MOD611 Datasheet

Presence, Motion, Respiration Sensor for Healthcare

bitsensing

Design Future Safety

Table of Content

1. Introduction

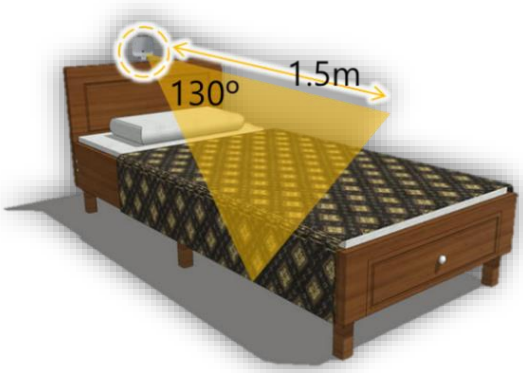
MOD611 is 60GHz mmWave IoT radar sensor for a more intelligent and safer monitoring system. Reliably detecting presence, movement and breathing without the use of intrusive cameras or wearables.

It can detect a person even if there is no movement or is under blanket as it detects vital signs like breathing or micro vessel flow. In addition, abnormal signs such as apnea can be detected and alerted in real-time to prevent sudden death of infants or to monitor the elderly person who are living alone, a person with dementia, or hospitalized patients. There is no blind spot within the sensing area and are not affected by obstacles such as blankets or clothes.

It can be used in dark and humid environment and does not invade privacy because it does not acquire optic information. There is no need to wear wearable devices and is easy to install.

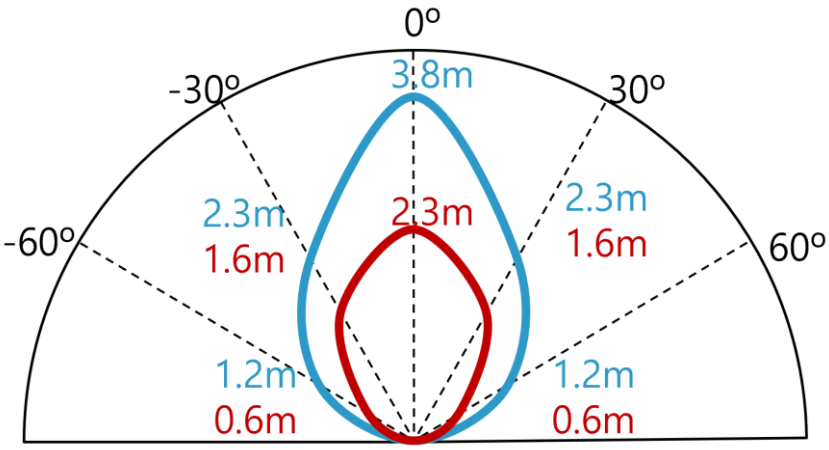
2. Product Specification

2.1 Detection Range



<Vital Detection Range>

<Sensor Image>



<Vital Detection Range>

Red: Presence, Movement, Apnea Detection Range

Blue: Movement Detection Range

2.1.1 Adult Presence/Apnea Detection Range by Angle (Min 0.2m)

Angle Points	0 deg	± 30 deg	± 60 deg
Presence, Movement, Apnea Detection Range	2.3 m	1.6 m	0.6 m
Movement Detection Range	3.8 m	2.3 m	1.2 m

1.1.1 Baby Presence/Apnea Detection Range by Angle (Min 0.2m)

Angle Points	0 deg	± 30 deg	± 60 deg
Presence, Movement, Apnea Detection Range	0.8 m	0.8 m	Not Available

3. Sensor Operation

3.1 Presence and Breathing Detection

3.1.1 Detect Condition

- Target person must be within 0.2m to 3m detection range.
- If more than one person is present in the detection zone, the MOD611 sensor will measure the one who's movement is bigger.
- Metallic objects should be avoided.

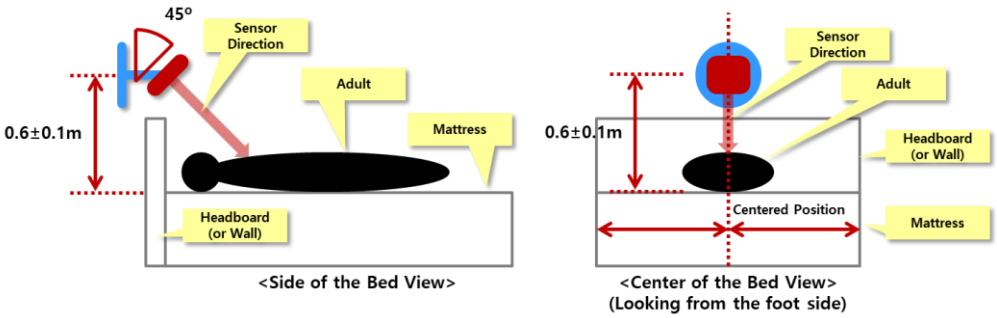
3.1.2 Sensor Detection Result

- Absence: When there is no person present
- Presence: When there is a person present (Person is still and breathing normally)
- Motion: When there is a person present and movements are detected
- Apnea (No Breathing): When there is a person present, but no breathing has been detected for certain time*

  (* Apnea is defined when there is no breathing for 10 seconds for Adults and 20 seconds for Baby)

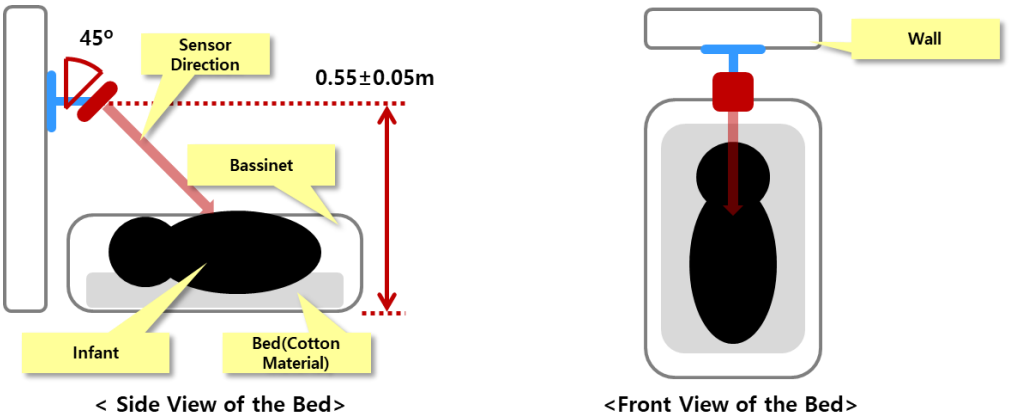
3.1.3 Adult Bed Installation Guide

- Height: 0.6±0.1m from the Mattress Surface
- Location: Center of the Bed's Headboard (Head side)
- Angle: Front of senor should be facing down by 45º
- Cautions:
  - The target person should be lying down in the center of the bed. The front of the sensor should be facing towards the target person's (Adult) chest
  - There should be Metallic objects right underneath the sensor. (Except for Electric Wires)



3.1.4 Baby Bed Installation Guide

- Height: 0.55±0.05m from the ground
- Location: Center of the Bed's Head
- Angle: Front of senor should be facing down by 45º, towards the baby's chest
- Cautions:
  - There should be Metallic objects right underneath the sensor. (Except for Electric Wires)



3.2 Detection Time

Category	Adult Monitoring	Baby Monitoring
Absence → Presence(Motion)	1 sec	1 sec
Presence(Motion) → Absence	10 sec	5 sec
Apnea	10 sec	20 sec

4. Device Dimensions

4.1 Dimensions

4.1.1 Device descriptions: Device Module with arm mount bracket

4.1.2 Sensor Size

- Dimension: 50x50x15 mm
- Height 58 mm (Arm mount bracket), Maximum 70 mm depending on installation angle
- Backside Connections

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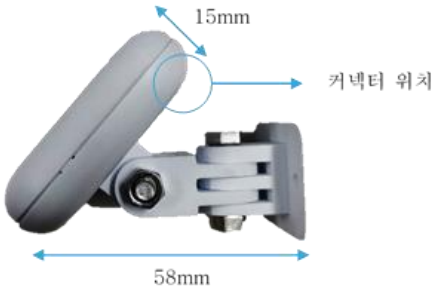

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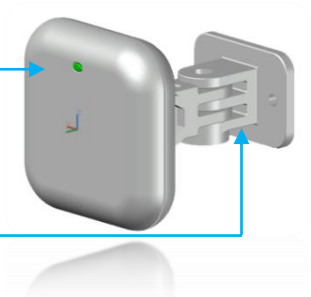
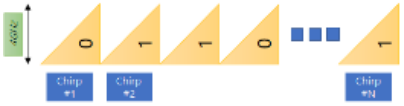
4.2 Name of the parts

- Sensor Module
- Connecting Cable
- Bracket



4.3 Identification Code

bitsensing's radar apply for transmitter identification code to avoid mutual interferences. Therefore, there are no mutual interferences issues between bitsensing's or other companies' radars. Identification codes are adopted the BPSK which include phase information in each chirp and detail specifications are as below.

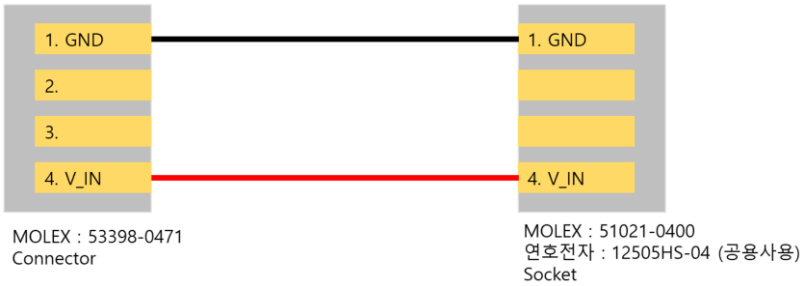


5. Electrical Specification

Items	
Frequency	57GHz ~ 64GHz
Transmitter Power	Max. 12dBm
Operating Voltage	5VDC
Current Consumption	3W
Operating temperature	-20℃ ~ +85℃

6. Hardware Interface

6.1 Connector and Pin Description



* Only Power has been connected as it uses WIFI Communication

6.2 Wi-Fi and BT

- Wi-Fi: 802.11 b/g/n
- BT: Bluetooth v4.2, Serial Port Profile

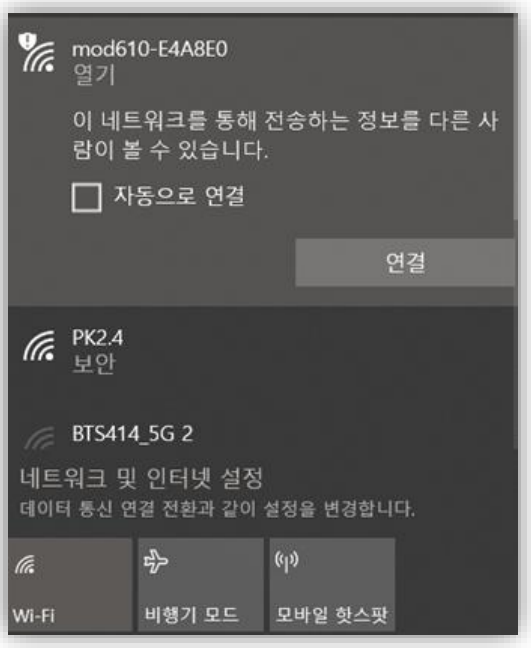
7. How to set-up

7.1 Installation guideline

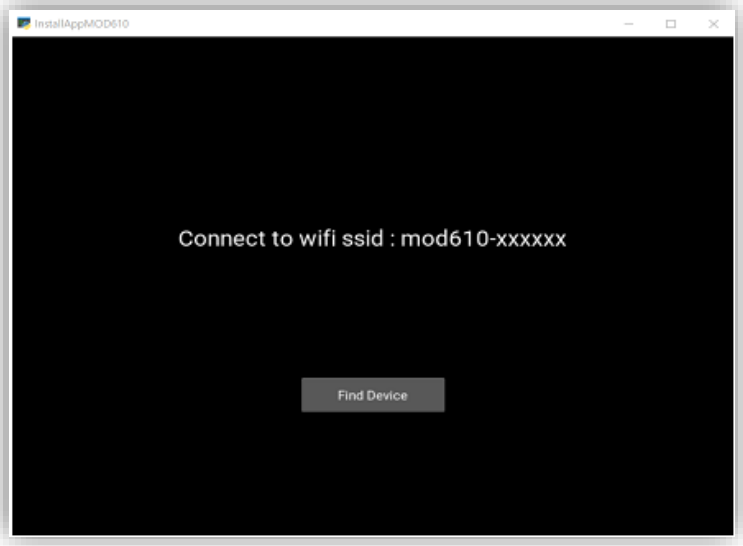
① Connect from the PC to the Device by using the Device's WIFI

Device's WIFI will appear as below 'mod611-xxxxx'

(xxxxx is unique serial number given to each devices)

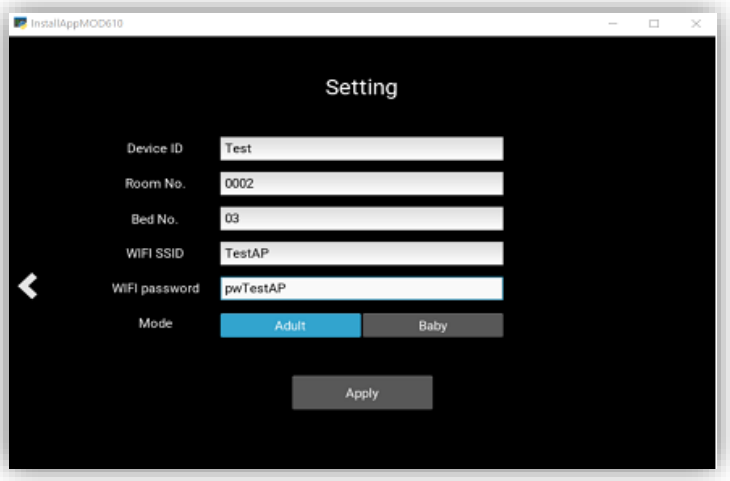


Once connected to WIFI, click ‘Find Device’



② Setting:

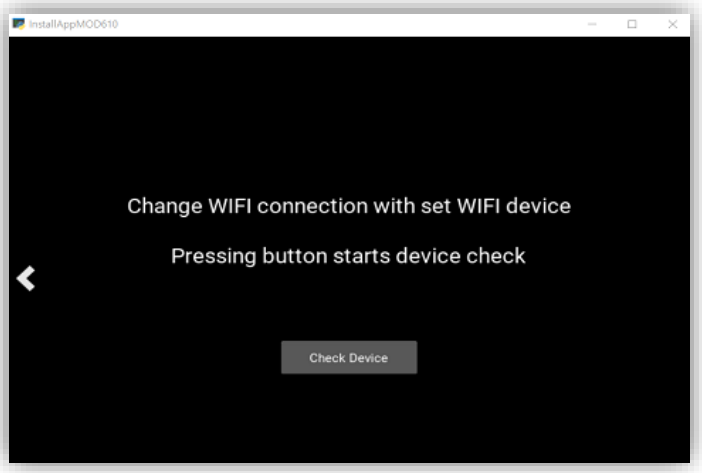
Enter the Setting values and click ‘Apply’



- Device ID: Set Device ID
- Room No.: Set Room Number
- Bed No.: Set Bed ID
- WIFI SSID: Set SSID of the WIFI (Device's WIFI that will be connected to the PC)
- WIFI password: Set WIFI password (Device's WIFI that will be connected to the PC)
- Mode: Select Adult/Baby mode

③ Check Device

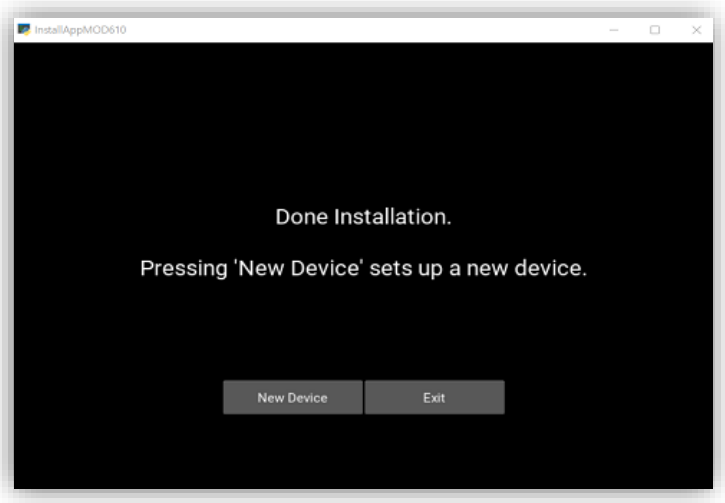
Connect the PC's WIFI to the same WIFI SSID from the Setting and click 'Check Device'



④ Done Installation

Once device check is complete below screen will appear

To set new device click ‘New Device’, or to exit click ‘Exit’



8. Contact

sales@bitsensing.com, +82-70-7114-1010

9. Disclaimer

All information in this document is subject to change without notice and contained in this document shall remain the sole and exclusive property of bitsensing.

10. 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.

Caution
Any changes or modifications (including the antenna) made to this device that are not expressly approved by the manufacturer may void the user’s authority to operate the equipment.

To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons. This device must not be co-located or operation in conjunction with any other antenna or transmitter.

This equipment complies with FCC

This device contains FCC ID: 2AC7Z-ESP32WROVERE

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.

10. Revision Table

Revision	Date	Detail	Assigned
1.0	2021.Jan.18th	First Released for ESP32 version E	YJ KIM
1.1	2021.Apr.15th	Updated for Wi-Fi / Bluetooth only	YJ KIM