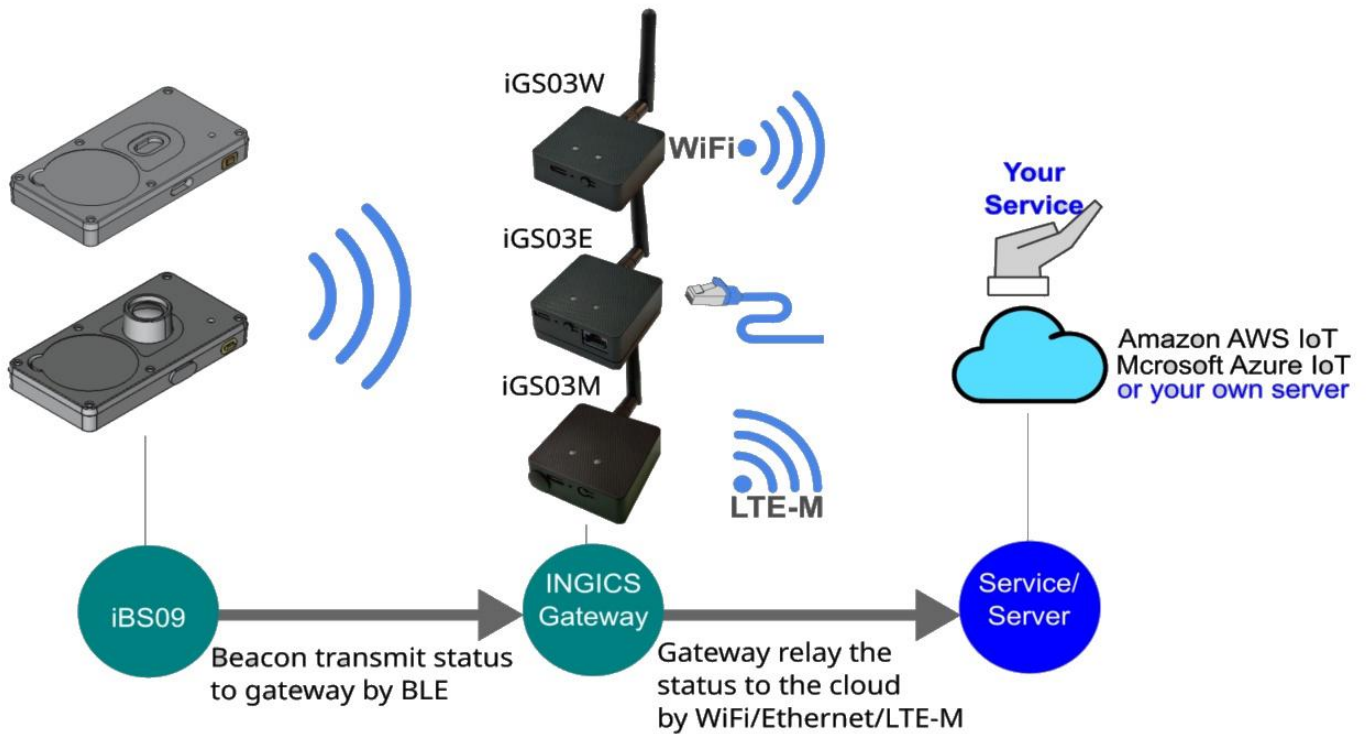
\*3 The iBS09R has 5 configurable modes, each with different power consumption and maximum detection distance, measured with A4-sized white 88 paper

\*4 Calculated with one CR2450 battery with 600mAH capacity in default settings. Considering the battery discharge characteristic, only 70%-80% of capacity is used for calculation. This value is just for reference and may be varied with component tolerance and different environments.

# INGICS TECHNOLOGY

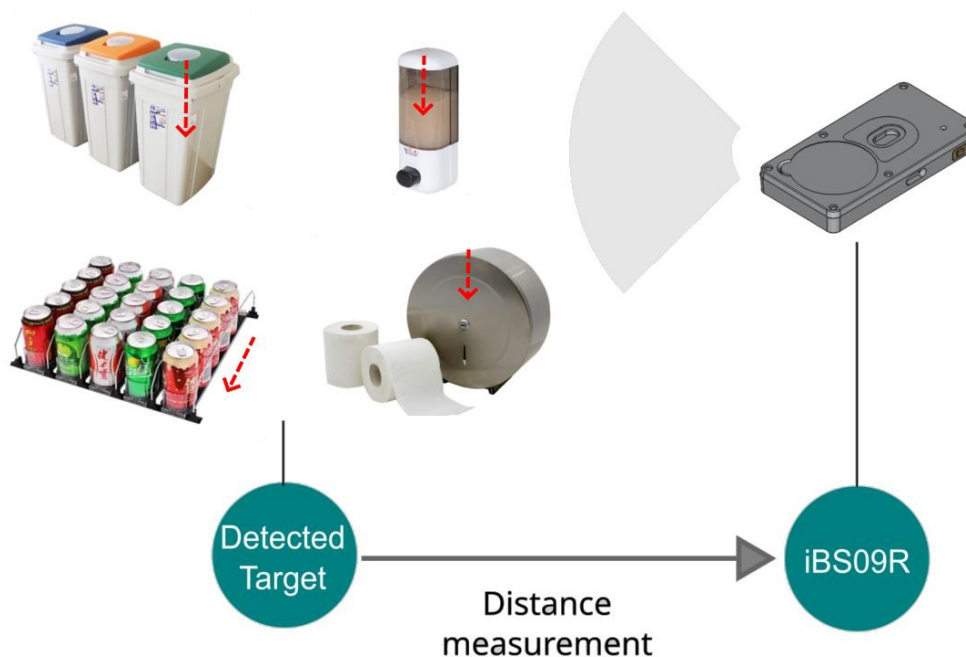
## Typical Usage

The beacon information can be received by our gateway (iGS03W/iGS03M/iGS03E) and then sent to the cloud server. Users can access and manage the data on their cloud.



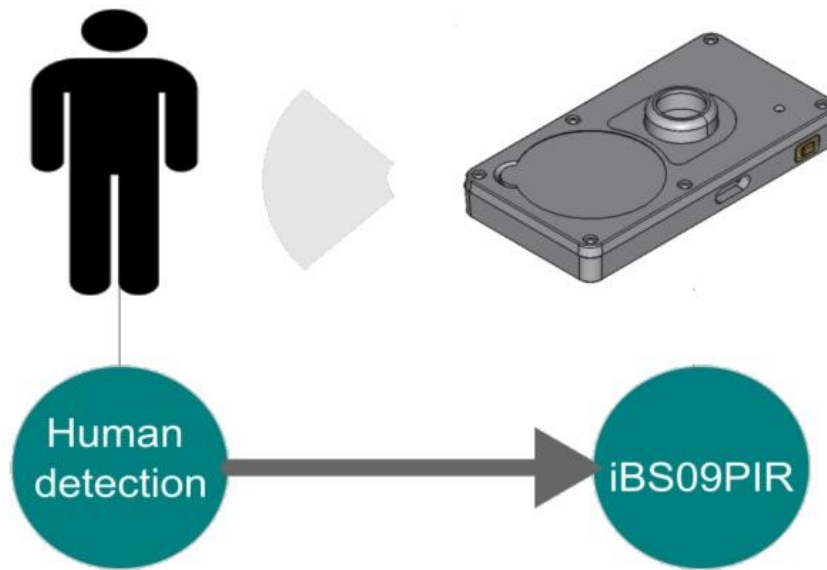
## iBS09R

By measuring distance, iBS09R can be used for waste container full/empty monitoring, toilet paper utilization or inventory monitoring.



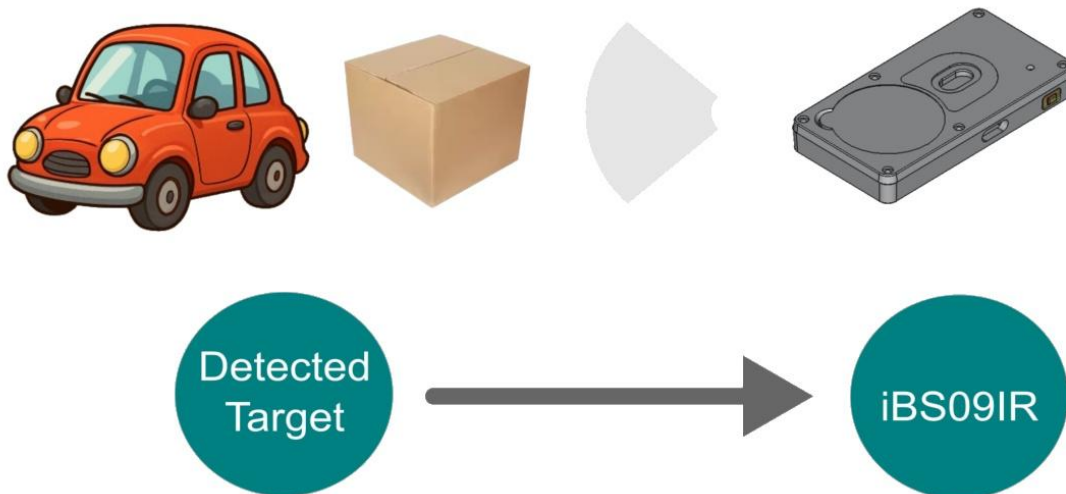
## iBS09PIR

For human detection within the 5M range

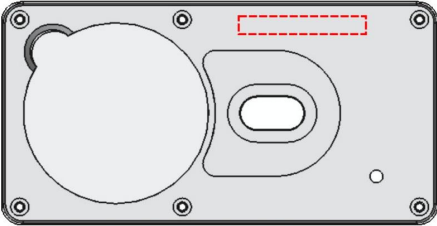
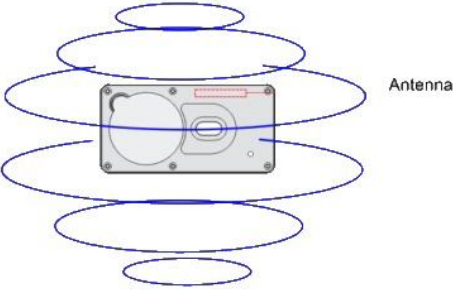
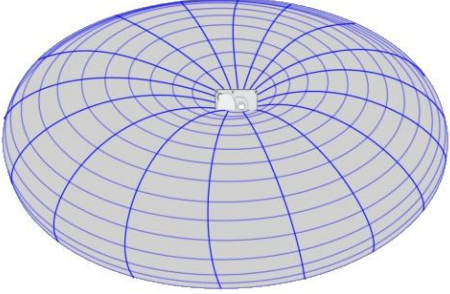


## iBS09IR

For object detection from 1cm to 50cm.



## Antenna

| Antenna Position                                                                 | Radiation Direction                                                                | Radiation Pattern                                                                   |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |

## BLE Payload Format

\* Endianness: Little endian

| Prefix     | MFG Code (2 bytes) | Beacon Code (2 bytes) | Tag Batt (2 bytes) | Event Status (1 byte) | Sensor 1 (2 bytes) | Sensor 2 (2 bytes) | Lux/Aux (2 bytes) | Aux 1 (2 bytes) | Aux 2 (2 bytes) | Aux 3 (2 bytes) | User Data (2 bytes) | Sub Type (1 byte) | Reserved (3 bytes) |
|------------|--------------------|-----------------------|--------------------|-----------------------|--------------------|--------------------|-------------------|-----------------|-----------------|-----------------|---------------------|-------------------|--------------------|
| 0201061AFF | 2C08               | 88BC                  | XXXX               | XX                    | XXXX               | XXXX               | XXXX              | XXXX            | XXXX            | XXXX            | 0000                | XX                | 000000             |

| Field                  | Description                                                                                                   |
|------------------------|---------------------------------------------------------------------------------------------------------------|
| MFG Code               | Manufacturer vendor code, fixed to 0x082C                                                                     |
| Beacon Code            | Magic Code to identify packet format, fixed to 0xBC88.                                                        |
| Tag Batt               | Battery voltage of tag in 0.01V unit                                                                          |
| Event Status (Bitmask) | 8-bit bitmask:<br>* 0x01: Button pressed<br>* 0x10: PIR active<br>* 0x20: IR proximity/Presence detected      |
| Sensor 2               | 2 bytes.<br>iBS09R: ToF distance reading (mm).<br>iBS09IR / iBS09PIR: Event counter.                          |
| User Data              | 16bit user defined data                                                                                       |
| Sub Type               | Model identification code:<br>* 0x42: iBS09R<br>* 0x44: iBS09PIR<br>* 0x47: iBS09IR<br>* 0x54: iBS09 Standard |

## iBS09 - iBeacon Mode

The iBS09 tag can be configured to simulate an iBeacon device, using the iBeacon payload format for advertising and the INGICS format (detailed above) for the scan response.

| Prefix     | MFG Code (2 bytes) | Beacon Code (2 bytes) | Proximity UUID (16 bytes) | Major (2 bytes) | Minor (2 bytes) | Measured Power (1 byte) |
|------------|--------------------|-----------------------|---------------------------|-----------------|-----------------|-------------------------|
| 0201061AFF | 4C00               | 0215                  | ....                      | XXXX            | XXXX            | XX                      |

| Field          | Description                                                                |
|----------------|----------------------------------------------------------------------------|
| MFG Code       | 0x004C (Apple's registered ID)                                             |
| Beacon Code    | 0x02 (Proximity Beacon)                                                    |
| Proximity UUID | 16-byte UUID. Default: B9A5D27D-56CC-4E3A-AB51-1F2153BCB967 (Configurable) |
| Major          | 2-byte Major number. Default: 0x00 + 4th byte of MAC. (Configurable)       |
| Minor          | 2 byte Minor number. Default: 5th and 6th byte of MAC. (Configurable)      |
| Measured Power | 1 byte representing RSSI at 1 meter. Default: -42. (Configurable)          |

## Specification

### Absolute Maximum Rating

|                     |                                                  |
|---------------------|--------------------------------------------------|
| Supply Power        | CR2450 battery X1<br>USB Type-C , Max. +5.5 Volt |
| Storage Temperature | -40° to 85° Celsius                              |

### Recommendable Operation Condition

|                       |                                     |
|-----------------------|-------------------------------------|
| Operating Temperature | -20°C to 60°C                       |
| VDD                   | +3V by CR2450 battery or USB Type-C |
| IPX7                  | 30min.@1 Meter water                |

### Average Current Consumption

|                |                                                  |
|----------------|--------------------------------------------------|
| iBS09-5s       | 9.6A*, in default 5sec transmit period@1Mbps.    |
| iBS09R-Low/30s | 15.2A*, in default 30sec transmit period@1Mbps.  |
| iBS09PIR-30s   | 12.3uA*, in default 30sec transmit period@1Mbps. |
| iBS09IR-30s    | 17.9uA*, in default 30sec transmit period@1Mbps. |

\* Measured with Panasonic CR2450 battery.

\* default setting

## Battery Life Simulation

|                |                                                  |
|----------------|--------------------------------------------------|
| iBS09-5s       | 4.9~5.6y in default 5sec transmit period@1Mbps.  |
| iBS09R-Low/30s | 3.1~3.6y in default 30sec transmit period@1Mbps. |
| iBS09PIR-30s   | 3.8~4.4y in default 30sec transmit period@1Mbps. |
| iBS09IR-30s    | 2.6~3y in default 30sec transmit period@1Mbps.   |

\* Calculated with one CR2450 battery with 600mAH capacity. Considering the battery discharge characteristic, only 70%-80% of capacity is used for calculation. This value is just for reference and may be varied with component tolerance and different environments.

## BLE RF Specification

|                |                                                    |
|----------------|----------------------------------------------------|
| Transmit Power | High: +8dBm<br>Mid: +4 dBm( default)<br>Low: -4dBm |
| Frequency band | 2.402 – 2.480 GHz                                  |
| Antenna        | on board PCB antenna                               |
| Range          | >100M in open space                                |

## TOF Sensor error

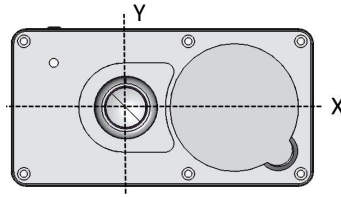
|                                   |                   |
|-----------------------------------|-------------------|
| Object distance $\geq$ 500mm      | $\pm 3\%$         |
| 50mm $\leq$ Object distance<500mm | $\pm 15\text{mm}$ |
| Object distance<50mm              | +5mm<br>-20mm     |

\* Detection rate is a statistical value indicating the worst case percentage of measurements that return a valid ranging. For example, taking 1000 measurements with 90% detection rate gives 900 valid distances. The 100 other distances may be outside of the specification and are flagged with an error status.

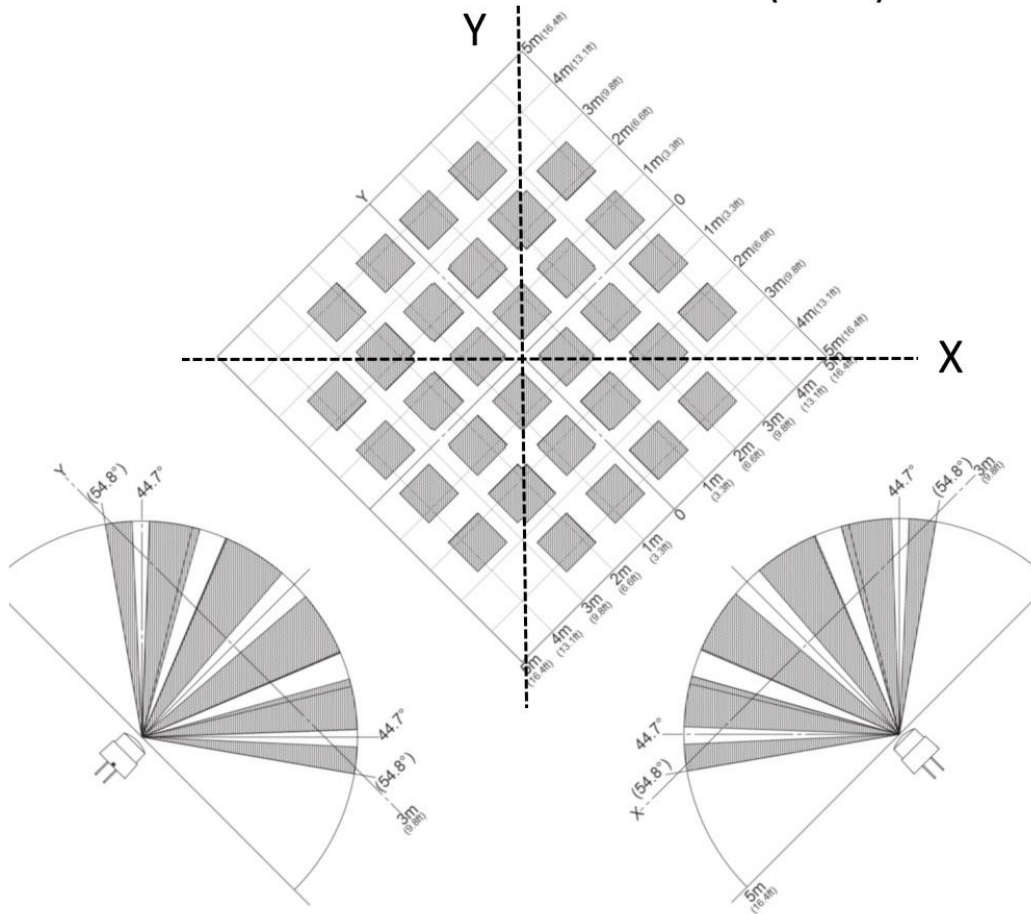
## PIR Sensor Characteristic

|                                            |             |
|--------------------------------------------|-------------|
| Detection distance                         | 5M          |
| Detection Range<br>(Horizontal X Vertical) | 110° X 110° |
| Detection zone                             | 32 zones    |

## PIR Detection Range



## X-Y cross section at 3m (9.8ft)



## IR Sensor Characteristic

|                    |                           |
|--------------------|---------------------------|
| Detection distance | 50cm: A4 size white paper |
|--------------------|---------------------------|

## Actual Measurement Result

iBS09R

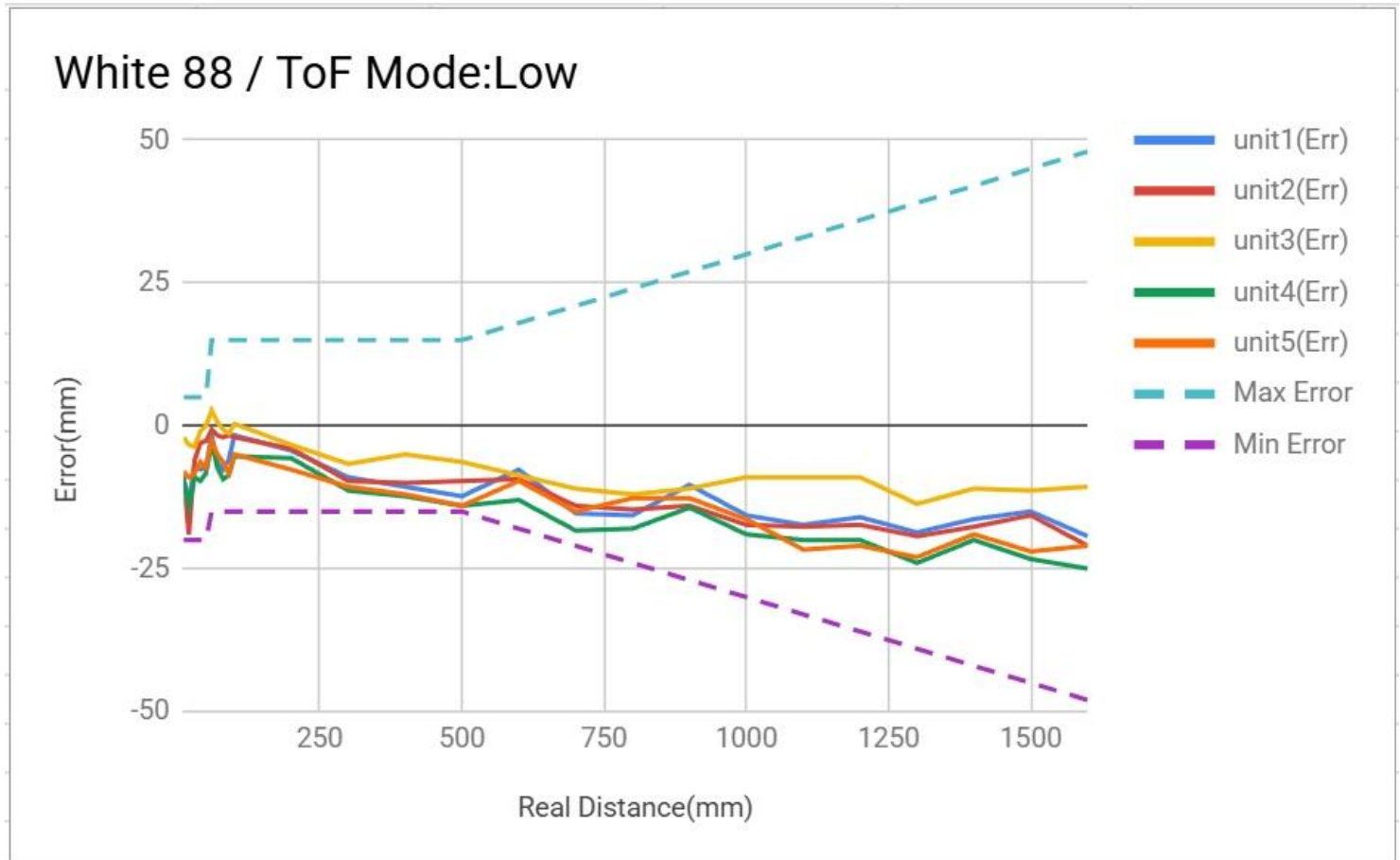
Test conditions

1. 5 units of iBS09R are used for the test.
2. Each number takes 3 averages.
3. Tested under office light.
4. Use an A4-sized white 88 and gray 18 paperpaper angle 0° for the test.\*1
5. Max./min. ranging error(mm) comes from the specification of the TOF sensor.
6. Working Voltage and temperature: 3 V & 27 °C.

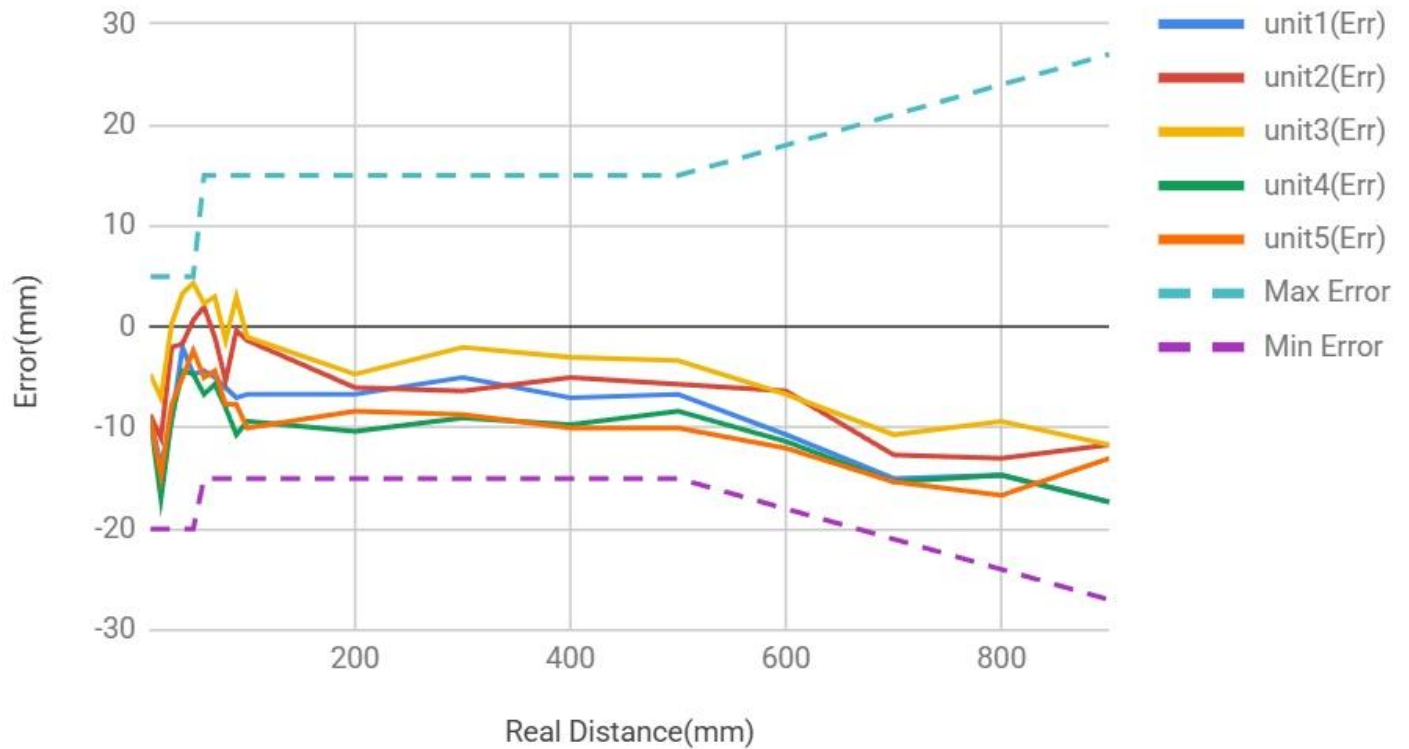
**\*1 The sensing distance varies depending on ambient lighting, object color, and object size. Under the 'ToF Mode: High' setting, it can detect a white wall up to 5 meters.**

Conclusion

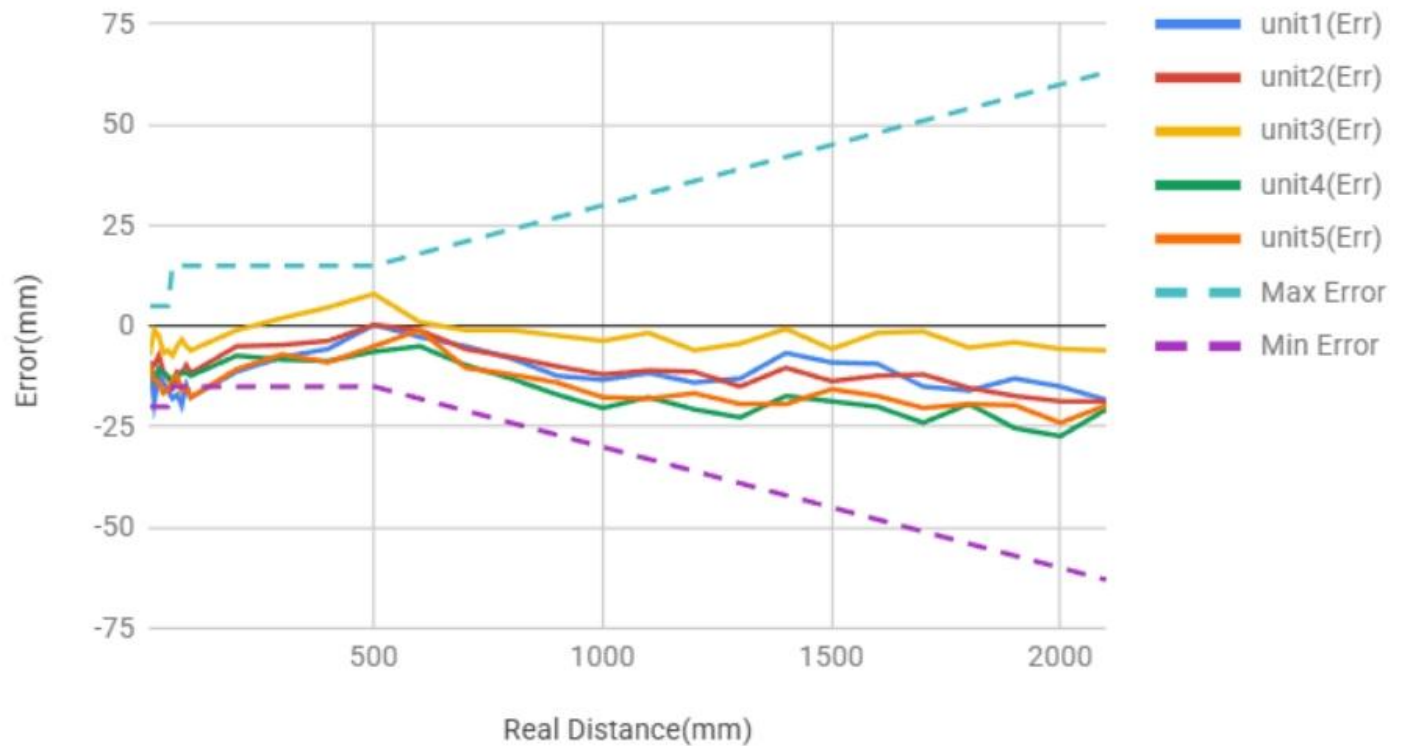
Distance detection across different modes meets specification in over 90% of cases.



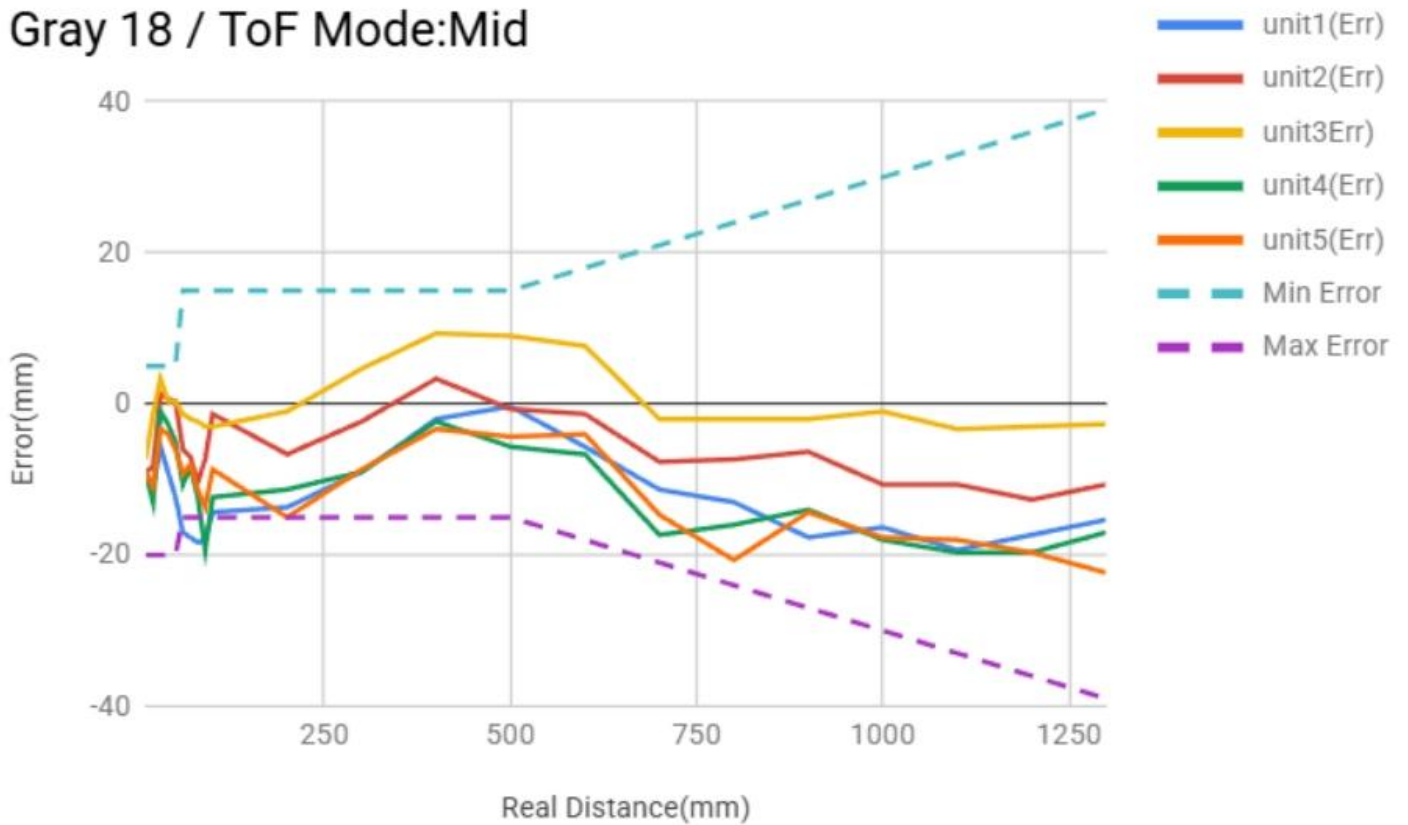
## Gray 18 / ToF Mode:Low



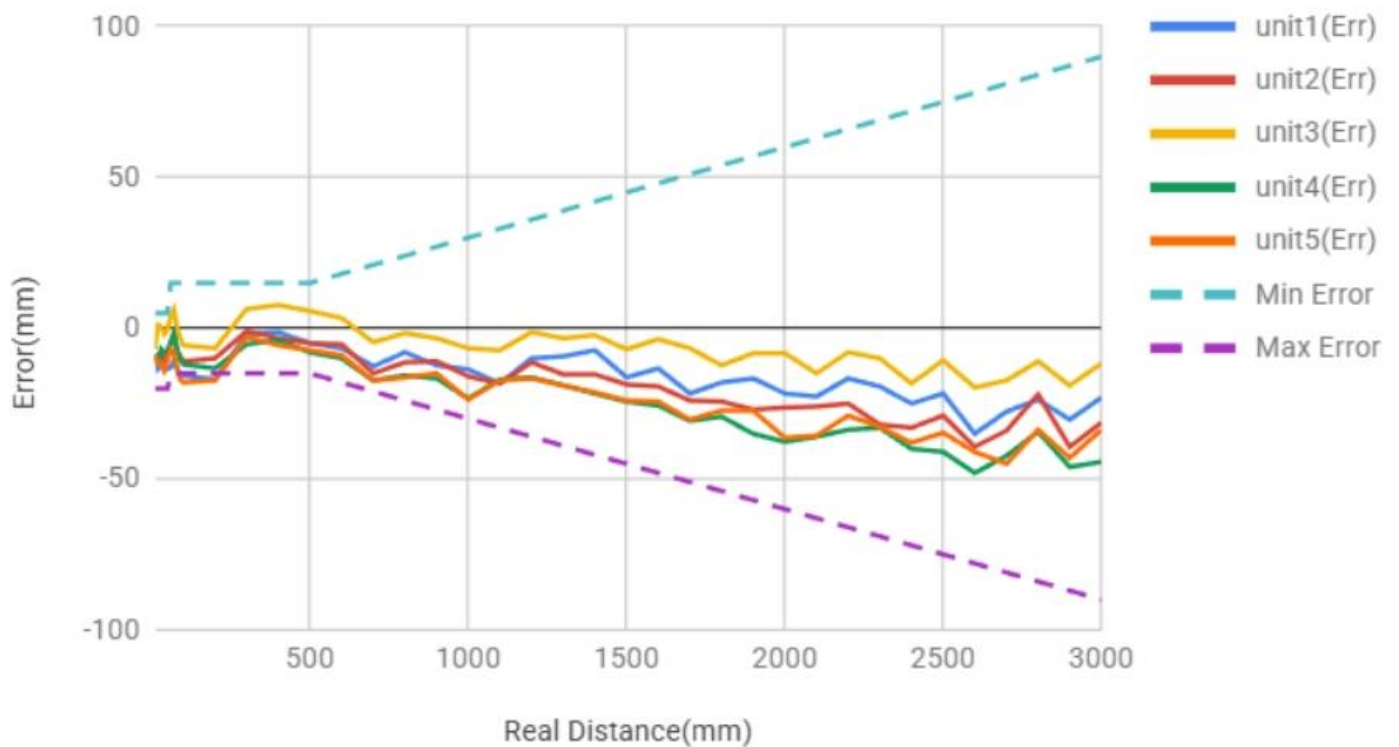
## White 88 / ToF Mode:Mid



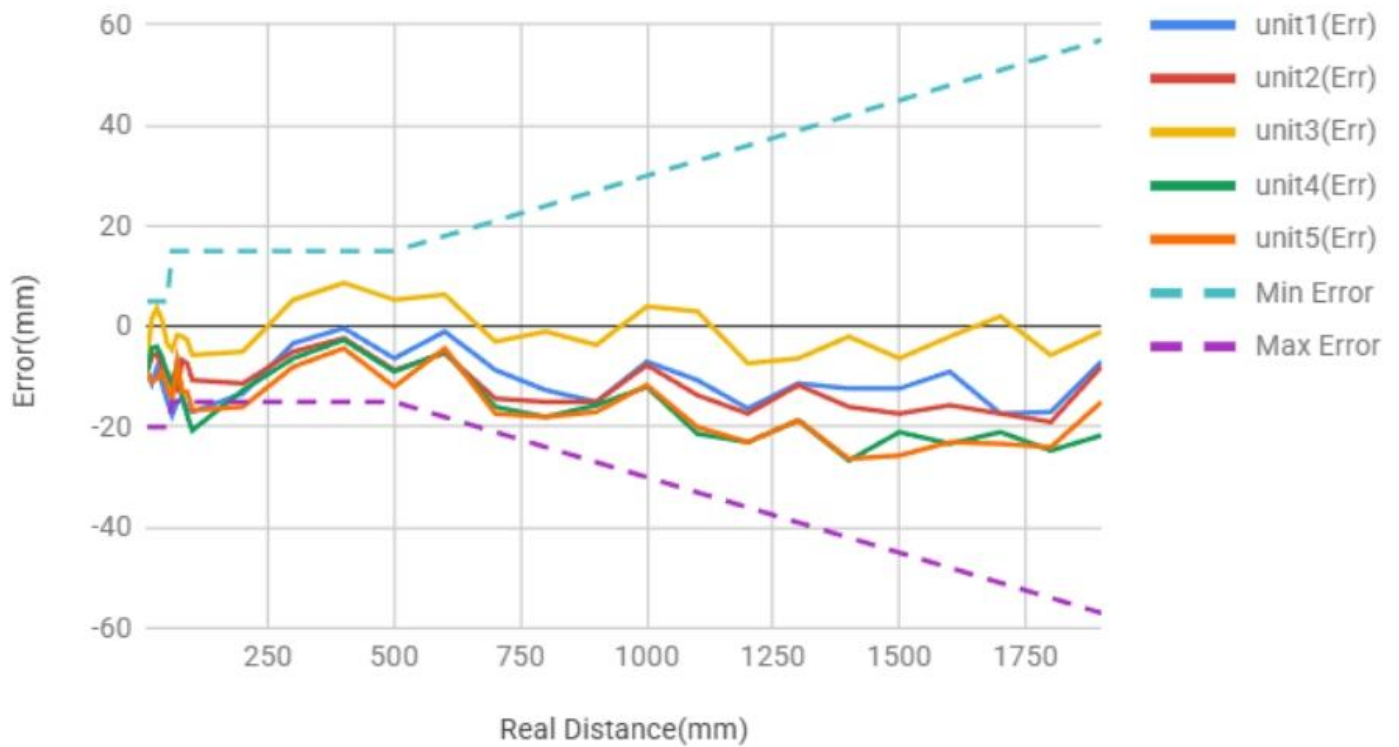
Gray 18 / ToF Mode:Mid



White 88 / ToF Mode:High



Gray 18 / ToF Mode:High

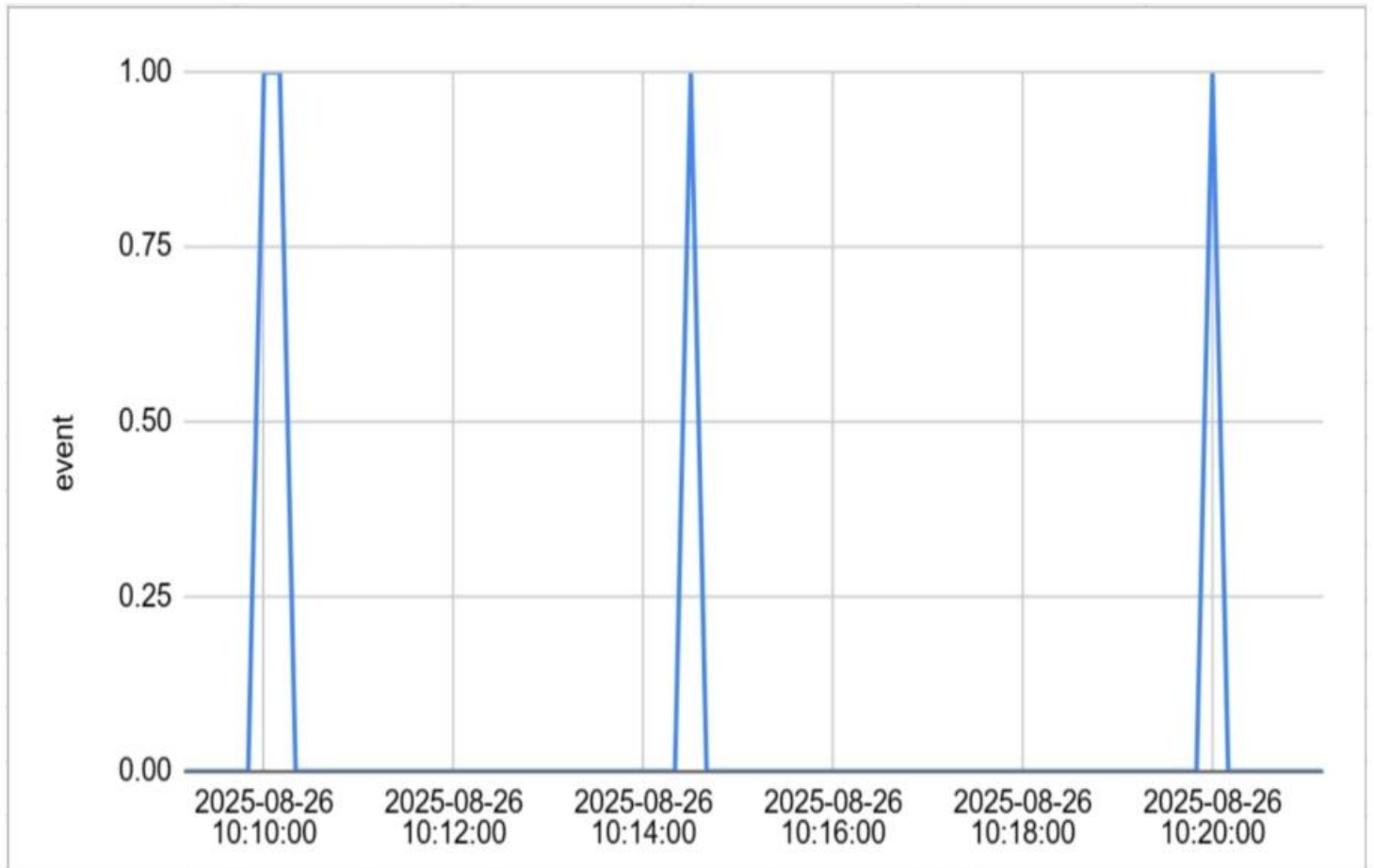
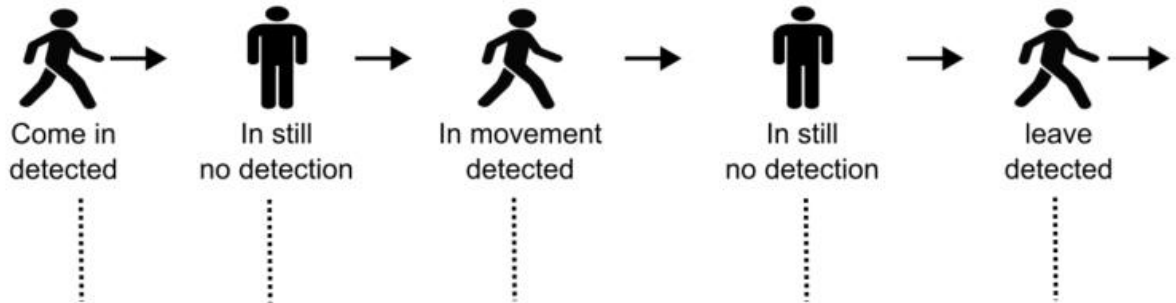


# INGICS TECHNOLOGY

iBS09PIR

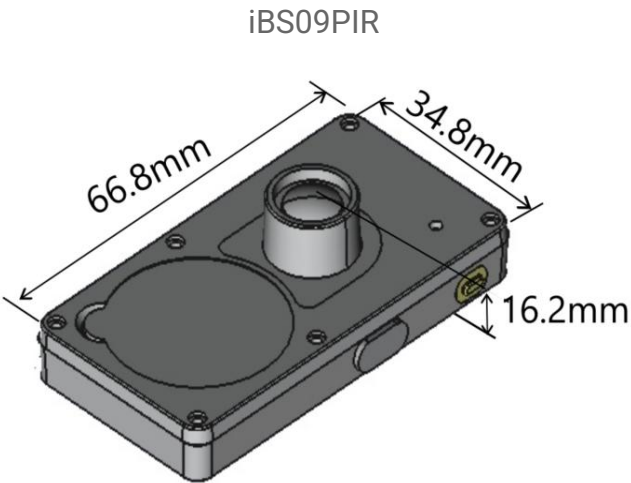
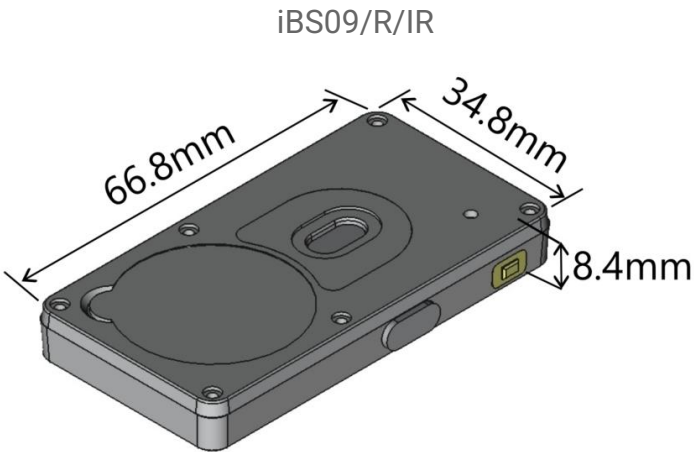
## Test conditions

1. 1 unit of iBS09PIR is used for the test.
2. Captured from a top-down angle at a height of 3 meters above the ground.
3. Tested under office light.
4. Working Voltage and temperature:: 3 V & 27 °C.



## Dimension

|                           |                                                                                 |
|---------------------------|---------------------------------------------------------------------------------|
| Dimensions L x W x H( mm) | 34.8mmx66.8mmx8.4mm( iBS09/ iBS09R/ iBS09IR)<br>34.8mmx66.8mmx16.2mm( iBS09PIR) |
| Weight( g)                | iBS09:21g<br>iBS09R:22g<br>iBS09IR:22g<br>iBS09PIR:23g                          |



## Marking



Serial Number: 2508750001

25: 2025

08: Aug

74: iBS09PIR product code

75: iBS09R product code

76: iBS09IR product code

70: iBS09 product code

0001: SN

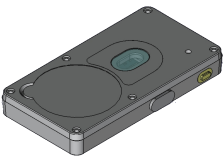
MAC: BFC2D7, the last 6 digits of MAC address

QR code: full MAC address

## Packaging

One package box(size: 125mmx60mmx70mm) contains 8 units of iBS09 with 8 pcs of double side tape.

8X



## Waste Electrical and Electronic Equipment Recycling

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.



## Certification

### Bluetooth SIG Qualification

Model number: iBS09  
Declaration ID: Q364006

### NCC Regulatory

iBS09:CCAH26LP1843T6  
iBS09R:CCAH26LP1840T0  
iBS09IR:CCAH26LP1841T2  
iBS09PIR:CCAH26LP1842T4

### FCC Regulatory

contains  
FCC ID:2AEQ404

Japan Giteki( MIC) Regulatory  
201-250934

## 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。」

## CE Regulatory

iBS09 series have been tested and complies with the essential requirements of the DIRECTIVE 2014/53/EU. The copy of the CE Conformity of Declaration is listed in the following page.

## DECLARATION OF CONFORMITY

UNDER EU RED - DIRECTIVE 2014/53/EU -

This declare that the following designated product

### Sensor Beacon

**Model No.: iBS09, iBS09R, iBS09IR, iBS09PIR**

**Brand Name: INGICS**

.....  
(Product identification)

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

#### EMC

EN 301 489-1: V 2.2.3 (2019-11)  
EN 301 489-17: V 3.3.1 (2024-09)

#### Radio Spectrum

EN 300 328 : V 2.2.2 (2019-07)

#### Safety

EN IEC 62368-1-2024+A11:2024  
used in conjunction with  
IEC 62368-1( Edition 4.0):2023  
Health  
EN 62479(2010)

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

This declaration is issued for

**INGICS TECHNOLOGY CO., LTD.**

**2F., No.15-2, Changshou St.,**

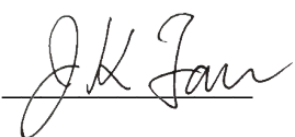
**Shulin Dist., New Taipei City 238,, Taiwan, R.O.C.**

.....  
(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: JK Fan

Title: President

Signature: 

Date: Feb 22, 2026

## UKCA Regulatory

iBS09 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.

## 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): iBS09, iBS09R, iBS09IR, iBS09PIR  
Trademark: INGICS  
Batch / Serial Number: 2602750001 and after



**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 3.3.1 (2024-09)

EN 300 328 : V 2.2.2 (2019-07)

EN IEC 62368-1-2024+A11:2024 used in conjunction with  
IEC 62368-1( Edition 4.0) :2023

EN 62479(2010)

### Signed for and on behalf of:

Feb 22, 2026  
Date of issue

J.K.Fan, President  
Name, Function, Signature



## Revision History

| DATE         | REVISION | CHANGES                                                                                                                                             |
|--------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Aug 28, 2025 | 0a       | Initial release                                                                                                                                     |
| Dec 17, 2025 | 0b       | Update operating temperature<br>Update battery life<br>Update iBS09PIR Size<br>Update certification time<br>Update iBS09IR FoV<br>Update weight( g) |
| Feb 24, 2026 | 01       | Update Operating humidity<br>Update iBS09 Spec<br>Update Statement<br>Update Frequency band<br>Update Packaging<br>Update Certification             |
| Jul 29, 2026 | 02       | Update BLE payload format section                                                                                                                   |
| Aug 11, 2026 | 03       | Update iBS09R battery life<br>Update iBS09R actual measurement result(Adjustment ToF Mode)                                                          |