

# Manual

(Model: EDC18D)

## 1. Product Description

The EDC18D module designed based on the 5.8GHz Ultra Low Power Microwave Radar Induction Chip AT58LP1T1DB. This chip is based on the principle of Doppler effect development, using mature CMOS technology, highly integrated microwave transceiver, IF signal processing and filtering on one chip. Because the adaptive calibration algorithm is integrated on chip, the problems of in-band interference, out-of-band blocking and environmental interference are effectively solved, and the reliability and practicability of the sensor are greatly improved. The EDC18D module is powered by the TM56M1511 power manage chip, and the microwave signal generated by the PLL inside the RF-IC (AT58LP1T1DB) is amplified by PA and radiated out through the ANT-TX antenna. The microwave signal will reflect when it encounters an object in the air. When the object is in motion, there is a certain frequency difference between the reflected signal and the transmitted signal. The reflected signal received by the ANT-RX is mixed with the transmitted signal to obtain the corresponding intermediate frequency information. MCU processes and analyzes the intermediate frequency signal, while MCU also continuously detects the CDS signal. Finally, the MCU determines the CDS signal and IF signal for final OUT output control.



EDC18D



## 2. Product Advantage

- CE-RED/FCC certified to meet new ERP requirements
- Simplified solution with integrated IC, simple wiring
- Hanging height within 3.5m, sensing radius within 3m
- Size: 20mm x 20mm
- Suitable for all kinds of scenes below 18W and short sensing distance
- Low price, high cost performance

### 3. Electrical Performance

Transmit frequency	5750~5870MHz
Input voltage	DC 5V
Output high level	DC 3.3V
Output low level	< DC 0.5 V
3db beam angle	97° (XZ plane) 99° (YZ plane)
Working current	12-16mA
Transmit power	0dBm
Sensing distance	2-4m
Delay time	30s±10%
Operating temperature	-20... + 85°C
Storage temperature	-20... + 105°C

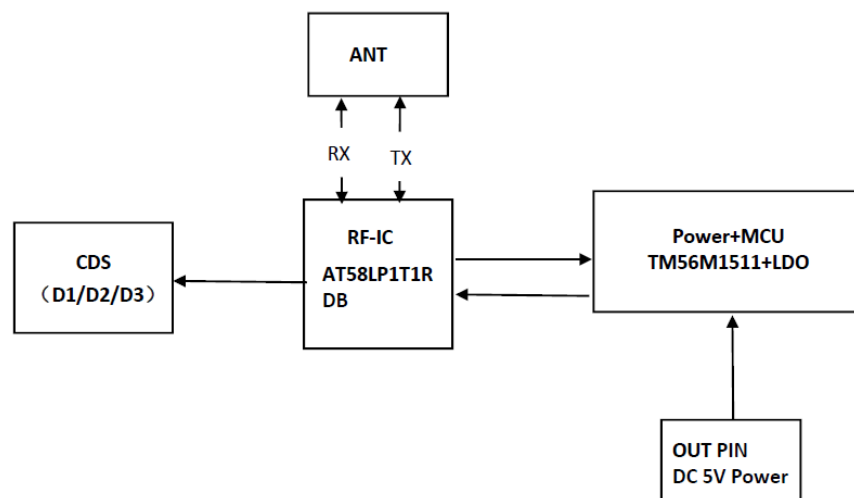
Remarks: 1. The test distance range is based on the module hanging height 3m, indoor testing environment. The tester's height is 170cm, the weight is 65-75kg, and the walking speed is 1m/s (2 steps per second). Different installation scenarios may cause range changes. Subject to actual test.

2. Due to the spectral characteristics of the photosensitive device, the threshold is uniformly tested under natural light conditions.

3. The delay time can be customized according to customer needs, with a delay tolerance of ±10%.

4. This product is suitable for scenarios where the installation height is less than 4m. If the installation height is greater than 4m, extreme conditions such as inability to sense may occur. If you need to exceed this height, please contact the relevant technical personnel.

### 4. Product block diagram

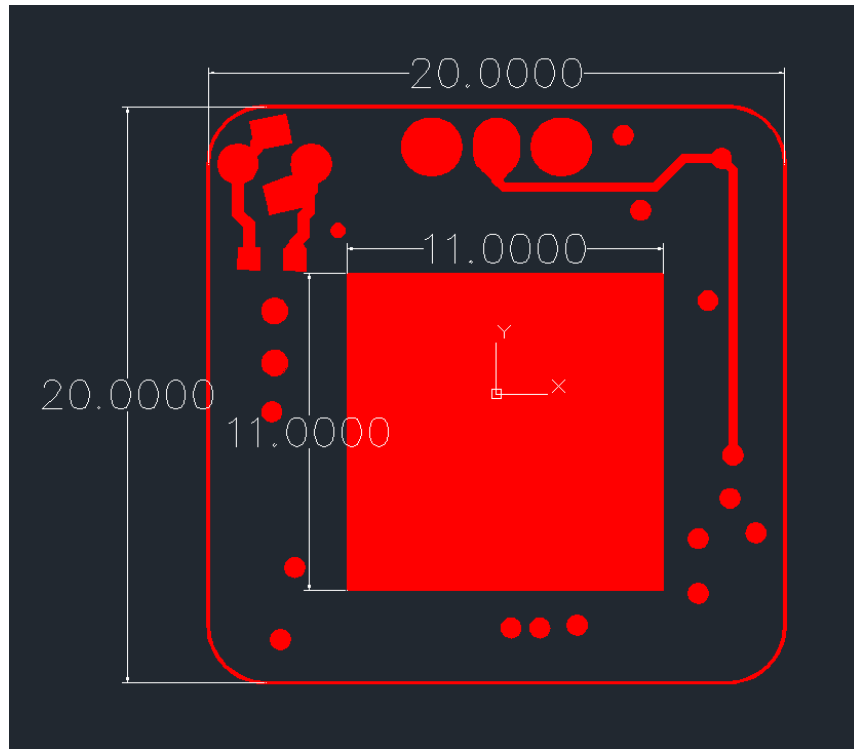


EDC18D module block diagram

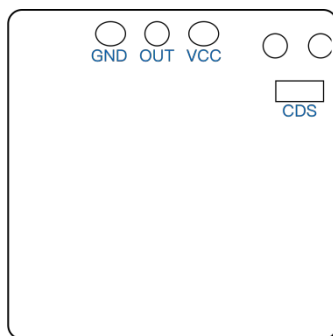
## 5. Product antenna dimensions and pictures

Antenna type: PCB antenna

Antenna size: 11mm\*11mm



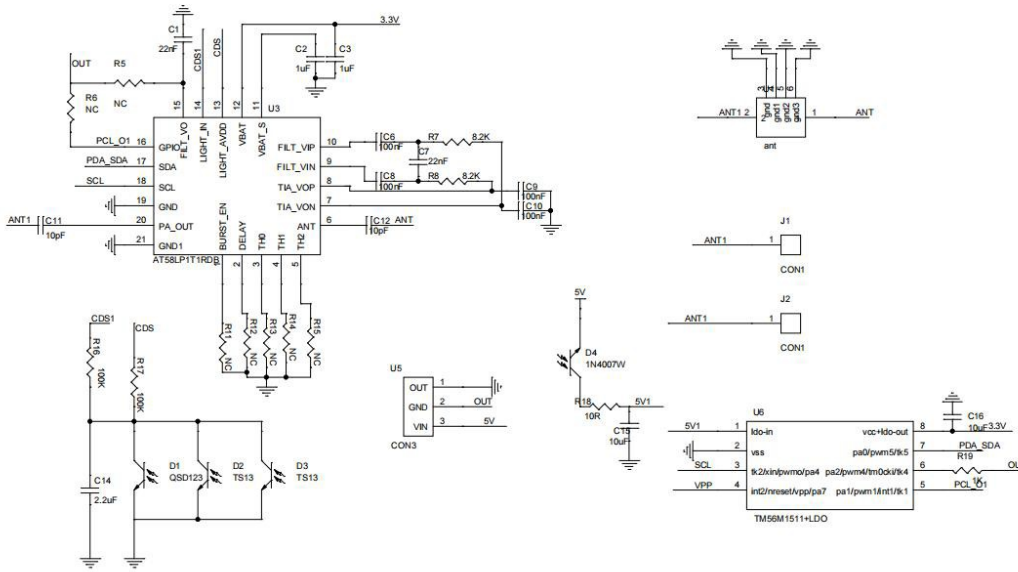
## 6. Pin Description



EDC18D pin definition

Pin	Description
GND	Ground
OUT	Output signal/support PWM
VCC	5V power supply

## 7. Product Circuit Schematic



## 8. Typical Application



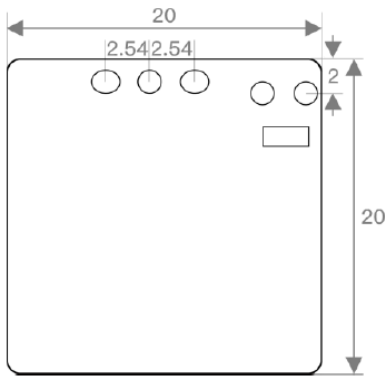
Bulb light

Ceiling light

Down light

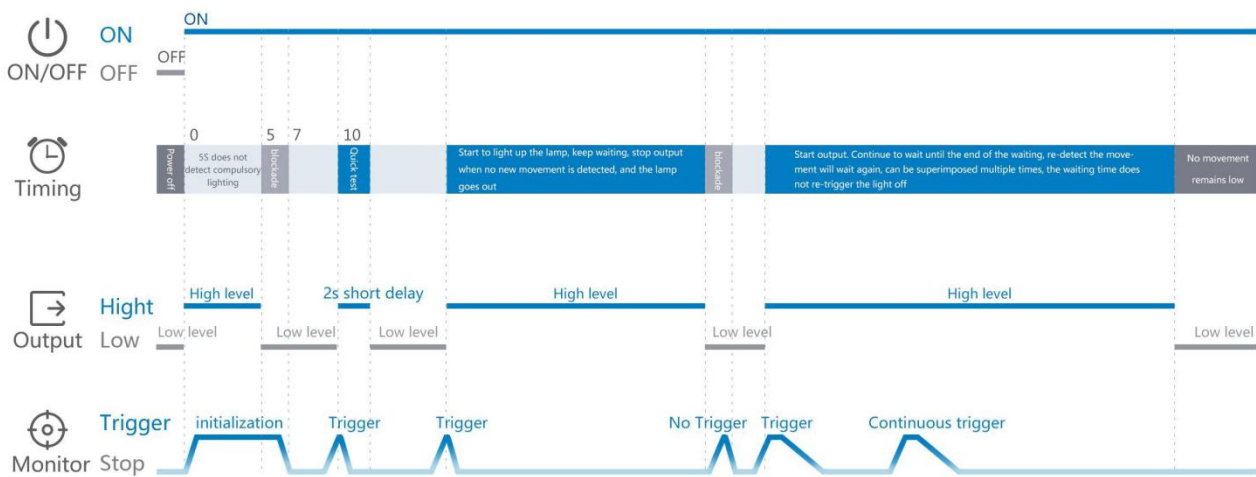
\*The above are typical application products, more products can be expanded.

### 9. Product Size Chart



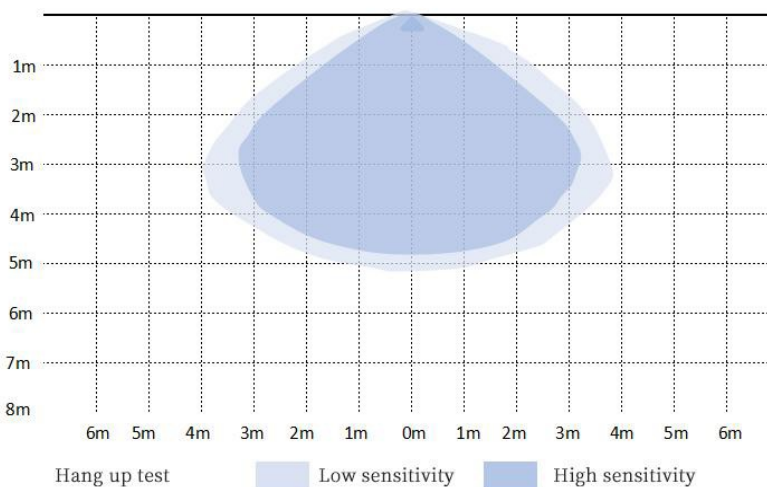
EDC18D dimensional tolerance:  $\pm 0.2\text{mm}$   
 (Pin welding hole:  $\phi 0.9\text{mm}$  tolerance:  $\pm 0.05\text{mm}$ )

### 10. Timing Diagram



### 11. Detection Diagram

Ceiling Installation Diagram

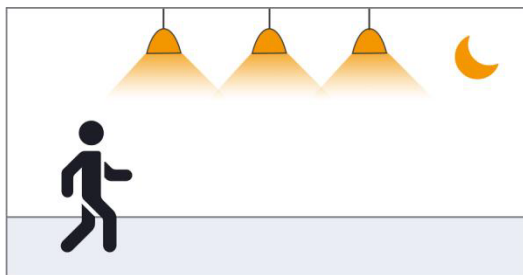


## 12. Function Description

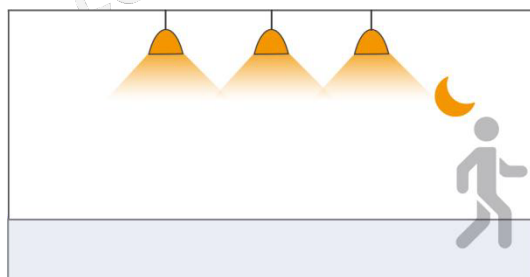
Photosensitive function is on.



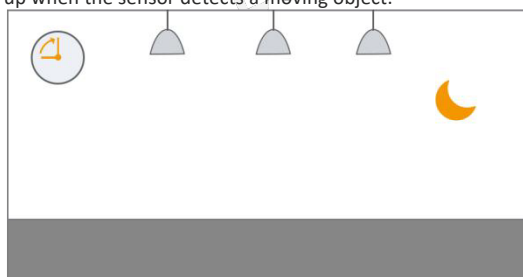
When the ambient light is bright enough, the light will not automatically light up even if a moving object is detected.



When the ambient light is lower than the preset photosensitive threshold, the light will automatically light up when the sensor detects a moving object.



After the moving object leaves, the sensor will enter the delay time when it cannot detect the moving object and keep the light on.

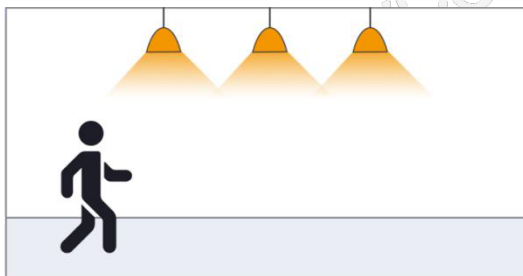


After the preset delay time, the light will automatically turn off.

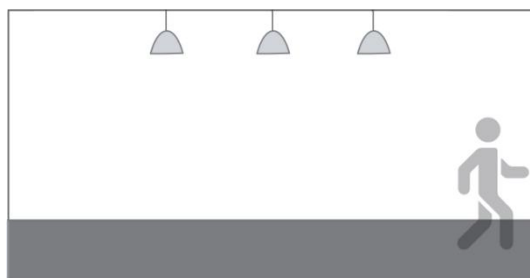
Photosensitive function is off.



If no moving objects can be detected, and the lamp goes out.



When the sensor detects a moving object, the light automatically lights up at 100% brightness and enters the preset delay time.



After the delay time, when the sensor cannot detect any moving objects, the lamp will be off.

### 13. Product Naming Law

ED	Frequency section	Product categories	Product subdivision	Product Number	Time delay	Serial number
C	1	8	D	0-9, A-Z	30 Y	
<input type="checkbox"/> S 3GHz	<input checked="" type="checkbox"/> 1 Microwave sensor module	<input type="checkbox"/> 0 Ultra-low-power series	<input type="checkbox"/> 1 Flagship series		<input checked="" type="checkbox"/> Y Has light sensor	
<input type="checkbox"/> F 6GHz	<input type="checkbox"/> 2 Microwave radar switch	<input type="checkbox"/> 1 Flagship series	<input type="checkbox"/> 2 Short-distance series		<input type="checkbox"/> N no light sensor	
<input checked="" type="checkbox"/> C 5.8GHz	<input type="checkbox"/> 3 Radar antenna	<input type="checkbox"/> 2 Short-distance series	<input type="checkbox"/> 3 Adjustable series		<input type="checkbox"/> P programmable	
<input type="checkbox"/> Q 24GHz	<input type="checkbox"/> 4 MCU	<input type="checkbox"/> 3 Adjustable series	<input type="checkbox"/> 4 External antenna series			
<input type="checkbox"/> V 60GHz	<input type="checkbox"/> 5 Microwave power supply	<input type="checkbox"/> 4 External antenna series	<input type="checkbox"/> 5 General Series			
<input type="checkbox"/> W 77GHz	<input type="checkbox"/> 6 IC	<input type="checkbox"/> 5 General Series	<input type="checkbox"/> 6 To be defined			
<input type="checkbox"/> X 10.5GHz	<input type="checkbox"/> 7 Other	<input type="checkbox"/> 6 To be defined	<input type="checkbox"/> 7 To be defined			
	<input type="checkbox"/> 8 Networking	<input checked="" type="checkbox"/> 8 Basic series	<input type="checkbox"/> 9 High altitude series			

### 14. Packaging Information

Supportable packaging:  Blister packaging  Bubble bag packaging  PE bag packaging



### 15. Configuration Version Description

【hardware】 :  
【software】 :

### 16. History Revision Record

Revision	Date	Description	Remarks
V1.0	2023-02-14	First Edition	
V1.1	2023-06-07	Change of sensing distance	
V1.2	2023-07-18	Change of transmit power	

## 17. FCC warning message

According to the definition of mobile and fixed device is described in Part 2.1091(b), this device is a fixed device.

And the following conditions must be met:

1. This Modular Approval is limited to OEM installation for fixed applications only. The antenna installation and operating configurations of this transmitter, including any applicable source-based timeaveraging duty factor, antenna gain, and cable loss must satisfy MPE categorical Exclusion Requirements of 2.1091.
2. The EUT is a fixed device; maintain at least a 20 cm separation between the EUT and the user's body and must not transmit simultaneously with any other antenna or transmitter.
3. A label with the following statements must be attached to the host end product: This device contains FCC ID:2ARDMEDC18D . This module must not transmit simultaneously with any other antenna or transmitter
4. The host end product must include a user manual that clearly defines operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

For portable devices, in addition to the conditions 3 through 6 described above, a separate approval is required to satisfy the SAR requirements of FCC Part 2.1093 If the device is used for other equipment that separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations. For this device, OEM Integrator must be provided with labeling instructions of finished products.

Please refer to KDB784748 D01 v07, section 8. Page 6/7 last two paragraphs: A certified modular has the option to use a permanently affixed label, or an electronic label. For a permanently affixed label, the module must be labeled with an FCC ID - Section 2.926 (see 2.2 Certification (labeling requirements) above). The OEM manual must provide clear instructions explaining to the OEM the labeling requirements, options and OEM user manual instructions that are required (see next paragraph).

For a host using a certified modular with a standard fixed label, if (1) the module's FCC ID is not visible when installed in the host, or (2) if the host is marketed so that end users do not have straightforward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module: 2ARDMEDC18D: "Contains Transmitter Module FCC ID: 2ARDMEDC18D" The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID.



## 17.1 Radiation Exposure Statement

This module support 5750~5870MHz which compliance with part 15.249 and apply for limited module approval. The module is limited to OEM installation only. The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

OEM host shall implement a Class II Permissive Change (C2PC) or a new FCC ID to demonstrate complied with FCC standard. The OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

The final end product must be labeled in a visible area with the following: “Contains FCC ID:2ARDMEDC18D” The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

The user’s manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes, or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

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.

Changes or modifications not expressly approved by the manufacturer could void the user’s authority to operate the equipment.

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Supplier’s Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements.

## 17.2 Class B digital device

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.

## 17.3 Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

## 17.4 Important Note

In the event that these conditions cannot be met (for example co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

## 17.5 Summarize the specific operational use conditions

The EDC18D radio module is designed specifically for control applications in the host product intelligent lighting series, model: EDC18D. The radio module is not intended to be sold as a standalone product. EDC18D is only applicable to indoor lighting equipment. The EDC18D radio module must not coexist or work in conjunction with any other antenna or transmitter.

## 17.6 How to Sell

This module is not sold separately and is installed by the applicant into the host and sold together with the host.

## 17.7 Note EMI Considerations

KDB 996369 D04 Module Integration Guide has been considered as “best practice” for RF design engineering testing and evaluation of non-linear interactions which can generate additional non-compliant limits due to module placement to host components or properties.

For standalone mode, KDB 996369 D04 Module Integration Guide was referenced, and simultaneous mode considered for the host product to confirm compliance.

## 17.8 How to make changes

Only the Grantee is permitted to make permissive changes. The Grantee may seek permissive changes to permit use of the radio module within additional SMART host products following the same procedure as identified in clause 18.

Each host product model will require AC Powerline Conducted Emissions, Spurious Radiated Emissions, and conducted output power verification. A C2PC will be completed for the integration into additional host models.

## 17.9 How to Contact Us

Please contact me if you have additional questions. Your attention to this matter is greatly appreciated.

ZhouBo

zhoubo@easydetek.com

ShenZhen Easydetek Technology CO. LTD

## 18. Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

### 18.1 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C 15.249

### 18.2 Specific operational use conditions

1. During product installation, the module is required to keep a certain height from the metal plane. It is recommended that the module should be controlled at 5-12mm from the metal plane and should not be close to or touch the metal plane, otherwise the product may not work normally!
2. The product has good penetration effect on plastic and wood. At the same time, avoid metal shielding in front of the antenna, which will reflect microwave and affect the actual induction effect.
3. The glass or ceramic in front of the antenna will bring reflection and penetration attenuation of electromagnetic

wave and reduce the sensing distance of the sensor, and the attenuation will be more serious with the increase of thickness.

**4.** Please use the power supply with small ripple, especially the low-frequency ripple, which is easy to interfere with the work of the sensor, resulting in false alarm of the sensor. Recommended power supply output capacitance 470 UF; It is suggested that the power ripple should be within 100mV, and the effect is better when the ripple reaches 50mV.

**5.** The signal output of the sensor has weak load current capacity, and may not be able to directly drive the back-end equipment.

**6.** When multiple sensors are applied in the field, the recommended product installation spacing is greater than 1.5m. The installation distance is too close, which may cause individual cycle false alarms.

**7.** The antenna surface shall be protected from high current circuit coverage. The electromagnetic field generated by the circuit loop will interfere with the normal radiation of the antenna, resulting in false alarm or changing the induction range.

**8.** If microwave sensor and wireless communication module (NB, Bluetooth, WiFi, 2.4G module) coexist, the installation spacing between IOT module antenna and microwave module antenna shall be enlarged and more. At the same time, try to shield or not receive the trigger signal of the microwave module during the communication of the Internet of things module; Microwave sensors or products with built-in microwave sensors will be interfered by wireless routers. It is recommended to keep a distance of more than 1m from routers, wireless hotspots and other high-power wireless communication equipment during installation.

**9.** The light sensor threshold is the test value under the conditions of sunny environment, no shadow and diffuse reflection of ambient light. The wavelength of light sensing detection light covers 400nm ~ 1100nm (including visible light, LED lamp and infrared light band). The illuminance value detected by light sensor may be different in different periods and different weather conditions.

**10.** The antenna surface of the microwave sensor shall avoid facing the AC driving power supply, and shall be far away from the rectifier bridge, transformer, switch MOSFET and other high-power devices of the driving power supply as far as possible, so as to avoid the power frequency signal interfering with the microwave module and causing false alarm.

### 18.3 Limited module procedures

The EDC18D radio module does not include its own RF shielding. The radio module has been tested in a standalone configuration and complies with FCC Part 15.249. The RF module has also been tested in the host product series, and each host product model has been verified for AC power line conducted emission, stray radiation emission, and conducted output power. The results of the host product testing indicate that the radio module meets the requirements when installed in the host product. Any installation or operation that does not follow this manual will require further evaluation. Host installation instructions: Plug the signal port of the module into the corresponding port on the main board of the host. See the figure below, marked in the red box.

The module is installed inside the host



Note: See Appendix 1 at the end for detailed instructions on how to install.

### 18.4 Trace antenna designs

Not applicable. The module has its own antenna, and doesn't need a trace antenna etc.

### 18.5 RF exposure considerations

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

The module has been evaluated and shown compliant with the FCC RF Exposure limits under Mobile exposure conditions. OEM integrator must not be co-located or operating in conjunction with any other antenna or transmitters, otherwise, a Class II Permissive Change (C2PC) must be filed with the FCC and/or a new FCC authorization must be applied.

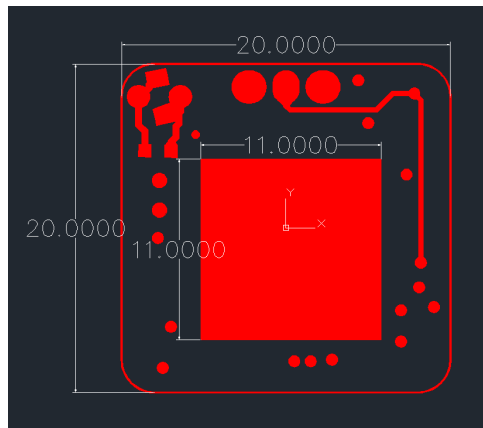
## 18.6 Antennas

This radio transmitter FCC ID: 2ARDMEDC18D have a unique and permanently fixed antenna which conform the requirement of FCC part 15.203. The antenna information shows bellow.

Antenna Type: PCB antenna

Antenna Gain(Peak): 4.86dBi

Antenna size: 11mm\*11mm



This antenna is permanently paired with a product to sell. The final installation of the radio module in the host must include an antenna.

## 18.7 Label and compliance information

The final end product must be labeled in a visible area with the following : “Contains FCC ID: 2ARDMEDC18D”

If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users' manual: 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.

A user's manual for the finished product should include one of the following statements: For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

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 User's Manual for the finished product should include the following statements:

Any changes or modifications to this equipment not expressly approved by the OEM Integrator may cause harmful interference and void the user's authority to operate this equipment.

#### RF Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

## 18.8 Information on test modes and additional testing requirements

Data transfer module demo board can control the EUT work in RF test mode at specified conditions. This radio module must not be installed to co-locate and operating simultaneously with other radios in the host system except in accordance with FCC multi-transmitter product procedures. Additional testing and equipment authorization may be required operate simultaneously with other radio.

## 18.9 Additional testing, Part 15 Subpart B disclaimer

The host product manufacturer is responsible for compliance with 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.

## General Statements

The module is intended only for OEM integrators.

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and 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. Note EMI Considerations: Note that a host manufacture is recommended to use KDB 996369 D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

For standalone mode, reference the guidance in D04 Module Integration Guide and for simultaneous mode; see D02 Module Q&A Question 12, which permits the host manufacturer to confirm compliance.

How to make changes:

When changing from the conditions of approval, please present technical documentation that it is equivalent to a Class I change.

For example, when adding or changing an antenna, the following technical documents are required.

- 1) The document indicating the same type as the original antenna
- 2) Technical document showing that the gain is the same with the gain at the time of the original approval. If the antenna gain is lower than the antenna gain value compared with the original approval, a class II permissive change should be followed.
- 3) Technical document showing that the radiated emissions level is no more than the worse value than when it was originally certified.



Module with no shield Class II Permissive Change (C2PC) Guidance:

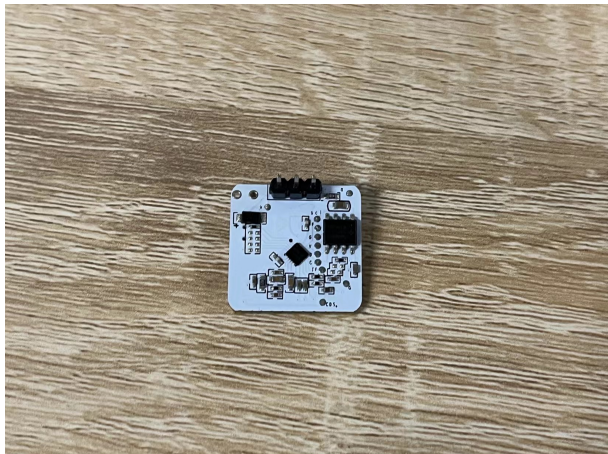
The test plan shall confirm and demonstrate compliance with the following:

- a. Confirm and document the continued compliance for the fundamentals for band 5750~5870MHz under Part15 Subpart C, Paragraph 15.249 granted for the module.
- b. The AC Power line test shall demonstrate the worst-case of band 5750~5870MHz with modulation type FSK, channel 5800MHz, as well as RSE 30-1000MHz; And the worst-case of RSE above 1GHz is 5750MHz.
- c. Test Band edge compliance for the widest and narrowest bandwidths for channel 5750MHz and 5870MHz.
- d. Include radiated spurious emissions with the antenna connected (the unique antenna with PCB antenna 4.86dBi ). Testing shall be performed for modulation type FSK, and three channels low, mid and high channel:5750MHz, 5800MHz and 5870MHz. In all cases, which as defined in 15.33(a) for unlicensed transmitters and 2.1057(a) for licensed transmitters.
- e. Confirm and demonstrate with the radiated test that no additional parasitic, non-compliant emissions exist due to ingress (parasitic oscillations, radiation of stray signals within a host, etc.), are present.
- f. These tests can be based on C63.10 and C63.26 as guidance.

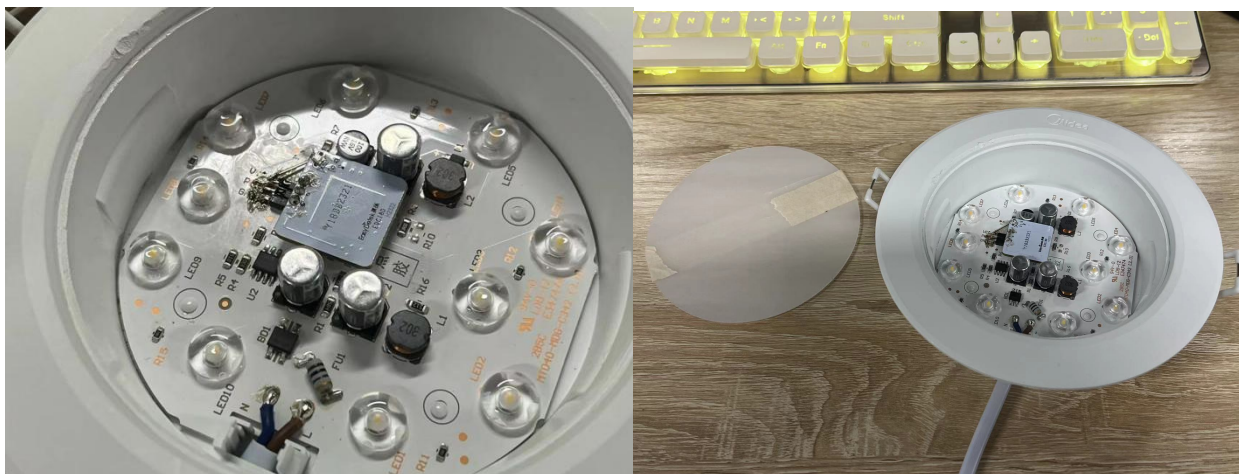
## Appendix 1-Quick Installation Guide

The wireless module is installed into the host by the certificate applicant, and other users cannot change it without permission.

### 1. This is a new module PCB board



### 2. Insert wireless module and prepare the lamp components, then complete the installation



### 3. Introduction to Typical Installation and Usage Environment

