

# CDW-UVC7300-11(S9)

## Wi-sun Module spec

### Software:

Node:

Root:

客 户 Customer	客户承认 Approve (请盖印章)	日期 Date

拟制 Design	审核 Check	批准 Approve	版本 Version	日期 Date
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深圳市中龙通电子科技有限公司  
CHINA DRAGON TECHNOLOGY LIMITED

公司地址：深圳市宝安区沙井街道南浦路林坡坑蚝三第一工业园 B4 栋

电话：(86 755) 81449957

传真：(86 755) 81449967

E-mail: Info@cdtech.cn

[Http://www.cdtech.cn](http://www.cdtech.cn)

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1.0	2023.09.27	Frist release

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## 1. Overview

CDW-UVC7300-11(S9) is a Wi-sun module based on VC7300BU chip. Is a system of Systems (SOC) solution for IEEE 802.15.4g/Wi-sun applications, it enables the establishment of powerful network nodes at a very low total material cost, combined with the superior performance of leading RF transceivers.

It has the advantages of small size, simple peripherals, easy to use, excellent RF performance, and special GPIO port, which is convenient for users to use, eliminating the complicated work of debugging RF and other aspects, and can be more easily embedded in the system, shorten the development cycle and cost, and seize the market opportunities faster.

## 2. Performance parameter

	parameter
Chip	VC7300BU
Wireless standard	802.15.4
Emission current@13dbm	45mA (Type)
Emission power@20dbm	125mA (Type)
sleep current	<60uA
Frequency range	902-928MHz, 915MHz (Type)
Radio data rate	50k
Modulation format	FSK
Protocol type	Wisun
Operating voltage range	2.7-3.6V
Receiver performance	-102 dBm at 50 kbps FSK
Environment	Operating humidity :10%~90% non-condensing storage humidity :10%~90% non-condensation
	Operating temperature-40°C~+85°C
	Storage temperature-40°C~+125°C

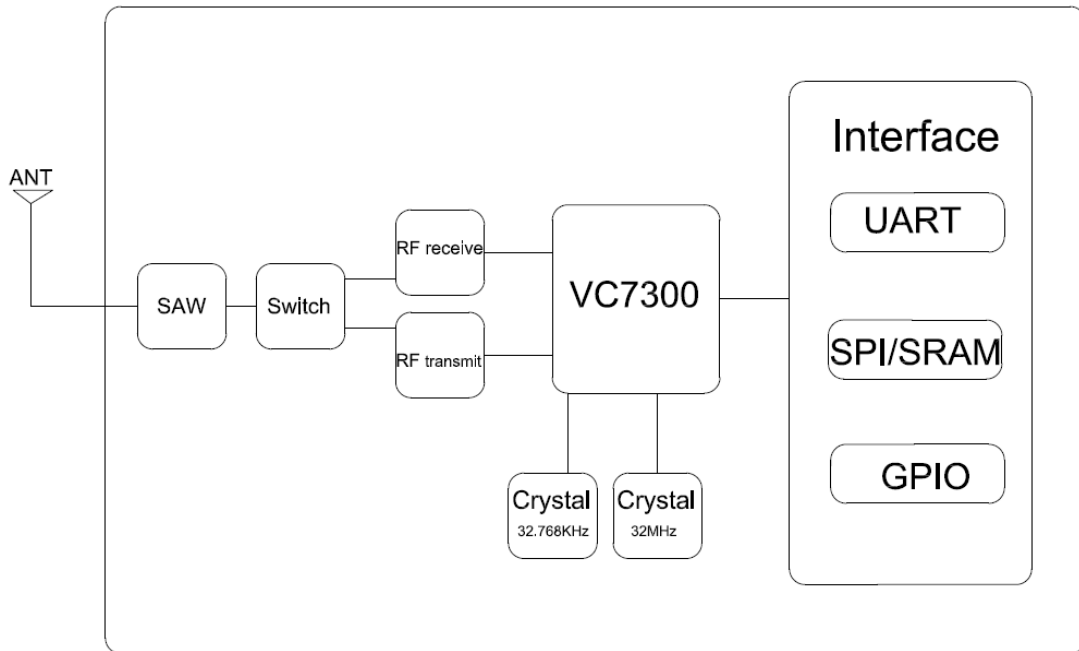
ESD: 2 Kv (All pads are based on mannequin JEDECSTD22 method A114)

0.5Kv (according to the charged device model JEDECSTD22 method C101)

(1) Exceeding the range listed in the limit parameters may result in permanent damage to the equipment. These are only limit parameters, other conditions beyond the recommended operating conditions for the functional operation specified here, without implication. The reliability of the device may be affected when the time exceeds the threshold.

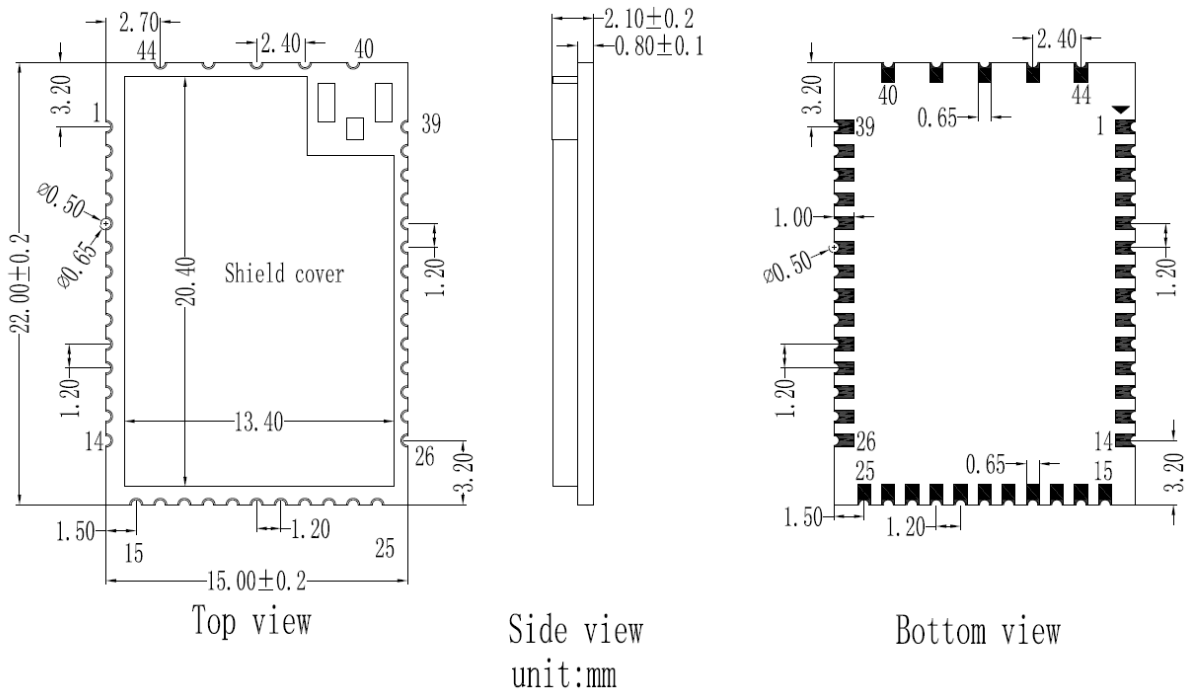
(2) Warning: ESD sensitive equipment. Precautions must be used when handling such equipment to prevent permanent damage.

### 3. Module function block diagram



### 4. Module dimensions and pin definition

(Unit: 22.0\*15.0\*2.1 ± 0.2mm)

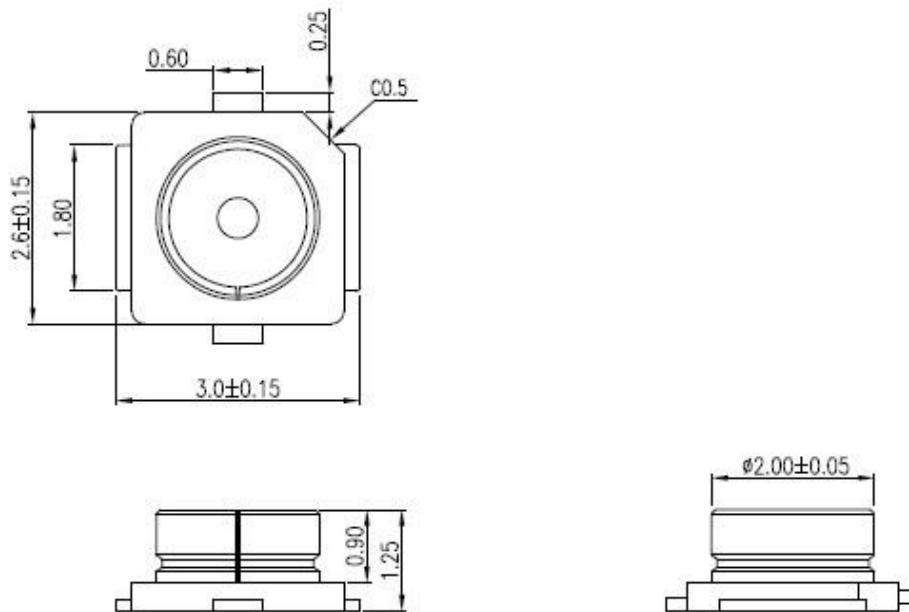


NO	Name	Description
1	IOD9	General GPIO; If not use, Not connect
2	IOD1	General GPIO; If not use, Not connect
3	Boot	Boot mode selection BOOT = 0: Embedded flash boot(Internal pull-down) BOOT = 1: Internal ROM boot
4	RXD1	Internal pull-up, debug port
5	TXD1	Debug port
6	RXD0	Internal pull-up, data port
7	TXD0	Data port
8	IOA7	General GPIO; If not use, Not connect
9	IOA6	General GPIO; If not use, Not connect
10	IOA5	General GPIO; If not use, Not connect
11	IOA4	General GPIO; If not use, Not connect
12	RSTN	Reset pin, recommended external RC pull-up, low level effective
13	IOF0	General GPIO; If not use, Not connect
14	IOF1	General GPIO; If not use, Not connect
15	IOE4	General GPIO; If not use, Not connect
16	IOE5	General GPIO; If not use, Not connect
17	IOE6	General GPIO; If not use, Not connect
18	IOE7	General GPIO; If not use, Not connect
19	IOA0	MODE = 0 SWCLK; MODE = 1 General GPIO; If not use, Not connect
20	IOA1	MODE = 0 SWDIO ; MODE = 1 General GPIO; If not use, Not connect
21	MODE	MODE = 0: Debug mode MODE = 1: Normal mode (Module default high level) , If not use, Not connect
22	IOA2	General GPIO; If not use, Not connect
23	IOA3	General GPIO; If not use, Not connect
24	IOA8	ADC0; General GPIO; If not use, Not connect
25	IOA9	ADC1; General GPIO; If not use, Not connect
26	VDD33	Module power supply input (3.3 V)
27	GND	Ground

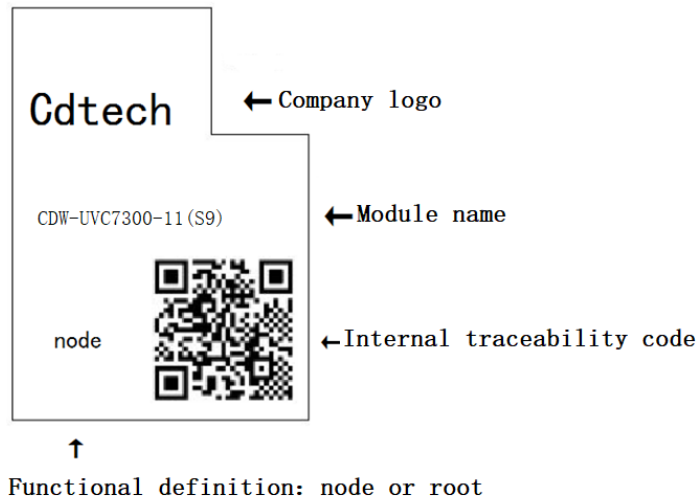
28	I0B7	FLASH_HOLD (FLASH Write protection pin) ; If not use, Not connect
29	I0B1	FLASH_WP (FLASH HOLD pin) ; If not use, Not connect
30	I0B6	PWM1, General GPIO; If not use, Not connect
31	I0B0	PWM0, General GPIO; If not use, Not connect
32	I0B15	General GPIO; If not use, Not connect
33	I0B14	PWM3, General GPIO; If not use, Not connect
34	I0B13	PWM2, General GPIO; If not use, Not connect
35	I0B12	SPI_MOSI; If not use, Not connect
36	I0B11	SPI_MISO; If not use, Not connect
37	I0B10	SPI_CLK; If not use, Not connect
38	I0B9	FLASH_CS <sub>n</sub> (FLASH Selected signal) ; If not use, Not connect
39	I0B8	SRAM_CS <sub>n</sub> (SRAM Selected signal) ; If not use, Not connect
40	GND	Ground
41	GND	Ground
42	RF	RF pin (default Not connect)
43	GND	Ground
44	GND	Ground

Note: The module uses IPEX by default and requires an external antenna

IPEX reference size



## 5. Module picture and label description



## Materials

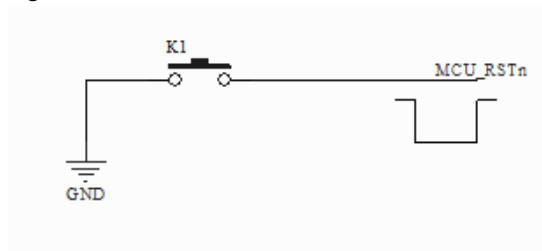
Materials	Specifications	Supplier
Crystal	32MHz/32.768KHZ	JWT,TKD,TXC
SOC	VC7300BU	Unicomsemi
Saw Filter	HDF915C1P2SP04	HD,TST
SWITCH	RTC7608U	Richwave
PCBA VER	132-UVC7300-08	A,O,P,T,N,B,C



## 6. Design Points to note

- 1、 Power supply filter circuit, and data line matching resistance as close as possible to the module。
- 2、 Module placement as far as possible from interference sources: such as WIFI antenna, GSM antenna, DDR CLK, LCD wiring。
- 3、 Reset circuit (required)

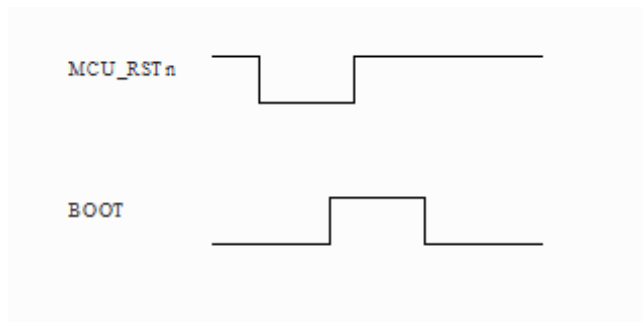
The module will reset when the reset pin is pulled down more than 1ms, so the user can use an external button or IO to achieve a low-level pulse to reset the module lasting 1ms. The recommended circuit design is as follows:



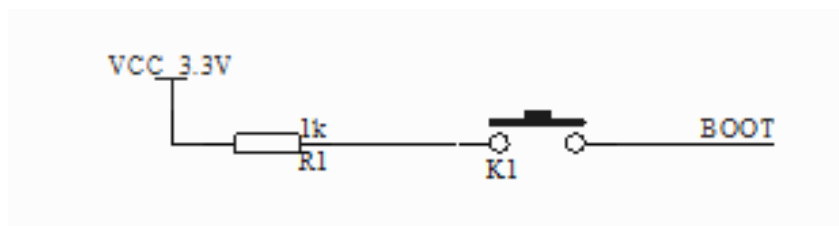
- 4、 Serial port burning (required)

When the module enters the serial port burning mode, it needs to use two pins, BOOT and MCU-RSTn. The timing sequence is to pull down MCU-RSTn → pull up BOOT → pull up MCU-RSTn → pull down BOOT, the timing key of MCU-RSTn is the rising edge during which BOOT needs to keep this feature high. It is recommended that the user direct the BOOT pin to a key or other device that provides a high level of power. The recommended designs are as follows:

Burn mode sequence diagram



BOOT pin circuit



## 7. Application Points to note

1, module storage usage instructions:

(1) Storage period of module packaging:

a, storage period: 12 months, storage environment conditions: temperature  $\leq 40^{\circ}\text{C}$ , humidity  $\leq 90\%$  R.H;

b, inventory control: "first in, first out" as the principle.

(2) After module packaging and unpacking, the time limit for SMT assembly:

a, check the humidity card: the display value should be less than 20%(blue); Eg. 30%(red) indicates that the module has absorbed moisture.

b, SMT workshop environment temperature and humidity control: operating at a temperature of  $22^{\circ}\text{C}(\pm 4^{\circ}\text{C})$ , humidity of 60% R.H( $\pm 20\%$ );

c, after baking, immediately used for SMT production, or put appropriate amount of desiccant resealed packaging, put in the drying cabinet storage.

2. If the unwrapped module is not used within 48 hours:

(1) The module must be re-baked to remove the module moisture absorption problem;

(2) Baking temperature conditions:

a, high temperature resistant packaging material,  $120^{\circ}\text{C}(\pm 5^{\circ}\text{C})$ , 24 hours;

b, can not withstand high temperature packaging material,  $40^{\circ}\text{C}(\pm 3^{\circ}\text{C})$ , 192 hours;

3, module baking temperature, time, use requirements, humidity sensitivity level, etc

First of all, the requirements of "incoming packing instructions" shall prevail; If the package of incoming materials is not specified, this article shall prevail.

4, the moisture grade classification of the outer packaging and the SMT service life after unpacking:

(1) After unpacking, the module must complete the SMT welding procedure within 48 hours;

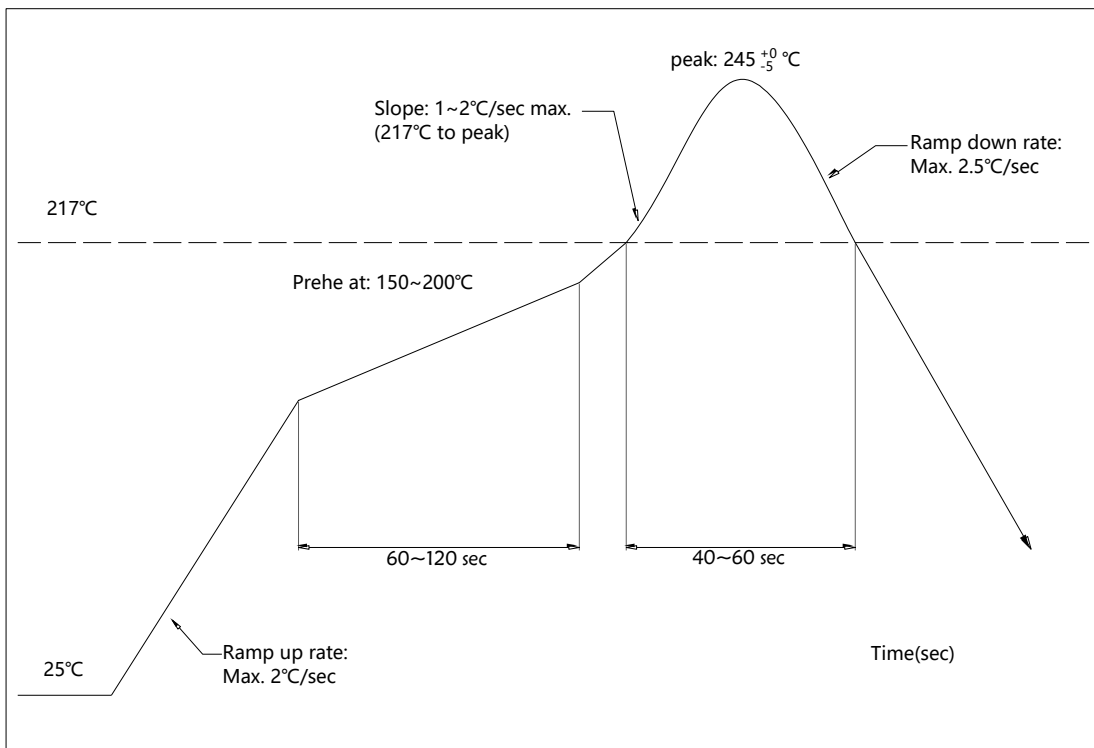
(2) The unsealed module must be stored in the drying cabinet. The humidity in the drying cabinet is  $\leq 20\%$  R.H.

## 8. Recommended Reflow Profile

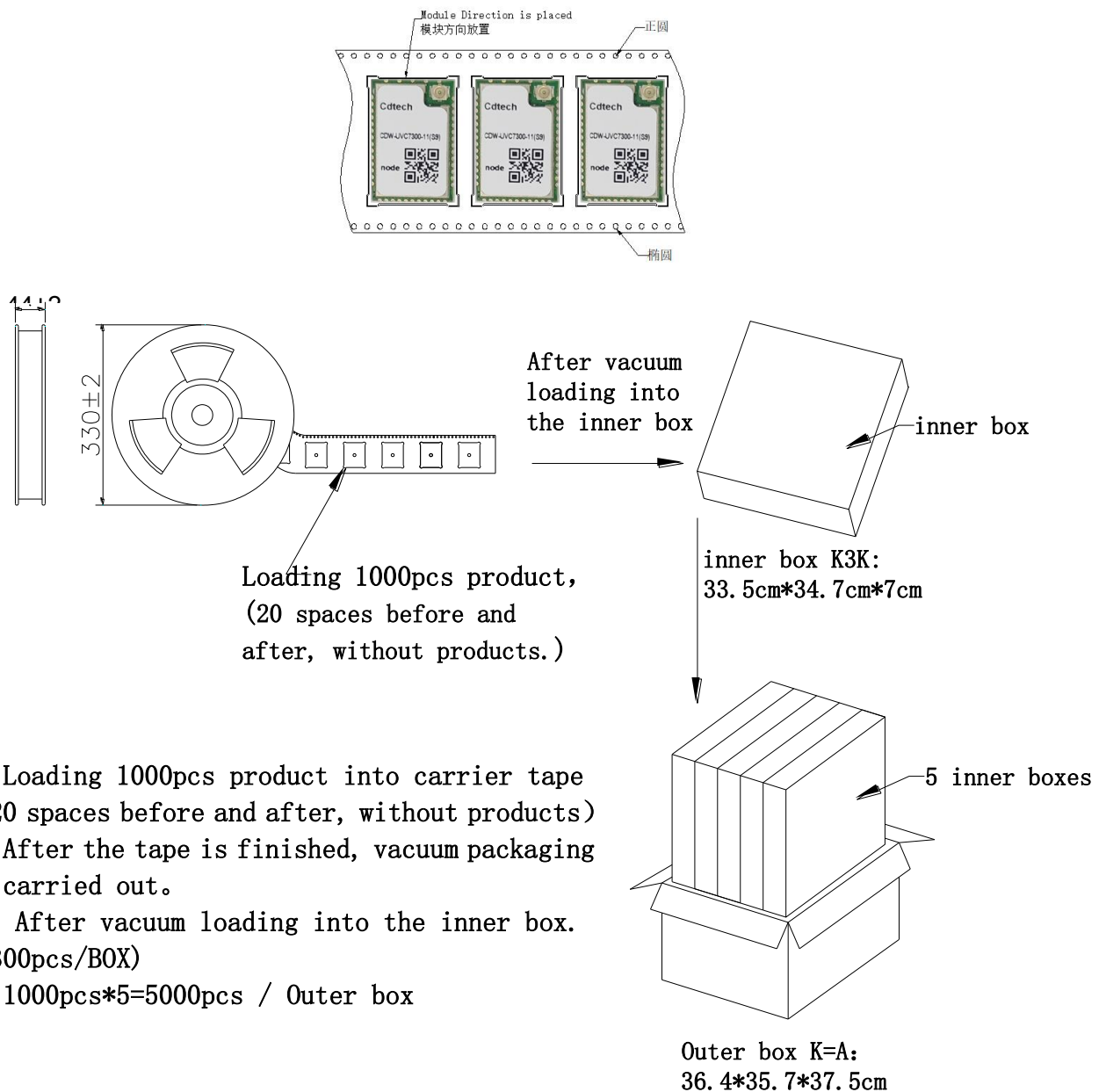
Referred IPC/JEDEC standard.

Peak Temperature : <math><250^{\circ}\text{C}</math>

Number of Times :  $\leq 2$  times



## 9. Packaging



- 1、 Loading 1000pcs product into carrier tape (20 spaces before and after, without products)
- 2、 After the tape is finished, vacuum packaging is carried out.
- 3、 After vacuum loading into the inner box. (1300pcs/BOX)
- 4、 1000pcs\*5=5000pcs / Outer box



### **ESD CAUTION**

The UVC7300-11(S9) is ESD (electrostatic discharge) sensitive device and may be damaged with ESD or spike voltage. Although UVC7300-11(S9) is with built-in ESD protection circuitry, please handle with care to avoid the permanent malfunction or the performance degradation.

**FCC WARNING**

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.

(b) 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:

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.

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

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

The firmware setting is not accessible by the end user.

The final end product must be labelled in a visible area with the following:

“Contains Transmitter Module 2BFLD-S9”

## Requirement per KDB996369 D03

### 2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See also Section 2.10 below concerning the need to notify host manufacturers that further testing is required.<sup>3</sup>

**Explanation:** This module meets the requirements of FCC part 15C(15.247).

### 2.3 Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer’s instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

**Explanation:** The EUT has FPC antenna, Yes, the module contains IPEX connected antenna with a maximum antenna gain of 2.2dBi.

### 2.4 Limited module procedures

If a modular transmitter is approved as a “limited module,” then the module manufacturer is responsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.

This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited

module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.

**Explanation:** The module is a single module.

### 2.5 Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ – Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.

- a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna);
- b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered);
- c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout;
- d) Appropriate parts by manufacturer and specifications;
- e) Test procedures for design verification; and
- f) Production test procedures for ensuring compliance.

The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

**Explanation:** Yes, The module with FPC antenna designs, and This manual has been shown the antenna, connectors, and isolation requirements.

### 2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

**Explanation:** This module complies with FCC RF radiation exposure limits set forth for an uncontrolled environment, This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body." This module is designed to comply with the FCC statement, FCC ID is: 2BFLD-S9.

## 2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an “omni-directional antenna” is not considered to be a specific “antenna type”)).

For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product. The module manufacturers shall provide a list of acceptable unique connectors.

**Explanation:** The EUT has FPC antenna, Yes, the module contains IPEX connected antenna with a maximum antenna gain of 2.2dBi.

## 2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This includes advising host product manufacturers that they need to provide a physical or e-label stating “Contains FCC ID” with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

**Explanation:** The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: 2BFLD-S9"

## 2.9 Information on test modes and additional testing requirements

Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer’s determination that a module as installed in a host complies with FCC requirements.

**Explanation:** Can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

## 2.10 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed 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. If the grantee markets their product as being Part 15

Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance



testing with the modular transmitter installed.

**Explanation:** The module without unintentional-radiator digital circuitry, so the module does not require an evaluation by FCC Part 15 Subpart B. The host should be evaluated by the FCC Subpart B.

### IC statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

The term "IC: " before the certification/registration number only signifies that the Industry Canada technical specifications were met.

This product meets the applicable Industry Canada technical specifications.

Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS) d'Innovation, Sciences et Développement économique Canada. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radio électrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

- 1) L'appareil ne doit pas produire de brouillage;
- 2) L'appareil doit accepter tout brouillage radio électrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Please notice that if the ISED certification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed should display a label referring to the enclosed module. This exterior label can use wording such as the following:

"Contains IC: 32294-S9" any similar wording that expresses the same meaning may be used. l'appareil hôte doit porter une étiquette donnant le numéro de certification du module d'Industrie Canada, précédé des mots « Contient un module d'émission », du mot « IC: 32294-S9 » ou d'une formulation similaire exprimant le même sens, comme suit

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.

Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 et la conformité

à l'exposition de RSS-102 rf, utilisateurs peut obtenir l'information canadienne sur l'exposition et la conformité de rf.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with a minimum distance of 20 centimeters between the

radiator and your body.

Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ou émetteur. Cet équipement devrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.

This radio transmitter 32294-S9 has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

ANT Type	Manufacturer	Model	Peak Gain	Frequency range	impedance
FPC antenna	Dongguan YiJia Electronics Communication Technology Co.,Ltd.	501013894	0dBi	900-930MHz	50Ω
FPC antenna	Dongguan YiJia Electronics Communication Technology Co.,Ltd.	501013895	2.2dBi	900-930MHz	50Ω