Human presence detection radar**HLK-LD1125H-24G**Application Manual

Due to product upgrades or other reasons, the content of this document will be updated from time to time. This document is intended as a guide only, and neither the information nor the recommendations stated shall constitute any express or implied warranty.

V1.2

2021-9-16

Table of contents

1.Overview 2

2.Module appearance and interface..... 3

3.Module Performance 4

4.Debug Connections..... 5

5.Debug configuration..... 5

6.Radar installation and testing 12

7.Precautions..... 14

8.appendix..... 15

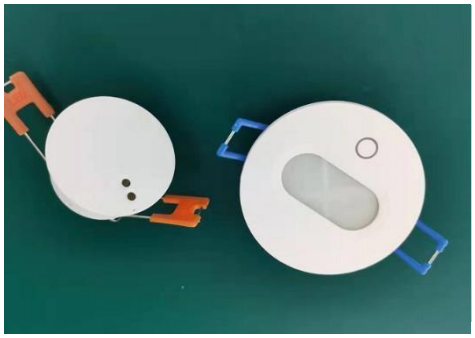
1 Overview

HLK-LD1125H-24Gis a high sensitivity24GHzMillimeter wave human presence detection radar module. Different from the traditional radar, which judges the existence of the human body by detecting the large-scale movements of the human body or the small-scale body movements, the main feature of this module is to judge the existence of the human body by detecting the accumulation of small-scale movements such as human breathing. Therefore, the detection of human presence is more accurate than traditional mobile detection radars. Not easy to miss.

Indoor human presence detection

Human body micro-motion induction

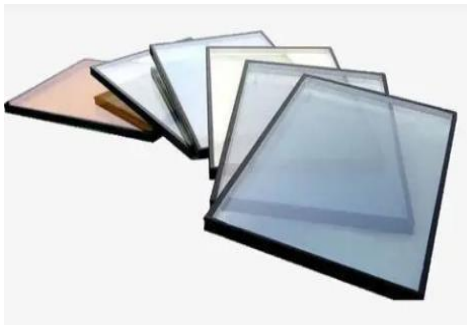
Modules can penetrate non-metallic enclosures without openings. Common materials include plastic, glass, acrylic, ceramic, etc.



Embedded ceiling buckle shell (recommended)

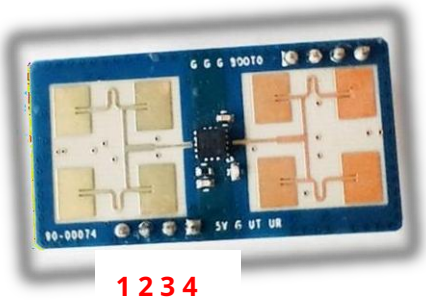
86Box plastic panel (recommended)

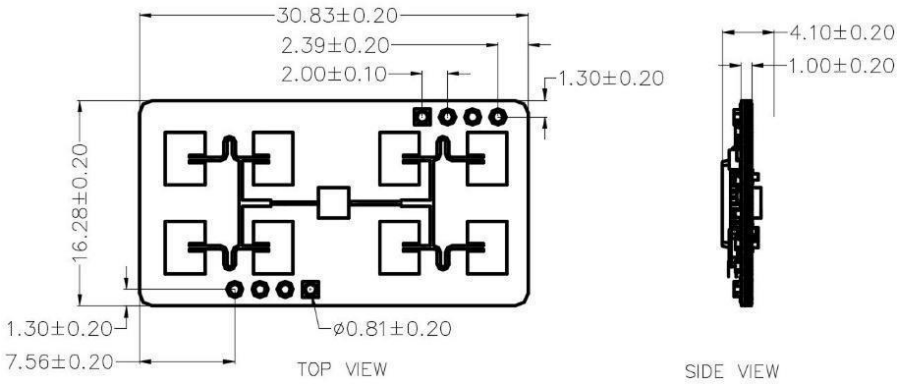
Assorted acrylic



Glass

2. Module appearance and interface





Pin interface definition: (2mm pitch pin headers are recommended for the interface)

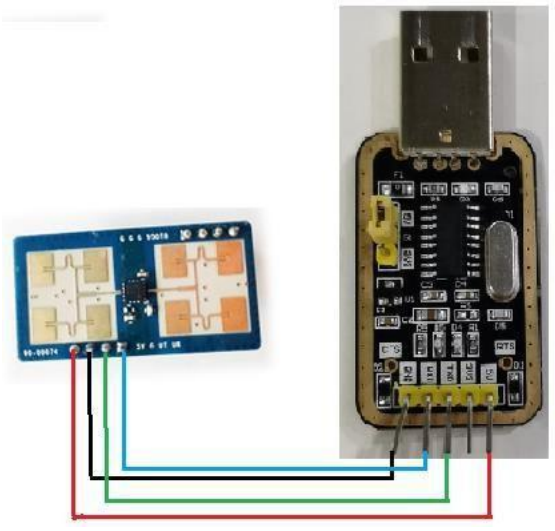
pin	name	Remark
1	VCC	power supply5Vpowered by
2	GND	ground
3	URX	TTLSerial receive
4	UTX	TTLSerial transmission

3 Module performance

parameter	type value
frequency	3.5G-24.5GHz
Modulation	FMCW
Detection distance	4m meditate, 8m exercise
scope	Hanging height 3m, static body detection coverage radius > 2m
powered by	3.3-5V
current	80mA
output serial level	3.3V
Detection cycle	adaptive
Antenna half power angle	+/-22° (horizontal/vertical)
Data Format	Serial ASCII output

Debug wiring

HLK-LD1125H-2.4GThe serial port is used to output the test results in string format, so when testing the module, the user can first perform a quick test evaluation on the serial port assistant.



You can connect the module and serial board according to the figure on the left: module1Pin connection to serial board5V

module2Pin connection to serial boardGND

module3Pin connection to serial boardTX

module4The pins are connected to the serial boardRX

4 Debug configuration

You can debug and test on the computer through the serial port assistantHLK-LD1125H-2.4G.

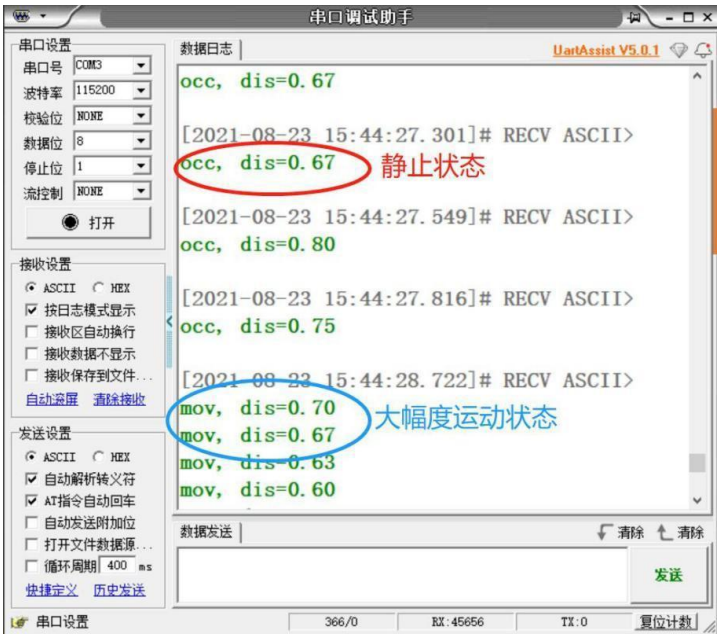
Use any serial debugging tool. baud rate115200,8bit data bits,1Bit stop bit, parity bit and flow control areNone,receive settingsASCII, send settings optionASCII.

Product SupportUARTtext protocol		
1	baud rate	115200
2	word width	8bit
3	stop bit	1
4	parity	None

Radar output

When the radar detects a relatively large motion, the outputmov,dis=***. When the radar detects the static state of the human body or the movement of a small amplitude, the output will beocc,dis=***. disRepresents the target distance, in meters.

When the radar cannot detect the target, it stops outputting. The user can make a certain delay in the upper layer to avoid frequent unmanned state when the signal is weak.



configuration directives

rmax=**, set the maximum detection distance. The distance value with one decimal place can be set, and the unit is meters. For example: set the module to detect only6target within meters. then sendrmax=6, the module will only output6Mine target.6Targets beyond meters will not be output. module defaultrmax=6.

mth1_mov=xx : Set the motion detection threshold within 2.8 meters, the default value is 30

mth2_mov=xx : Set the motion detection threshold within 2.8~8 meters, the default value is 15

mth3_mov=xx : Set more than 8 meters, the motion detection threshold, the default value is 6

mth1_occ=xx : Set the detection threshold within 2.8 meters, the default value is 30

mth2_occ=xx : Set the detection threshold within 2.8~8 meters, the default value is 15

mth3_occ=xx : Set more than 8 meters, there is a detection threshold, the default value is 6. The larger the sensitivity value, the less sensitive the module is. The main reason for segment sensitivity is that the reflected signal of the short-range target is relatively stronger, so the same sensitivity as the long-distance target is not required at short distances. At the same time, according to different environments, you can also make targeted settings. The segment sensitivity can be debugged with the test mode. Generally, it is recommended that customers test according to the default parameters. If you encounter problems, please consult our technical staff.

save,Save Settings. Otherwise, power down and restore the default value.

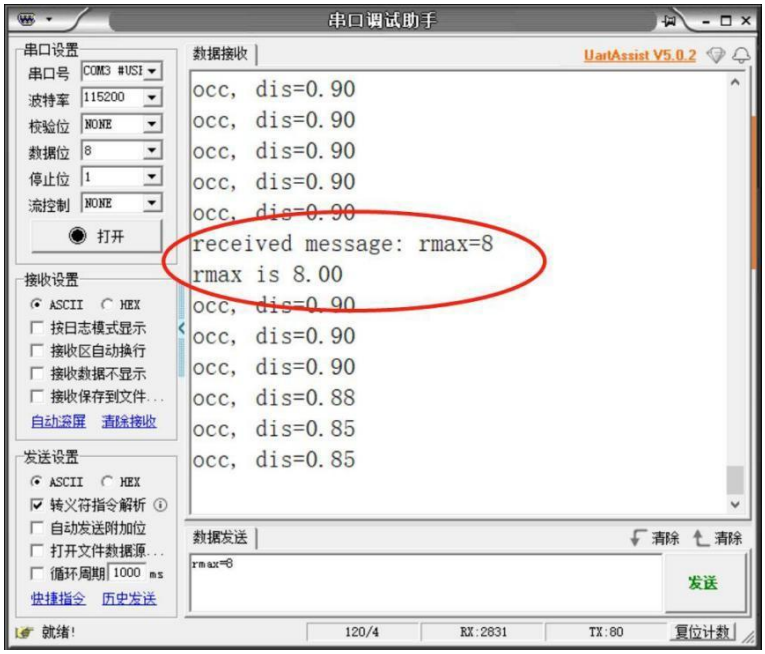
get_allto get the current parameter settings.

Note: The command needs to be sent with carriage return and line feed to take effect.

Demonstration of configuration directives

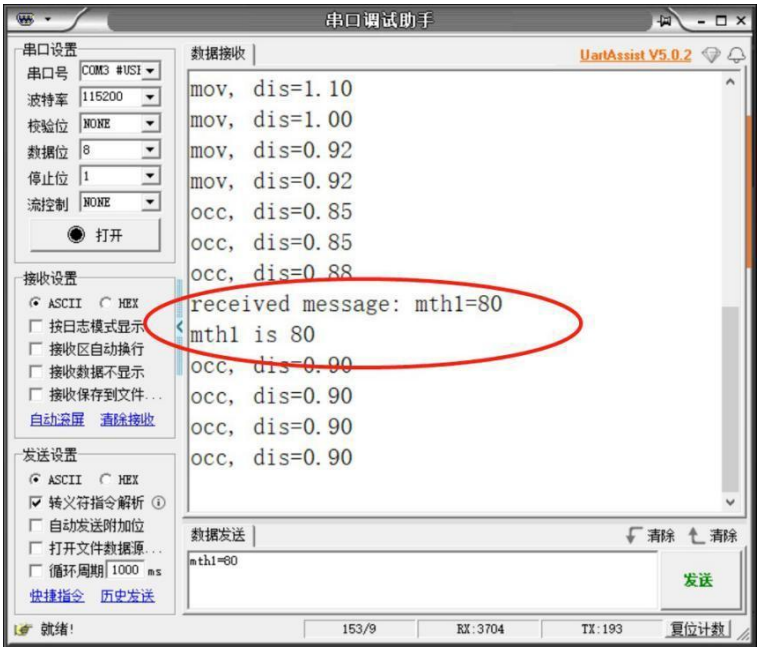
Take the serial port assistant window as an example to demonstrate the function and output of each command:

- send**rmax=8**, the module will feedback "**receivedmessage: rmax=8** **rmax is8.00**" indicates that the instruction is configured as achievement. If you do not receive this feedback, please check whether the sending command has a carriage return and line feed, and resend the command.

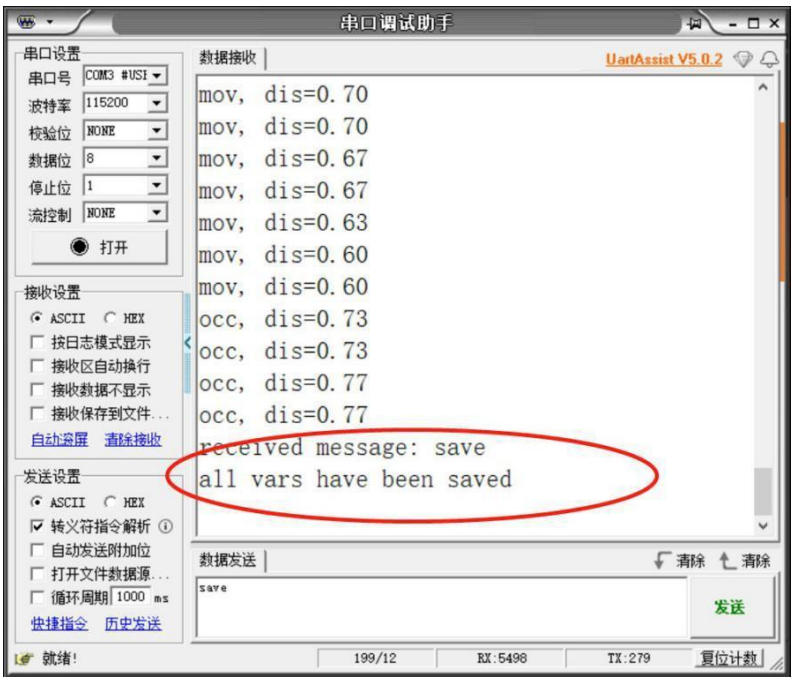


- send**mth1=100**, the module will feedback "**received message: mth1=80 mth1 is 80**" indicates that the command configuration is successful. If you do not receive this feedback, please check whether the command is sent with a carriage return and line feed, and resend the command.

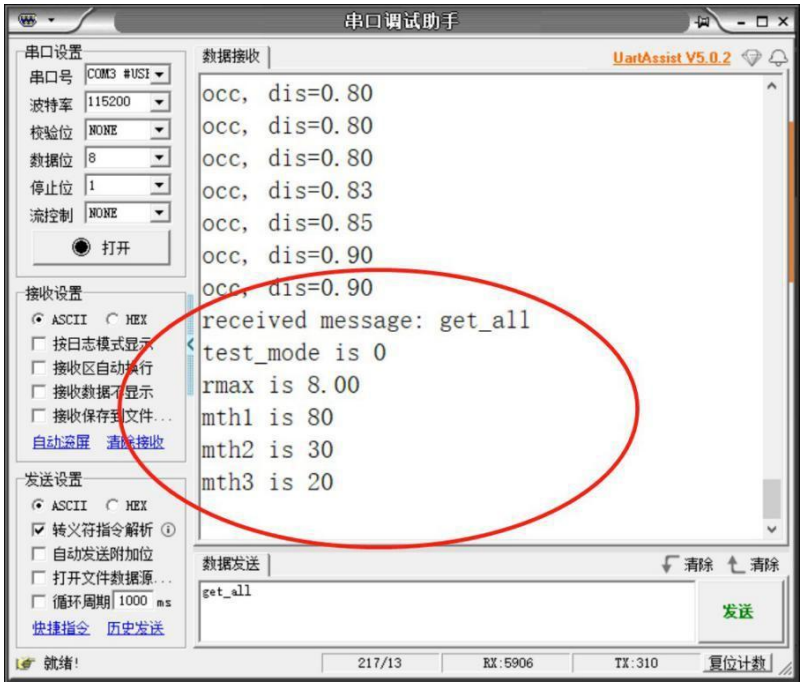
mth2andmth3It is the same operation, and will not be repeated here.



- send**save**, the module will feedback "**received message: save all vars have been saved**" indicates that the command configuration is successful and the parameters are saved. If you do not receive this feedback, please check whether the command is sent with a carriage return and line feed, and resend the command.



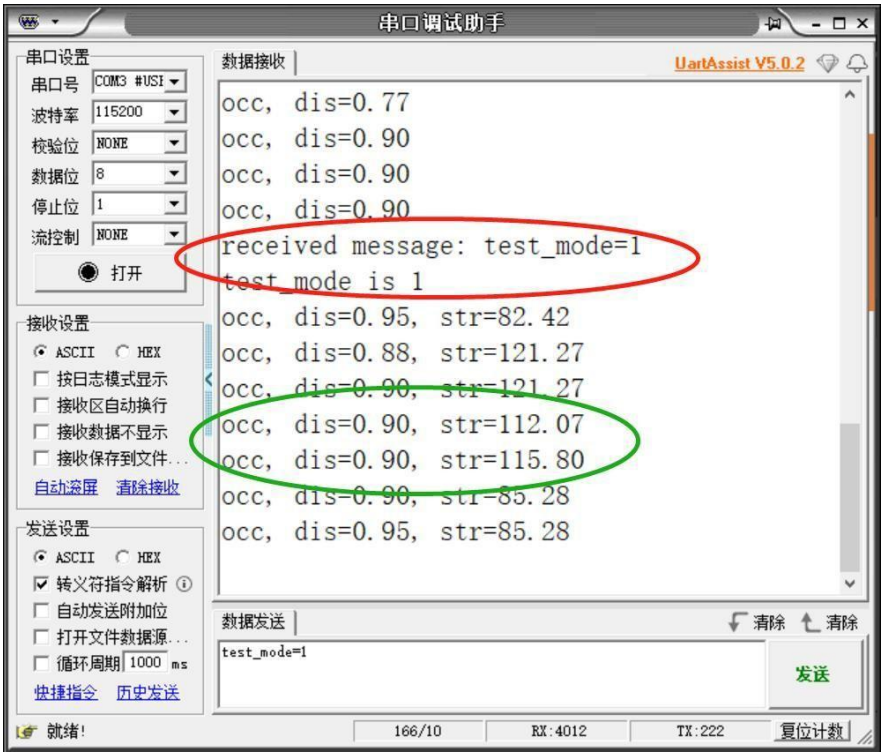
- send**get_all**, the module will feedback "**received message: get_all**" and return all parameter settings of the current module. If you do not receive this feedback, please check whether the sending command has a carriage return and line feed, and resend the command. You can use this command to check whether the module parameter settings are normal: set the parameters and sendsaveAfter that, power off and restart the module, and then sendget_allto check whether the parameters are properly configured.



- send**test_mode=1**, the module enters the test mode, and the module output information will have signal strength at this time. The default setting of the module is set according to the highest sensitivity, and the test site is an open large room (see the test site diagram in the appendix).

When the application environment changes, such as entering a small closed room, the noise floor may be raised beyond the default sensitivity threshold due to multiple reflections and refractions of the signal due to the small room, or other surrounding electromagnetic factors. In this case, it is necessary to enter test_mode, observe when no one is presentdisas well asstrsize, to set the correspondingmthvalue.

For example: if you entertest_modeAfter that, keep the room without people, but the module keeps outputtingmovorocc,dis exist2 Mine,strexist80within. By defaultmth1=60, at this timestrmore thanmth1. Therefore, in such an environment, it is necessary tomth1set to > 80. Users can according tomthCorresponding range, observe the output distance andstr, to determine eachmthvalue is appropriate. For this setting, it is recommended that customers consult our technical staff during actual debugging. Our technical staff will provide professional guidance.



Using the host computer

We provide a matching host computer for users to use for evaluation. Different from directly observing the output of the module through the serial port, the host computer can do some upper-layer delay processing after receiving the serial port signal output by the module.

1.After connecting the module, click**Serial port detection**—**Serial port selection**—**Open serial port**,at this time**The display interface will show the distance value** and **state**.**someone status**Corresponding module serial portmovoutput. The displayed distance is the serial port of the moduledis=**the output value.

2.Application layer settings: It is mainly used to set the switching of people, static and unmanned states. exist**static state window**input greater than 2integer, click Settings. When the host computer continuously receivesoccWhen the number of times is greater than or equal to the set value, the upper computer displays that someone is still. For example setting6, it means that the host computer needs to continuously receive6Second-rateoccis displayed when someone is stationary.

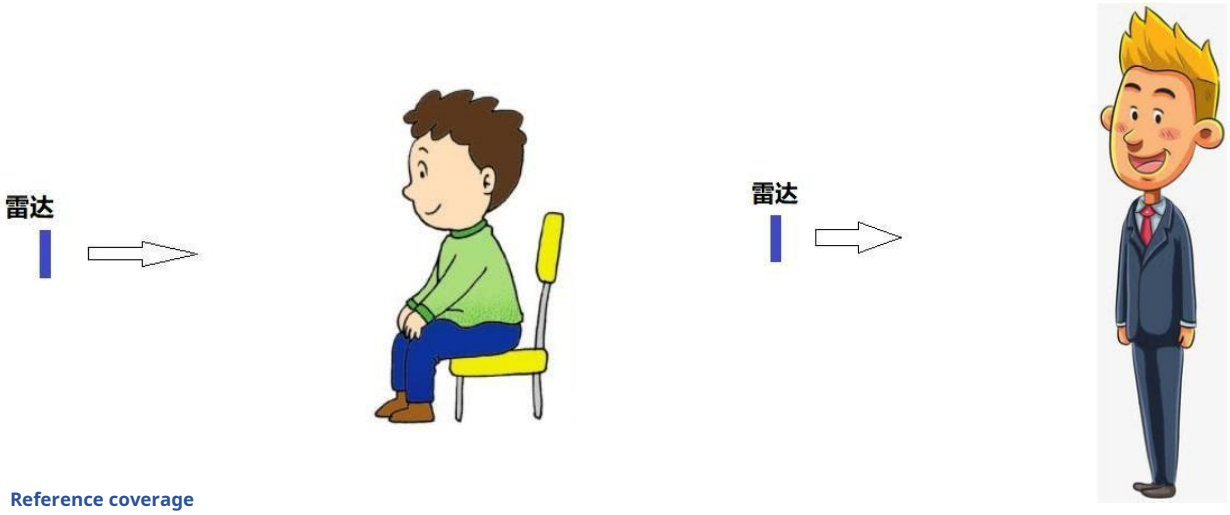
3.exist**Toggle unattended window**Enter >1is an integer, the host computer will enter the unmanned state when it does not receive any data within the set time. The window value unit is seconds. For example setting30, then represents30If no radar output is received within seconds, it will enter an unmanned state.

4.click**Set interface**to enter the parameter setting interface.**Sensitivity drop-down menu**optional1-9,1is the default sensitivity setting, increasing each 1Then the sensitivity thresholdmth1/mth2/mth3both increase10%.**maximum distance window**Set the distance threshold, corresponding to rmaxparameter. Click after setting**save**, otherwise the power failure will fail, corresponding tosaveinstruction.

5 Radar installation and testing

Test application scenario 1: Horizontal installation straight line test

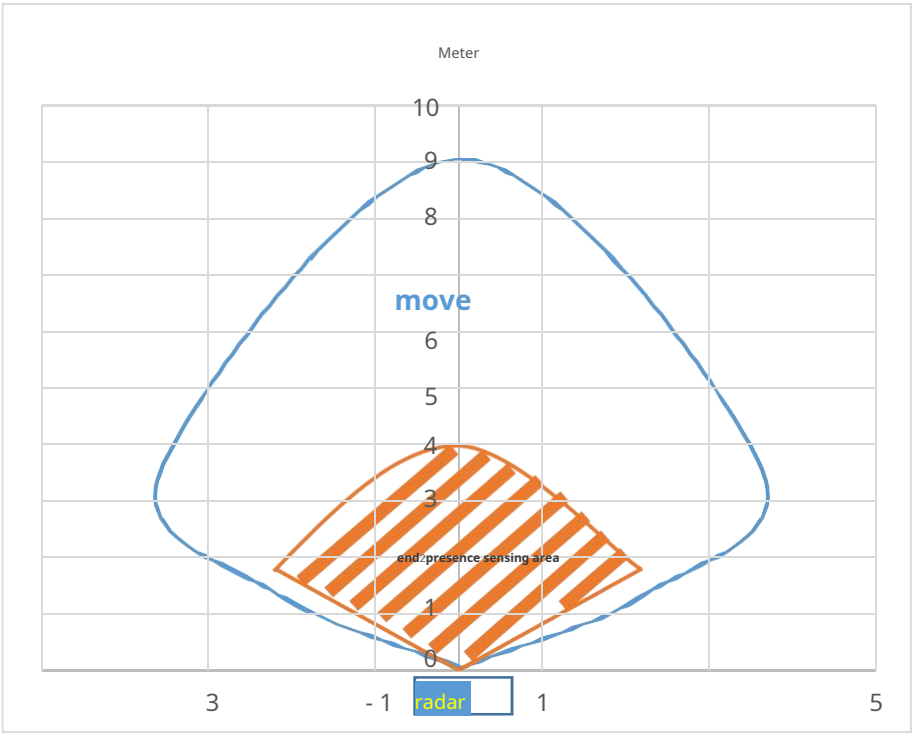
The installation height is 1 meter, and the human body is facing the radar when measuring. Test coverage in both sitting and walking states.



Reference coverage

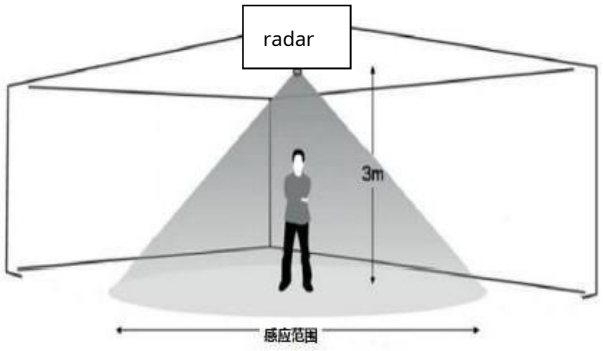
The figure below shows the radar coverage when it detects sitting and walking. for reference. The blue area is the mobile sensing area

The orange area is the static presence sensing area



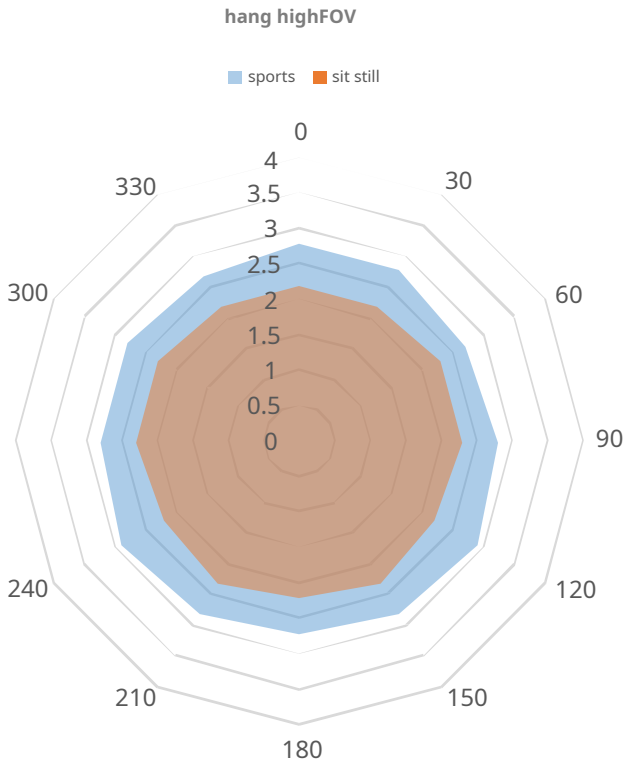
Test application scenario 2: hanging height vertical test

This module can also be hung up for human presence detection. Our test scenario is hanging high3Meters, measure the amount of standing and walking of the human body FOV.



The blue area is the mobile sensing area

The orange area is the static presence sensing area

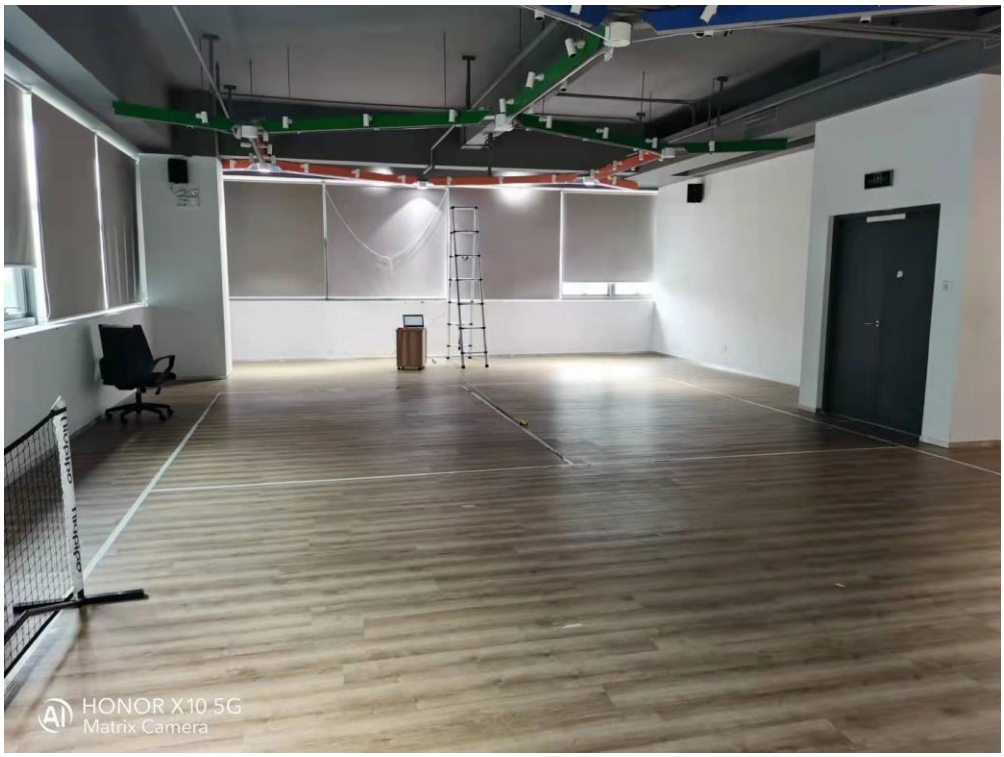


6 Notes

- When the radar is working, there should be no metal or other medium that hinders the transmission of electromagnetic waves in front of the antenna to block the antenna. Different housing materials and the distance between the
- module and the inner surface of the housing are different, and the returned spectrum energy and parameter settings will be different, which need to be fine-tuned according to the actual parts. It is generally recommended that the strip
- module be kept away from the housing5-6mm, which can be adjusted according to the actual situation. We recommend users to test according to the default settings of the module. If the effect is not as expected, you can send the
- shell structural parts to the original factory, and the original factory will test and adjust a reference setting. Measurement

- The module is for human movement and presence detection, so the distance value given is not accurate distance measurement, but only indicates the approximate distance of the
- target. If the person under test sits with his back to the radar, the sensing effect will decrease. Because the back of the radar, the chest or abdomen caused by breathing at this time rise
  cannot be detected.
- It is recommended to use plastic as the casing, because the radar is a very sensitive module in the presence of the human body. If the casing is made of a material with large attenuation, it may affect the meeting
  detection.
- Install to avoid air conditioner vents, fans and other objects.
- Sensitivity is adjustable according to user scenarios. This manual gives the highest sensitivity case. To adjust the sensitivity, contact technical support. If you need more
- technical support, you can contact sales.

Module test environment display: an empty room with a length of 18 meters and a width of 10 meters.



Hanging height installation test: