Multifunctional
Whole-Home AI Care Monitor
(HT-W)



Quick Start Guide
V1.0

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1. Overview

The Multifunctional Whole-Home AI Care Monitor (HT-W) is a 60 GHz mmWave radar-based device designed to detect and analyze human movements and postures. By combining advanced algorithms with application-specific logic, it enables accurate perception of people within indoor areas, including occupancy, location, heart rate, respiration, fall detection, and sleep quality.

Featuring high stability, strong resistance to interference, and privacy protection, the HT-W can be widely used in elderly care, security, and other indoor applications. It transmits event information and device status through a Wi-Fi wireless network.

Product Network Setup and Initial Configuration

1) Wi-Fi Network Configuration

Use the EspBlufi APP to configure the Wi-Fi network for the radar device.

2) MQTT Server Configuration

Use a third-party MQTT client tool, such as MQTT.fx or MQTTX, to subscribe to device information.

The default MQTT server address is tcp://broker.emqx.io, and the default port is 1883.

Customers can use MQTT commands to modify the device's MQTT server configuration to the customer-specified MQTT server.

3) Detection Range and Attribute Configuration

Manually configure the device's detection range and related attribute parameters according to the actual application scenario.

2. Radar Device Platform Integration Process

The initial development process for integrating the radar device with the customer's platform mainly consists of two steps:

1) **Configure the device to connect to the network and the default server.** This step covers the Wi-Fi network provisioning process, enabling the radar device to connect to the network and establish a connection with the default server.
2) **Configure the device to connect to the customer's server.** Use MQTT commands to configure the customer's designated MQTT server address and related parameters.

The customer's server address can be pre-configured at the factory. For mass production, the factory can configure the customer's server information in advance. During on-site deployment, the device only needs to be connected to the network to be ready for use.

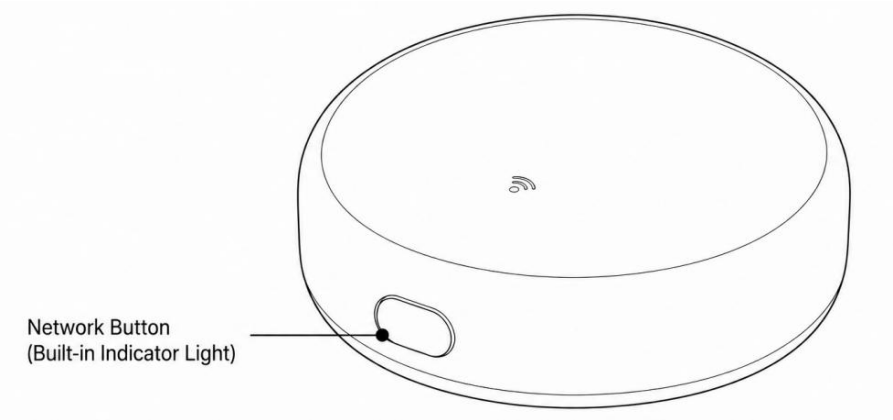
Sample devices do not include customer server configuration by default. Before testing, the device must be manually configured with the server address and other relevant parameters provided by the customer.

2.1 Device Network Provisioning and LED Status During Provisioning

Note: All network provisioning operations described below must be performed while the device's indicator light is flashing. If the indicator light is not flashing, the provisioning process will fail, and the network provisioning procedure must be restarted.

The figures below shows the flashing status and location of the network provisioning indicator light.

Button press detected	Blue light
Network provisioning initiated	Blue light changes to green
Network Provisioning Mode	Red light flashing
Network provisioning completed and device connected to the server	LED off



(1) Download and Install the EspBlufi APP

- iOS users: Search for and download the EspBlufi APP from the Apple App Store.
- Android users: Search for and download the EspBlufi APP from your mobile app store, or install it using the APK package provided by the device manufacturer.



(2) Press the network provisioning button. The indicator light will turn blue. Continue pressing the button for approximately 2 seconds. When the indicator light turns green, release the button. The indicator light will then flash red, indicating that the device has successfully entered Network Provisioning Mode. Open the EspBlufi APP and search for the device whose name starts with “BLUFI_DEVICE”.

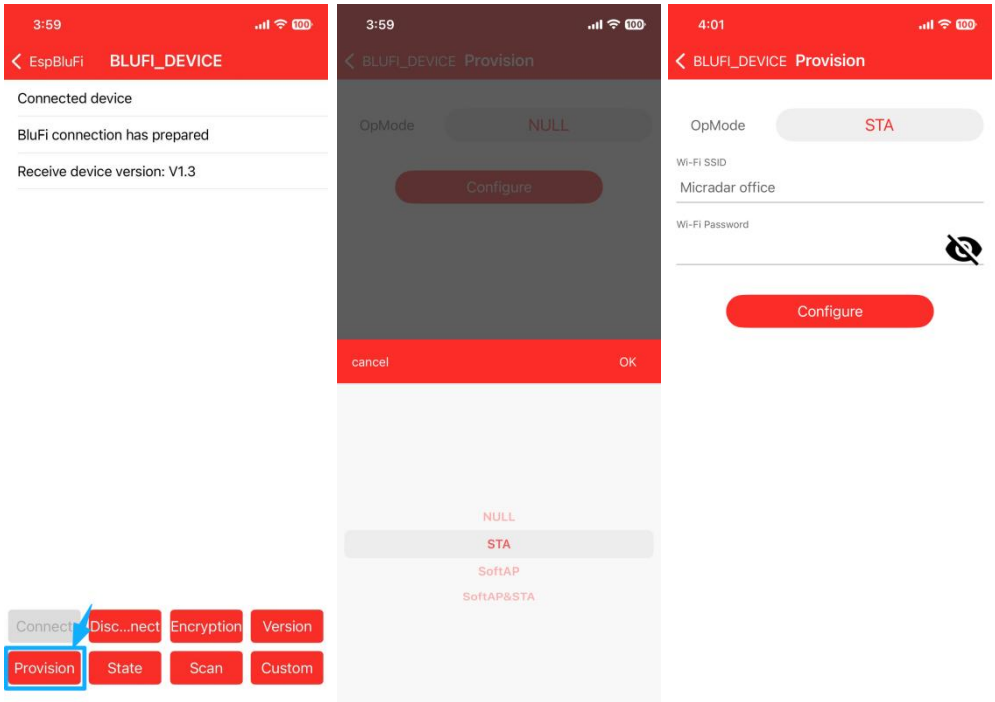


(3) After the connection is established, tap the “Provisioning” button in the lower-left corner of the screen to enter the network provisioning page.

If a Wi-Fi provisioning mode selection window appears, **select STA Mode**, then enter the Wi-Fi network name (SSID) and password to start the provisioning process.

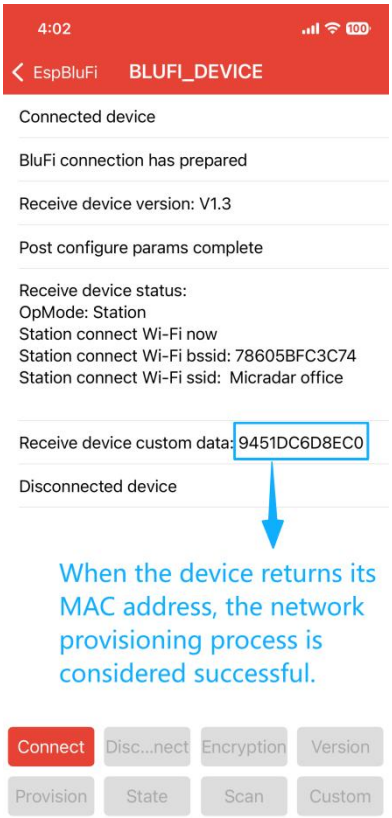
If the provisioning mode selection window does not appear, directly enter the Wi-Fi network name (SSID) and password to start the provisioning process.

Note: Please make sure to select a 2.4 GHz Wi-Fi network for provisioning.



(4) After network provisioning is completed, the device will return its MAC address and automatically disconnect from the APP. Afterward, when the device is powered on again, it will automatically connect to the configured Wi-Fi network. Once the connection is

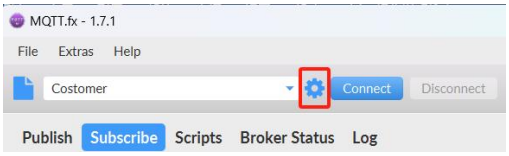
established, the indicator light will turn off, indicating that the device is online and operating normally.



2.2 Connect to the Default Server and Subscribe to Device Topics Using a Third-Party MQTT Client

Note: The following procedure assumes that the device has successfully connected to the public MQTT server. After a successful connection, the network provisioning indicator light should be off. If the network provisioning indicator light is still showing any provisioning status, troubleshoot the device according to the Network Provisioning Process and LED Status section, and repeat the network provisioning procedure until the device successfully connects to the public MQTT server.

1）Open an MQTT client (e.g., MQTT.fx) and add the default MQTT server information.

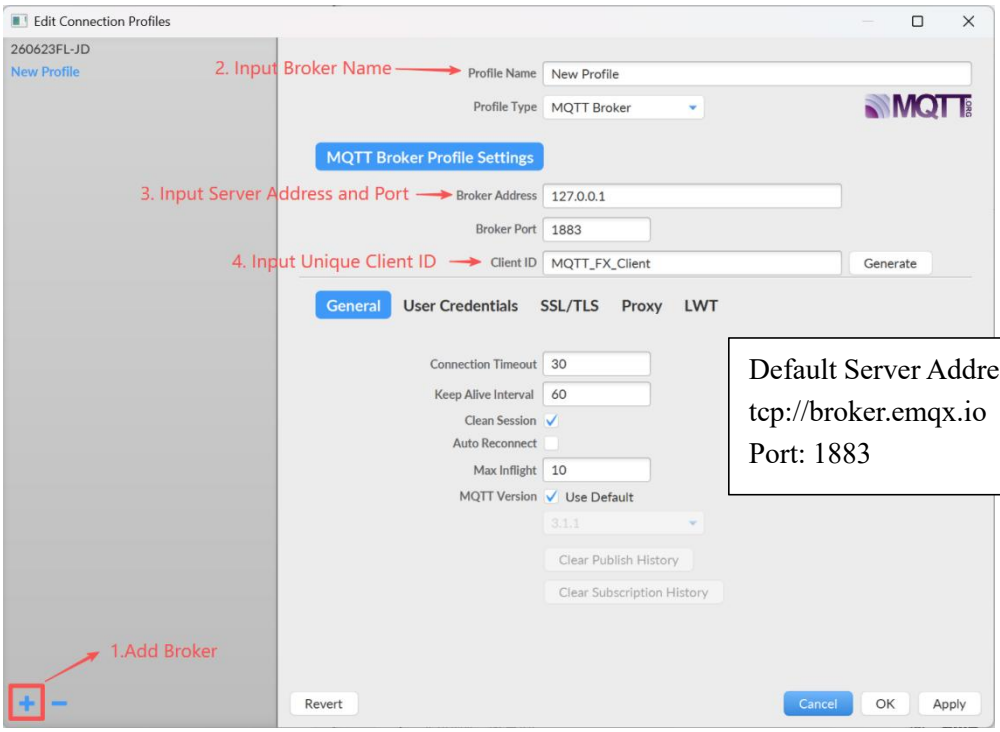


Default Server Address: tcp://broker.emqx.io **Port: 1883**

Note: The Client ID must be unique. Users are recommended to generate a random Client ID to avoid conflicts with other users.

If different users connect to the MQTT server using the same Client ID, the newly established connection may cause the existing connection to be disconnected by the

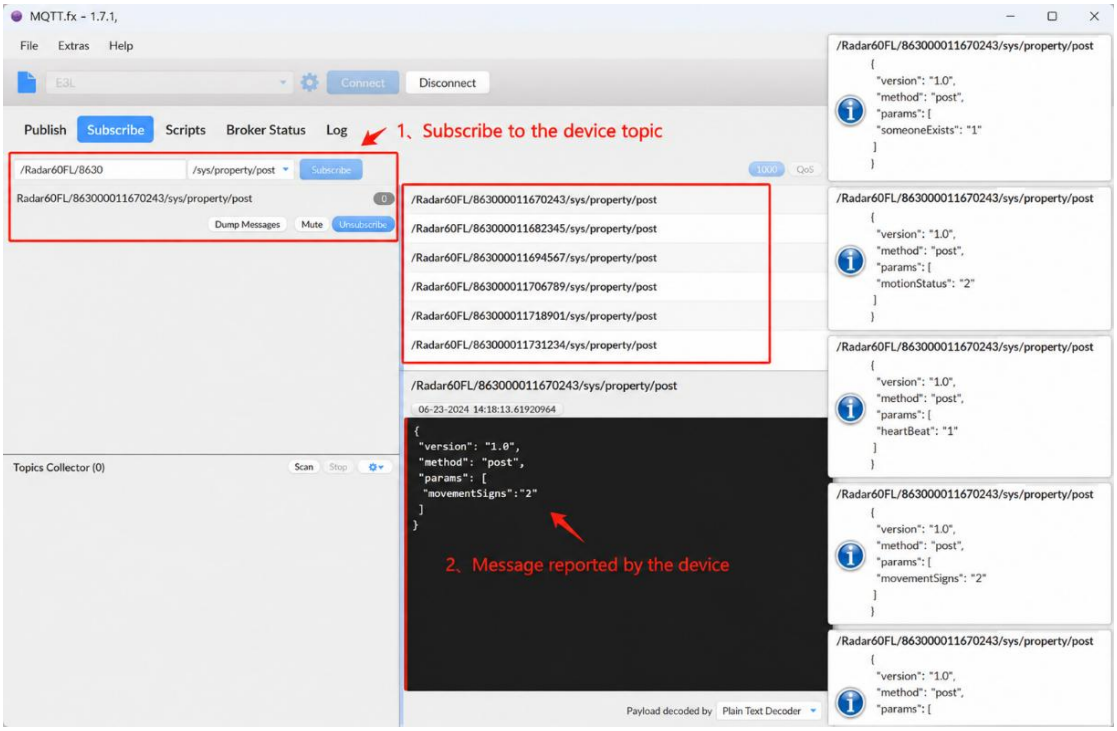
server.



Default Server Address:
tcp://broker.emqx.io
Port: 1883

2）Subscribe to the Device:

Topic：/Radar60SMF/Device IDID/sys/property/post



3）To modify the device's MQTT server address, send the server configuration command through the MQTT server. After receiving the command and returning a successful configuration response, the device will automatically restart and connect to the new MQTT server address.

The command format is as follows:

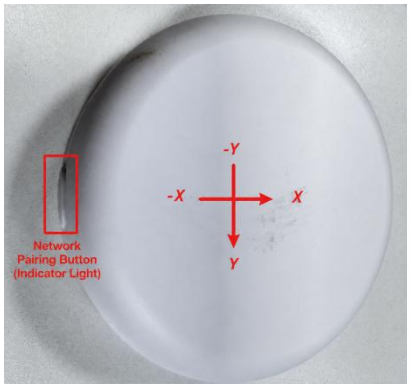
```
{
    "version": "1.0",
    "method":        "set",
    "params": {
            "serverInfo": {
                    "addr":"broker.emqx.io",
                    "port":"1883",
                    "username":"12345",
                    "password":"12345"
            }
    }
}
```

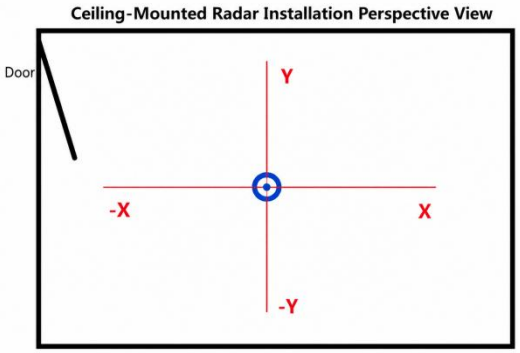
The configuration result is formatted as follows:

```
{
    "version": "1.0",
    "opt": "set",
    "res": "success",
    "params": {
            "serverInfo": {
                    "addr":"broker.emqx.io",
                    "port":"1883",
                    "username":"12345",
                    "password":"12345"
            }
    }
}
```

3. Detection Range, Parameters, and Installation Requirements

3.1 Ceiling-Mounted Installation and Device Coordinate System:





The direction of the network provisioning button corresponds to the −X axis, while the opposite direction corresponds to the +X axis.

The maximum detection range along the ±X axis is approximately 2.5 m, while the detection range along the ±Y axis is approximately 2 m.

Installation Precautions:

(1) The device should normally be installed at the center of the detection area, with the −X axis facing the entrance/exit direction, as shown in the diagram above.
(2) The actual installation height must be consistent with the configured installation height.
(3) The recommended installation height is 2.2 – 2.8 m.

3.2 Setting the Detection Range

When setting a rectangular detection area, determine the distances from the radar to the boundaries along the four axes, and calculate the coordinates of the four corner points accordingly.

For an irregular detection area, calculate the coordinates of all corner points that define the detection boundary.

Recommended value ranges for each axis when setting the detection range:

- Negative X-axis: $0 \leq -X \leq 250$
- Positive X-axis: $0 \leq X \leq 250$
- Negative Y-axis: $0 \leq -Y \leq 200$
- Positive Y-axis: $0 \leq Y \leq 200$
- Unit: cm

3.2.1 Coordinate Value Encoding

1) For data on the negative half-axis, the most significant bit of the first Byte must be 1 in binary (Hexadecimal: 80; Decimal: 128). The detection range parameters should be filled in using decimal values.

Example:

"2B (Negative X-axis)" = 128 100

Here, 128 indicates that the most significant bit is 1 in binary, representing a negative value. Therefore:

128 100 = -100 cm

2) If the data size exceeds one Byte, the corresponding value of each byte should be parsed and filled in.

Example:

To set the Negative X-axis distance to -400 cm, the corresponding hexadecimal value is 81 90.

"2B (Negative X-axis)" = 129 144

To set the Positive X-axis distance to 400 cm, the corresponding hexadecimal value is 01 90.

"2B (Positive X-axis)" = 1 144

3) If the data size does not exceed one Byte, fill it in directly.

Example:
To set the Negative X-axis distance to -100 cm:
"2B (Negative X-axis)" = 128 100

To set the Positive X-axis distance to 100 cm:
"2B (Positive X-axis)" = 0 100

3.2.2 Detection Area Configuration

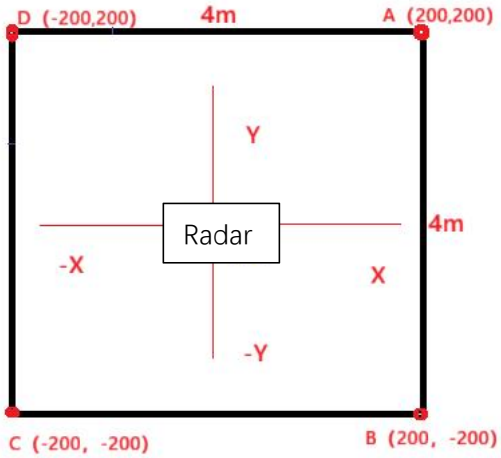
Determine the effective detection range of the radar in the front, rear, left, and right directions based on the actual distances between the device and the room boundaries, and configure the corresponding parameters through the MQTT server.

Data Format:
1B Configuration Mode Type + Configuration Data
Currently, Mode 6 is recommended.

Mode 6

- Command:
  6 (Configuration File Mode) + 2B Number of Points (n) + n × (2B X + 2B Y)
- Response:
  6 (Configuration File Mode) + 2B Number of Points (n) + n × (2B X + 2B Y)

Example:
Mode 6 — Four Points Defining a Rectangular Detection Area
1B (6: Mode Type) + 2B (Number of Detection Area Coordinates) + [2B X + 2B Y (Point 1 Coordinates)] + [2B X + 2B Y (Point 2 Coordinates)] + [2B X + 2B Y (Point 3 Coordinates)] + [2B X + 2B Y (Point 4 Coordinates)]



The command format is as follows:

```
{
    "version":       "1.0",
    "method":        "set",
    "params":        {
            "configFileDetectionRange":
    [6,0,4,0,200,0,200,0,200,128,200,128,200,128,200,128,200,0,200]
```

```
        }
    }
```

The configuration result is formatted as follows:

```
    {
        "version":          "1.0",
        "opt":           "set",
    "res":       "success",
                 "params":   {
                 "configFileDetectionRange":
        [6,0,4,0,200,0,200,0,200,128,200,128,200,128,200,128,200,0,200]
        }
    }
```

3.3 Door Label

Using radar as the origin, obtain the center coordinates of the **door label** area and its width and height (or radius). Calculate the coordinates of each vertex of the rectangle based on the room dimensions. When entering the rectangle coordinates, the vertices must be entered sequentially in either **clockwise** or **counterclockwise** order.

Two door label area types are supported: Rectangle and Circle.

0: Circle, 1: Rectangle.

When the door label area type is Circle, X represents the circle radius, and Y is not used (set to 0).

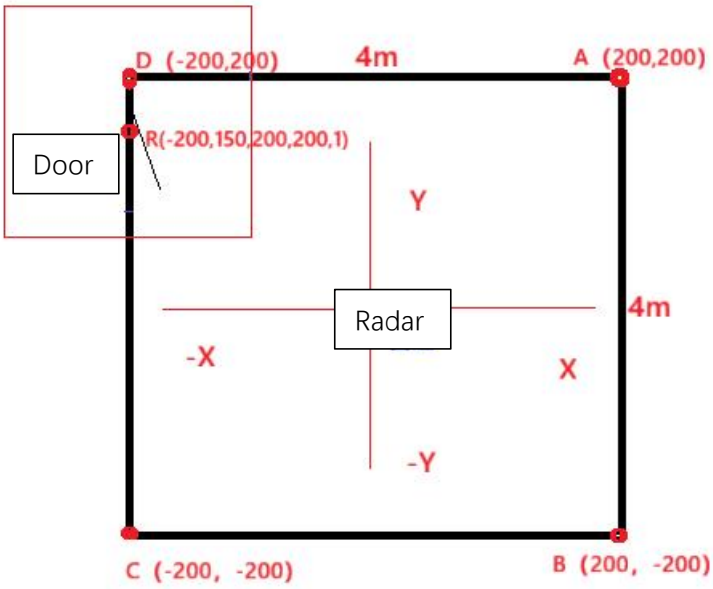
When the door label area type is Rectangle, X and Y represent the width and height of the rectangle, respectively.

Data Range:

2B X + 2B Y (door center coordinates) + 2B X + 2B Y (door width and height) + 1B (Door Label type/Range type) + [n × (2B X-axis + 2B Y-axis)]

Format example:

```
    {
      "version": "1.0",
      "method": "set",
      "params": {
        "configFileDetectionRange":
    [128,200,0,150,0,200,0,200,1,0,200,0,200,0,200,128,200,128,200,128,200,128,200,0,
200]
      }
    }
```

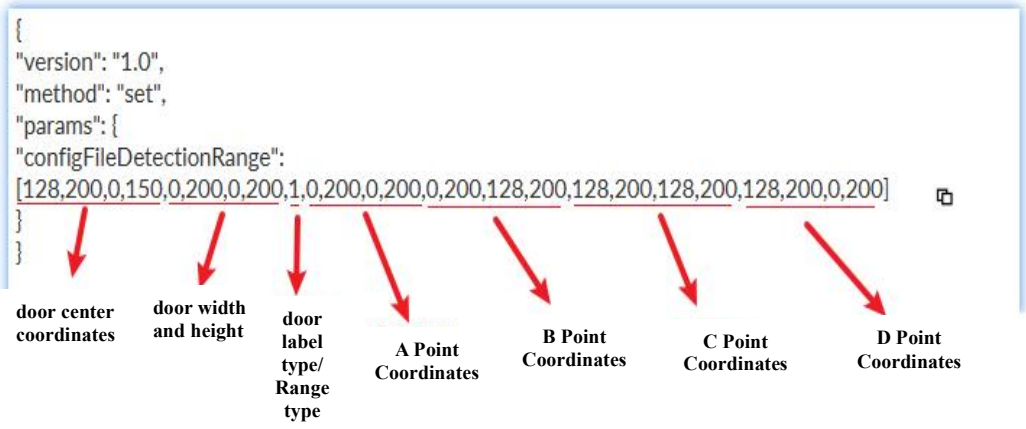


As shown in the figure above, the door configuration parameters and detection range coordinates can be determined. If the range type is set to Rectangle, the range configuration follows the format below:

2B X + 2B Y (door center coordinates) + 2B X + 2B Y (door width and height) + 1B (range type) + [n × (2B X-axis + 2B Y-axis)]

The door center coordinates and width/height are R (-200, 150, 200, 200, 1). The overlap between the door and the detection area must be no less than 1 meter. Generally, the door width is approximately 100 cm. Setting the overlap to 100 cm on each side ensures that a person passing through the door can be fully detected.

Based on these parameters, the four coordinate points of the rectangular detection area, A, B, C, and D, can be determined. The coordinates are then converted into decimal values and configured as shown in the figure below.



3.4 Test Procedure

After completing the installation and configuration, ensure that all personnel have left the room. Send the "Clear Number of People Information (clearNumberOfPeopleInfor)" command to calibrate the number of people before starting the test.

For details on the command, refer to the "*HT Wi-Fi MQTT Communication Interface Document*".

4. Feature Description

Feature	Description
Human Presence Status	Based on the radar detection results, the device actively reports the presence/absence status. It only actively reports when the status changes.
Motion Status	Based on the radar detection results, the device actively reports the stationary/active status. The device only actively reports when the status changes.
Movement Signs	Quantified human motion amplitude values used by the algorithm: 0 → No person detected 1 → Stationary; only breathing is detected, with no body movement 2–30 → Minor body movements 31–60 → Relatively slow body movement 61–100 → Rapid body movement
Trajectory Count	The number of trajectory targets, noise points, and multipath points detected within the detection area. In some environments, a large number of noise trajectories may be present.
Real Time Head Count	Filter out interference points and multipath points, identify the remaining valid targets as actual people, and output the real-time number of detected people.
Label	Door label function: Counts people entering and exiting. Other label function: The output value indicates whether a person is approaching or moving away from the label.When no door label is configured: The real-time people count is consistent with the number of trajectory changes detected within the detection area. When a door label is configured: The real-time people count is the final result after the algorithm processes the detected trajectories within the detection area.
Trajectory Generation Distance	Adjust the judgment conditions for the real-time people counting interface. The marking starts from the position where the trajectory is generated. When the trajectory point movement meets the configured distance and the trajectory generation time conditions, the person is successfully determined as part of the real-time people count.
Trajectory Existence Time	Adjust the judgment conditions for the real-time people counting interface. The marking starts from the position where the trajectory is generated. When the trajectory point existence time meets the configured time and the trajectory generation distance condition is met, the person is successfully determined as part of the real-time people count.

5. Revision History

Revision	Release Date	Summary
V1.0	2026/08/17	First Release