

iBS03R Specification

iBS03R Waterproof Sensor Beacon

iBS03R is an IP67 waterproof BLE beacon with a TOF(Time-of-Flight) sensor which can be used for distance measurement. BLE is a very low power 2.4G radio that can transmit the beacon information efficiently. iBS03R is a rugged design for working in tough conditions. The typical battery usage time is 1.6~2.6 year in default settings(60s ADV interval).



Features

General

- ARM Cortex™-M3 32-bit processor
- Support BLE 4.2 and BLE 5 long range
- IP67 waterproof
- 1.5M of drop protection
- Powered with 1XCR2450 battery
- battery life: 1.6~2.6 year in typical beacon setting(60s ADV interval)
- Android APP for configuration
- Power on/off switch(internal)
- Main unit Size: 43mmx43mmx 16.5mm
- Main unit Operating temperature: -20°C to 75°C
- Certificate: CE/FCC/IC/TELEC

Sensor

- TOF sensor for distance measurement from 4 centimeters to 3 meters.

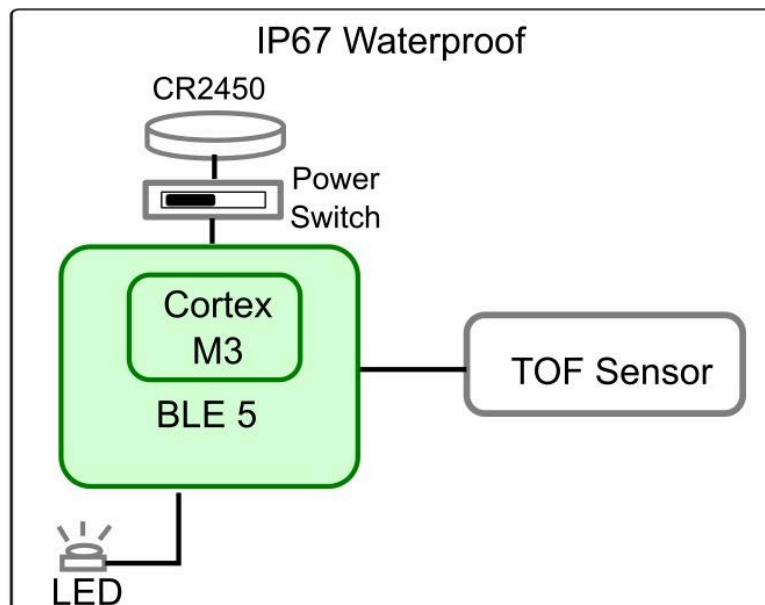
RF

- 2.4GHz frequency band
- Maximum transmit power: +5dB
- On board PCB antenna
- >100M range in open space

Applications

- Trash can monitoring
- Toilet paper monitoring
- Consumables monitoring
- Sanitizer monitoring
- Inventory monitoring
- Industrial automation

Block Diagram



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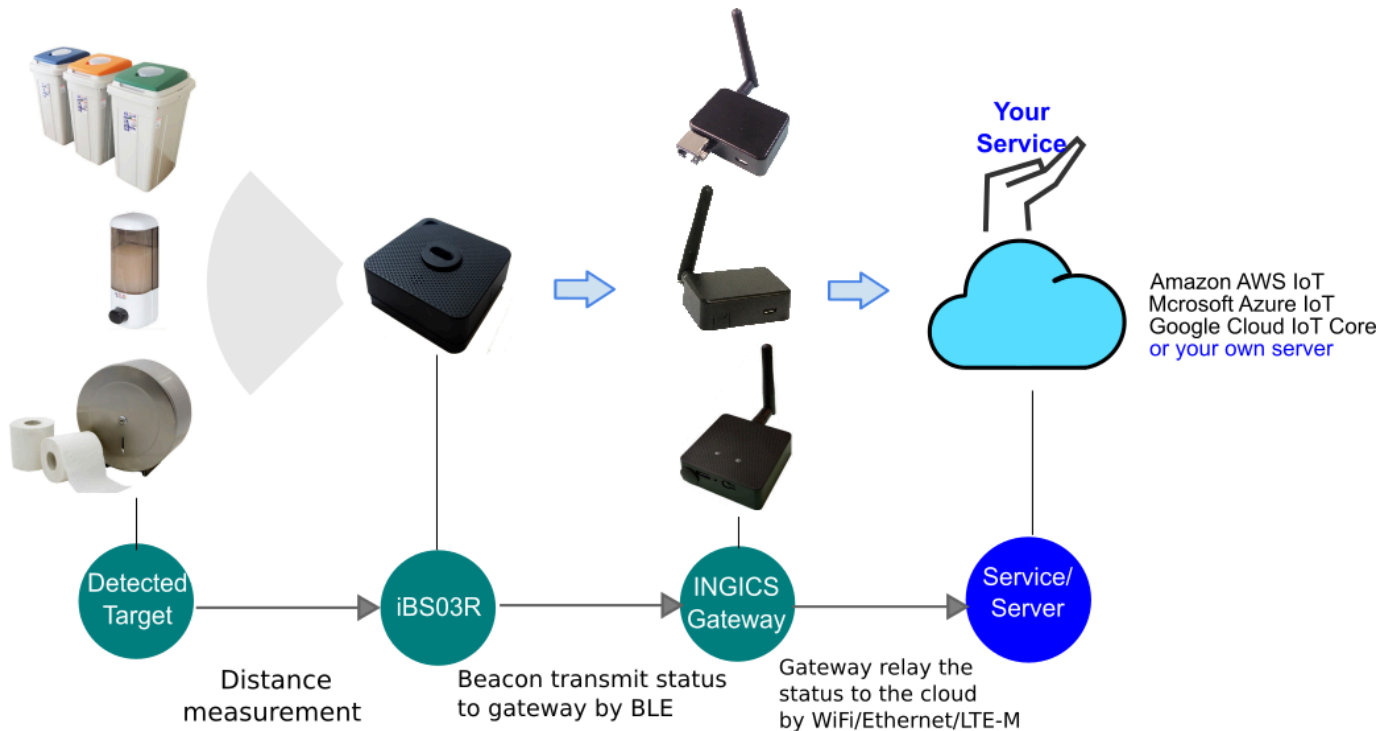
Mode

iBS03R

Mode	Measurement Range	Note
Short Distance	40-1300 mm	Default mode. Use this mode when possible. Consumes less power. More immune to the ambient light.
Long Distance	40-3000 mm	For long distance measurement. Ambient light may affect the measurement accuracy.

Typical Usage

By measuring distance, iBS03R can be used for many applications, such as trash can monitoring, toilet paper monitoring, and the other consumables monitoring. It can also be used for inventory monitoring. The distance information can be received by our gateway(iGS01S, iGS02E, or iGS03W/iGS03M/iGS03E) and then sent to the cloud server. Users can access and manage the data anytime and anywhere.



Specification

Absolute Maximum Rating

Supply Power	CR2450 battery
Storage Temperature	-40° to 85° Celsius

Recommendable Operation Condition

Operating Temperature	-20° to 75° Celsius
VDD	+3V by CR2450 battery
IP67	30min.@1 Meter water

Update Interval

BLE advertising	100ms~60 min. (default: 60 sec)
TOF Sensor	0.5X (BLE advertising interval) but the minimum is 10 sec

Current Consumption

iBS03R-Short distance	Average: 17.87uA*, in the default 60s transmit period.
iBS03R-Long distance	Average: 24.9uA*, in the default 60s transmit period.

Battery Life Simulation

iBS03R-Short distance	1.6 ~2.6 yr*, in the default 60s transmit period.
iBS03R-Long distance	1.4~2.4 yr*, in the default 60s transmit period.

* Calculated with one CR2450 battery with 600mAH capacity. Considering the battery discharge characteristic, only 50%-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	Max.: +5dBm
Frequency band	2.400 – 2.483 GHz
Frequency Deviation	+/-350 kHz @1Mbps
Antenna	on board PCB antenna
Range	>100M in open space

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TOF Sensor iBS03R

	Max. distance in dark(mm)* ¹	Max. distance in office light(mm)* ¹	Max. distance in 200 kcps/SPAD light (mm)* ¹	Min. distance(mm)
Long distance mode	3000	2900* ²	730* ³	40
Short distance mode	1300	1300	1300	40
Ranging error(mm)	±25* ⁴			
Field-of-view (FoV)	27°* ⁵			

*1: Ambient light is defined as follows:

- a) Dark = no IR light in the band 940 nm ±30 nm
- b) 200 kcps/SPAD = lighting on a sunny day from behind a window, with direct illumination on the sensor
- c) For reference, usual office lighting is around 5 kcps/SPAD

*2: Based on actual measurement results on 10 pc of samples.

*3: In long distance mode, the maximum ranging distance is impacted by the ambient light. While the short distance mode is more immune to the ambient light

*4: The error may exceed 25mm when the target is transparent liquid because the bottom of the container will reflect the light too. In that case, please make sure the bottom of the container is black or non-reflective.

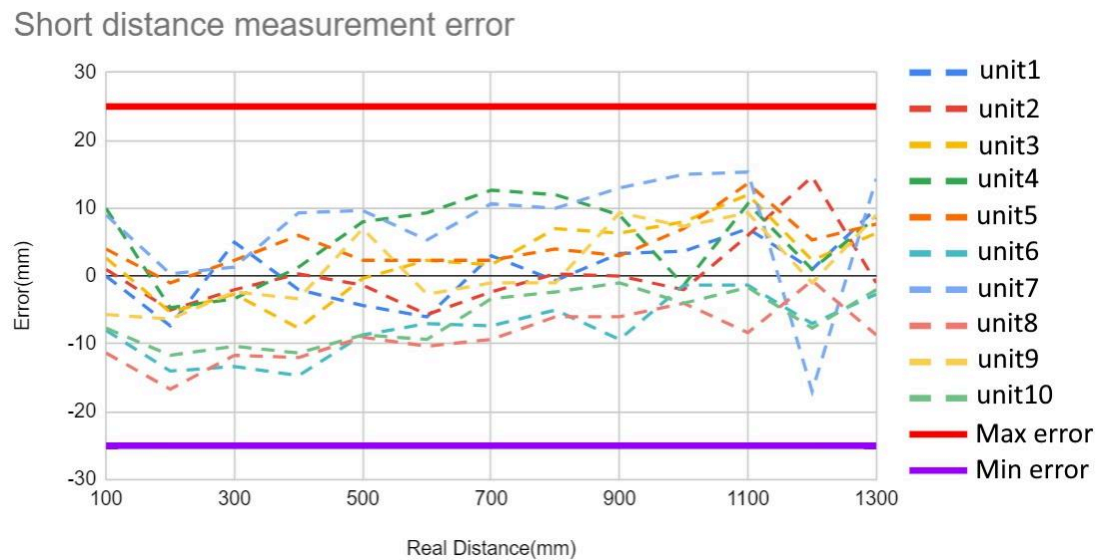
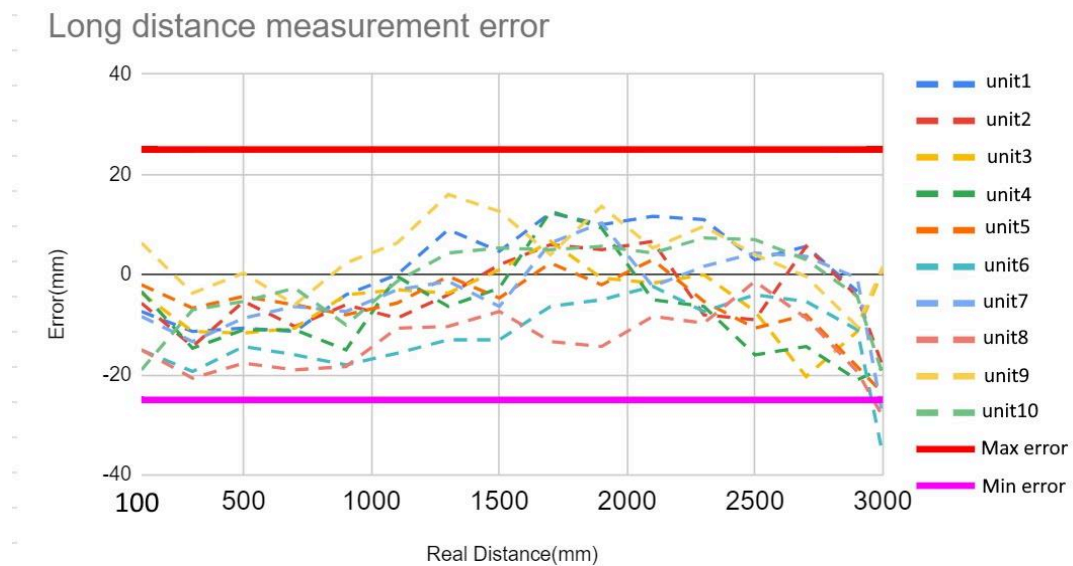
*5: The maximum detection angle will be varied depending on the object size.

Actual measurement result

iBS03R

Test conditions

1. 10 units of iBS03R are used for the test.
2. Each number takes 3 averages.
3. Tested under office light.
4. Use A4 paper angle 0° for the test.
5. Max./min. ranging error(mm) comes from the specification of the TOF sensor.
6. Working Voltage and temperature:: 3 V & 26 °C.



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Detection angle test(FOV)

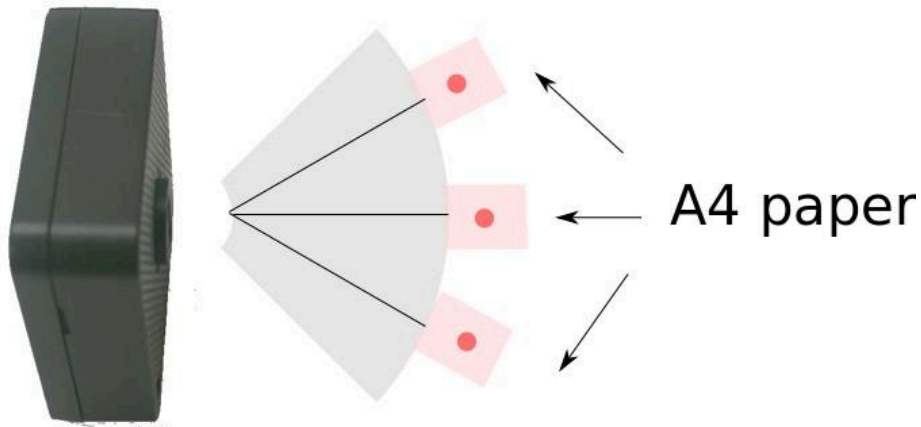
Test conditions

1. 2 units of iBS03R are used for the test.
2. Each number takes 3 averages.
3. Tested under office light.
4. Use A4 paper for the test.
5. Real measurement distance : 700mm.
6. Working Voltage and temperature:: 3 V & 26 °C.
7. Use short range mode.

iBS03R

Angle	-15°	-10°	-5°	0°(Center point)* ¹	5°	10°	15°
unit1 Measurement result	783 Error:+83 mm	730mm Error:+30mm	710mm Error:+10mm	701mm Error:+1mm	713mm Error:+13mm	725mm Error:+25mm	770 Error:+70mm
unit2 Measurement result	770 Error:+70 mm	723mm Error:+23mm	709mm Error:+9mm	699mm Error:-1mm	715mm Error:+15mm	730mm Error:+30mm	764 Error:+64mm

*1:The measurement angle should be kept as small as possible to keep the measurement error small.



Dimension

Dimensions L x W x H (mm)	43 x 43 x 16.5
Weight(g)	24

Packaging

One package box(size: 11cmX5.5cmx6.5cm) contains 8 units of iBS03R, 8 pc of double side tape, and 20pc of stainless screw .



Certification

Japan MIC Regulatory
211-180707

FCC Regulatory
2AH2IIBM40R2

IC Regulatory
21379-IBM40R2

CE Regulatory

iBS03R have been tested and comply with the essential requirements of the DIRECTIVE 2014/53/EU. Below is the copy of the CE Declaration of Conformity.

UKCA Regulatory

iBS03R 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.

DECLARATION OF CONFORMITY

Under EU RED - DIRECTIVE 2014/53/EU -

This Declaration that the following designated product

Sensor Beacon
Model No.: iBS03R
Brand Name: INGICS

.....
(Product identification)

complies with the essential requirements of the EU RED - DIRECTIVE 2014/53/EU on the approximation of the laws of the Member States relating to *Radio Spectrum Matters*.

Assessment of compliance of the product with the requirements relating to radio spectrum matters was based on Annex IV of the Directive 2014/53/EU and the following standard:

EMC
EN 301 489-1: V2.2.3 (2019-11)
EN 301 489-17:V3.2.4 (2020-09)

Radio Spectrum
EN 300 328 :V 2.2.2(2019-07)

Health
EN 62479(2010)
Safety
IEC 62368-1:2018 and
EN IEC 62368-1:2020+A11:2020

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

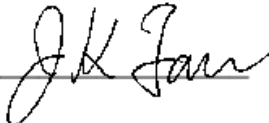
This declaration is issued from
INGICS TECHNOLOGY.
2F., No.15-2, Changshou St.,
Shulin Dist., New Taipei City 238,, Taiwan, R.O.C.

.....
(Name / Address)

Furthermore we declare that our product will be produce in correspondence with all requirements according to the Directive 2014/53/EU.

Name: JK Fan

Title: President

Signature 

Date: 2023.08.31

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):	iBS03R
Trademark:	INGICS
Batch / Serial Number:	After 210937000001



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

JK Fan, President
Name, Function, Signature



F058 v.2

Revision History

DATE	REVISION	CHANGES
Jan 26, 2021	0a	Initial release
Apr 6, 2021	01	Add conformity declaration of CE certification
Apr 12, 2021	01a	Add detection angle test
June 3, 2021	01b	Update the content of the certification chapter
Aug 31, 2023	01c	Update CE Certification information Battery life change to 1.6~2.6 year
June 11,2024	01d	Update UKCA Certification information