



# ATS58-2020 5.8GHz Microwave Motion sensor

Version: 1.0

FCC ID: 2AVK2-ATS58-2020

Made in China

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

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## ATS58-2020 5.8GHz User Guide

### Description

ATS58-2020 is a miniaturized 5.8G radar sensor launched by AirTouch, The module size is 20\*20mm, the size is equivalent to a coin, The sensor uses a self-developed radar sensor chip AT5810S, which integrates a 5.8G microwave circuit, an intermediate frequency amplifier circuit and a signal processor, The chip has a high degree of integration and good production consistency. The peripheral is equipped with a miniaturized planar antenna, which greatly reduces the overall size while ensuring the performance of the sensor. The sensor can be used to detect various scenes of human being or moving target sensing, including intelligent home, Internet of things, intelligent lighting and other fields. Especially in the field of lighting, it has been widely used in standard lighting products such as induction bulbs and T8 tubes.

### Radar Sensor illustration

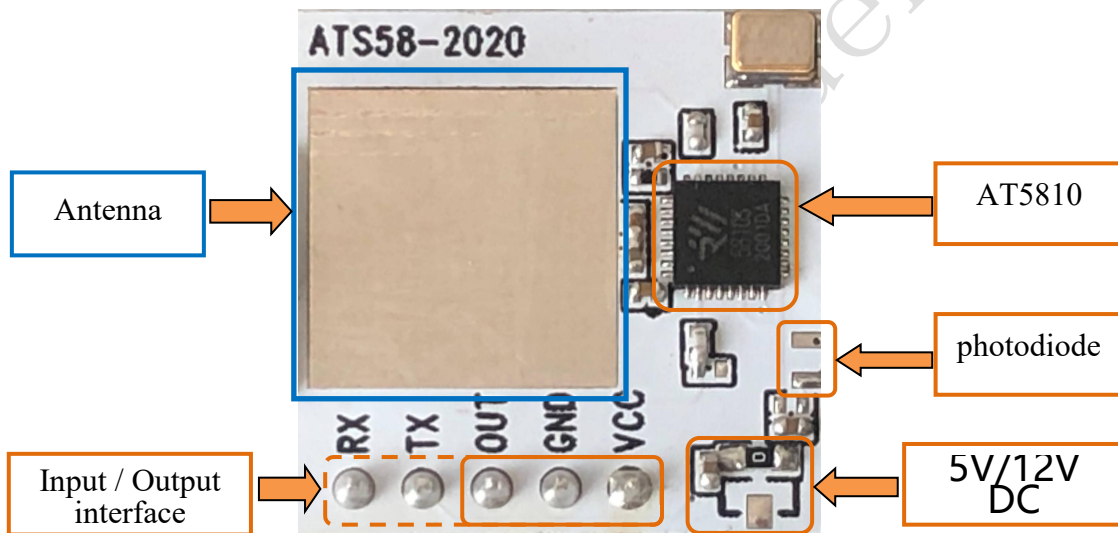


Figure 1 ATS58-2020 Radar Sensor

### Input and Output Interface

The module reserves 5 pin holes with a pin distance of 2.54mm. By default, three pins, VCC, GND and out, are used, If you need to adjust the distance, delay time and other parameters, you can use the UART port RX and TX to flexibly configure them. For scenarios without upper computer, you can also use RX and TX as I / O ports to adjust the parameters, The following table describes the definition of each pin:

Pin Name	Function	Note
VCC	Power supply	VCC is 5V by default, external LDO is needed if VCC higher than 6V. Driver current should be better than 50mA.
GND	Ground PIN	

<b>OUT</b>	Output control	Output is 5V TTL by default, could be PWM if needed
<b>TX</b>	tDio/IO	used for software upgrade or performance parameter adjustment
<b>RX</b>	tClk/IO	used for software upgrade or performance parameter adjustment

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### Module size and Pin position

Figure 2 below is the schematic diagram of module size and pin position. The length and width of the module is 20 mm \* 20 mm. By default, there is no pin, and the overall thickness is 2.5 mm. If a pin is required, the default pin height is 12 mm.

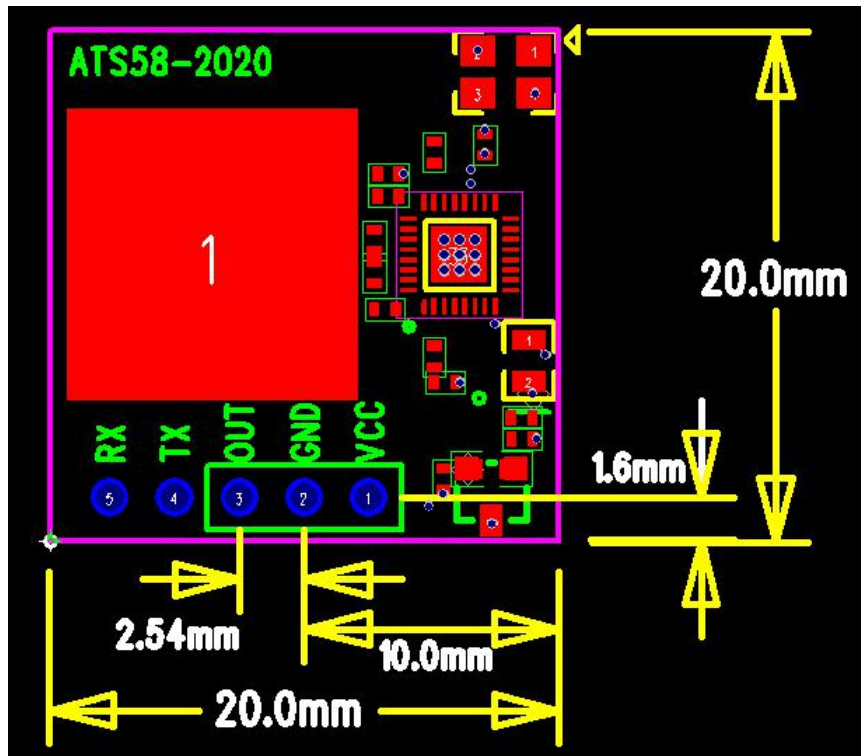


Figure 2 Module size and pin position of ATS58-2020

### Electrical characteristics

Parameters	Min.	Typical	Max.	Unit	Note
Frequency	5725		5875	MHz	
TX Power		0.5	1	mW	
Input VCC	4.5	5	5.5	V	Without external LDO
Output High		5		V	
Output Low		0		V	
Current		38	50	mA	
Mounting		3	6	M	Adjustable according to specific needs
Detection		5	8	M	Related to mounting height
Hold time		30		S	Adjustable according to specific needs
Daylight sensor		10		Lux	Adjustable according to specific needs
Operating	-30		85	°C	

### The delay time and detection area

Ats58-2020 requires three pins by default, VCC, GND and out. the delay time and sensing distance are fixed values. If you need to adjust the delay time and sensing distance and other related parameters, you need to add two pins, RX and TX, as shown in Figure 3.

In terms of software configuration, RX and TX can be used as I / O ports or UART ports to adjust module parameters. By default, the software uses these two pins as I / O ports。 TX is used to adjust the sensing distance, which is 4-6m for low level and 3-5M for high level. Rx is used to adjust the delay time, which is 30s for low level and 2S for high level , Triggering the sense again within the delay time will restart the timing.

RX and TX can also be used as UART ports to adjust module parameters. When they are used as UART ports, refer to the document 《Airtouch Radar Setting Tool》。

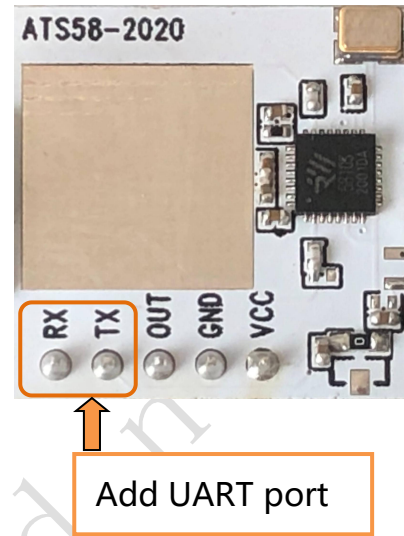


Figure3

### Photosensitive Detection

Module supports photosensitive detection, but photosensitive function is optional. If photosensitive function is required, photodiode and tuning resistance can be added at the position shown in Figure 4. Photosensitive detection function shall also be enabled synchronously in software, and photosensitive threshold can be adjusted by tuning resistance. Turn on the version of photosensitive function, only when the ambient light is lower than the set illuminance, the radar sensing will be started. If the light is too bright, the module will not start the sensing function. When testing the radar performance alone, the photodiode can be covered with black tape to avoid the photosensitive effect affecting the radar sensing function.。

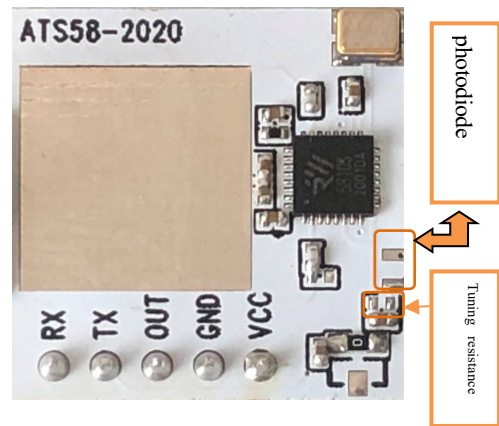


Figure4

### Power on Sequence

The module has a power-on self-test function, that is, after the module is powered on, the out pin outputs the high level first, the low level is output after the delay of 1s, and the low level is delayed for 1s before entering the normal induction mode. The following is the sequence diagram of the control signal after the module is powered on:

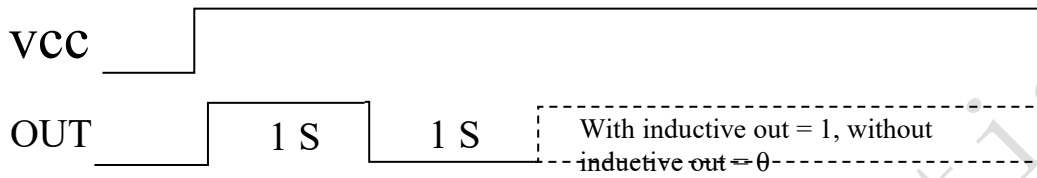


Figure5 Power on Sequence

## Detection Pattern

The sensing sensitivity of radar sensor can be configured by MCU, and its limit sensing distance is 10 meters. The actual sensing distance can be adjusted according to the needs. The following is the schematic diagram of radar detection range in case of high hanging. If the sensitivity is set higher, the detection range will be correspondingly larger. In the figure, the dark area is the high sensitivity area, which can be fully detected, while the light area is the low sensitivity detection area, which can basically detect objects.

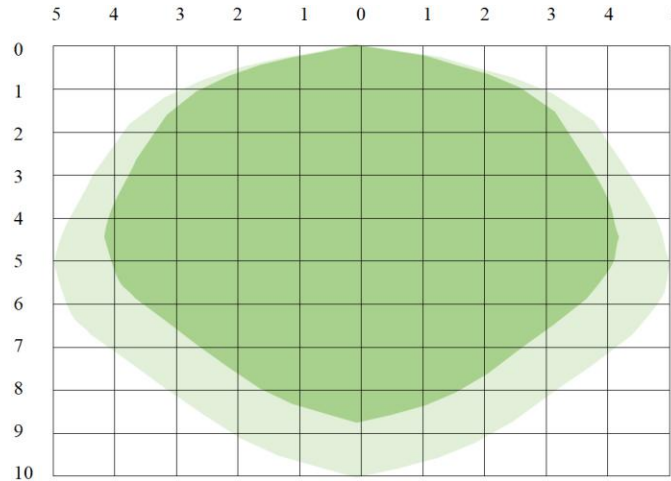


Figure6 ATS58-2020 Detection Pattern

## Precautions

- During installation, the front of the antenna shall be free of metal shell or parts to avoid signal shielding. Plastic or glass and other materials are allowed, but these materials shall not be close to the front of the antenna;
- Try to avoid pointing the radar antenna at the large metal equipment or pipeline, etc;
- When multiple radar modules are installed, the antennas of each radar module shall be parallel to each other as much as possible to avoid direct radiation between the antennas, and the distance between the modules shall be more than 1m;
- The radar sensor should avoid facing the AC driving power supply and keep away from the rectifier bridge of the driving power supply as far as possible to avoid the interference of the power frequency;
- The power supply driving capacity of the radar module needs to be greater than 50mA, otherwise the sensor will work abnormally.



## Revision History

Revision	Release Date	Description
1.0	2020/03/26	Initial version

### Requirement of FCC KDB 996369 D03 for module certification:

1. List of applicable FCC rules:

The module complies with FCC Part 15.249

2. Summarize the specific operational use conditions:

The module has been certified for Fix, Mobile, Portable applications. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

3. Limited module procedures:

The module has not its own RF shielding, which belong to Limited module Standard requires:

Clear and specific instructions describing the conditions, limitations and procedures for third-parties to use and/or integrate the module into a host device (see Comprehensive integration instructions below).

Resolve: Supply example as follows:

Installation Notes:

- 1) ATS58-2020 module Power supply range is DC 4.5~5.5V, when you use ATS58-2020 module design product, the power supply cannot exceed this range.
- 2) When connect ATS58-2020 module to the host device, the host device must be power off.
- 3) Make sure the module pins correctly installed.
- 4) Make sure that the module does not allow users to replace or demolition.

4 .Trace antenna designs:

Not applicable.

5. RF exposure considerations:

This equipment complies with FCC’s RF radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be collocated or operating in conjunction with any other antenna or transmitter.

Note: the host product manuals must include a statement in order to alert the users of FCC RF exposure compliance.

6. Antennas:

The antenna is permanently attached, can’ t be replaced.

Type	Gain	Impedance	Application
PCB type	2.3dBi	50Ω	Fixed, Mobile, Portable

## 7. Label and compliance information

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.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: 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.

The system integrator must place an exterior label on the outside of the final product housing the ATS58-2020 Modules. Below is the content that must be included on this label.

The host product Labeling Requirements:

NOTICE: The host product must make sure that FCC labeling requirements are met. This includes clearly visible exterior label on the outside of the final product housing that displays the contents shown in below:

Contains FCC ID: 2AVK2-ATS58-2020

## 8. Information on test modes and additional testing requirements:

When testing host product, the host manufacture should follow FCC KDB Publication 996369 D04 Module Integration Guide for testing the host products. The host manufacturer may operate their product during the measurements. In setting up the configurations, if the pairing and call box options for testing does not work, then the host product manufacturer should coordinate with the module manufacturer for access to test mode software.

## 9. Additional testing, Part 15 Subpart B disclaimer:

The modular transmitter is only FCC authorized for the specific rule parts (FCC Part 15.249) list on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed when contains digital circuitry.

**10 Information on test modes and additional testing requirements:**

When testing host product, the host manufacture should follow FCC KDB Publication 996369 D04 Module Integration Guide for testing the host products. The host product shall work normally, all the transmitters installed must be operating, investigate the fundamental and unwanted/spurious emissions with the modular transmitter(s) operating in a normal mode. When testing for emissions from the unintentional radiator, the transmitter shall be placed in the receive mode or idle mode if possible, if receive mode only is not possible, test laboratories may need to add attenuation or filters depending on the signal strength of any active beacons (if applicable) from the enabled radio(s).