

# UAM0 5 7

Wi-Fi single-band 1T1R 802.11b/g/n/ax

Module Datasheet

# 1 Overview.

## 1.1 Introduction.

UAM057 is a cost-effective WIFI+BLE module, supporting Bluetooth dual mode 5.2 and IEEE 802.11 b/g/n/ax protocol standards, lightweight TCP/IP protocol stack, STA, AP, and Direct modes, and Matter protocol. Users can use this module to add networking functions to existing devices or build independent network controllers.

## 1.2 Features.

- Operate at ISM frequency bands (2.4GHz).
- Standard IEEE 802.11b/g/n/ax.
- Support WiFi+Bluetooth 5.2.
- Support Wi-Fi and BLE coexist.
- Support BLE assists in fast Wi-Fi connection.
- Built-in single core RISC-V MCU with a main frequency of up to 320MHz, can be used as an application processor.
- Built-in 64KB ROM, 512KB SRAM, 4Mbit Flash, 32byte eFuse.
- Built-in TR switch, BALUN, LNA, PA, and PCB onboard antenna.
- Support remote firmware OTA upgrade.
- Support STA, AP, STA+AP and Direct working modes.
- Support WPA/WPA2/WPA3 security protocol.

## 1.3 Recommended Operating Rating.

| Description              |                     | Min     | Typ | Max     | Unit  |
|--------------------------|---------------------|---------|-----|---------|-------|
| Ambient Temperature (TA) |                     | -40     | 25  | 105     | deg.C |
| Vcc                      |                     | 3.0     | 3.3 | 3.6     | V     |
| (VOL)                    | Output low voltage  | VSS     | /   | VSS+0.3 | V     |
| (VOH)                    | Output high voltage | VCC-0.3 | /   | VCC     | V     |

## 1.4 Reference power consumption for conventional continuous operation.

| Parameter       | Condition/Notes | Typ. | Unit |
|-----------------|-----------------|------|------|
| TX model        |                 |      |      |
| I <sub>RF</sub> | 11b 11M         | 280  | mA   |
| I <sub>RF</sub> | 11g 54M         | 250  | mA   |
| I <sub>RF</sub> | 11n HT20 MCS7   | 250  | mA   |
| I <sub>RF</sub> | 11n HT40 MCS7   | 250  | mA   |
| I <sub>RF</sub> | 11ax HE20 MCS7  | 250  | mA   |

|          |                |     |    |
|----------|----------------|-----|----|
| $I_{RF}$ | 11ax HE40 MCS7 | 250 | mA |
| RX model |                |     |    |
| $I_{RF}$ | 11b 11M        | 80  | mA |
| $I_{RF}$ | 11g 54M        | 80  | mA |
| $I_{RF}$ | 11n HT20 MCS7  | 80  | mA |
| $I_{RF}$ | 11n HT40 MCS7  | 80  | mA |
| $I_{RF}$ | 11ax HE20 MCS7 | 80  | mA |
| $I_{RF}$ | 11ax HE40 MCS7 | 80  | mA |

## 1.5 ESD Specifications

| Item                  | Description                                                        | Value     | Unit |
|-----------------------|--------------------------------------------------------------------|-----------|------|
| Human Body Mode (HBM) | Electrostatic Discharge<br>Tolerance under Human<br>Body Model     | $\pm 4$   | KV   |
| CDM                   | Electrostatic Discharge<br>Tolerance under Charged<br>Device Model | $\pm 0.2$ | KV   |

## 2 Module usage precautions.

When using the WIFI module , a certain tolerance should be reserved for the output current of the power supply. It is recommended that the output current of the power supply be  $\geq 500\text{mA}$ , and a suitable power supply IC packaging should be selected. When supplying LDO power, attention should be paid to the issue of heating, and when supplying DC-DC power, attention should be paid to the issue of overshoot at the moment of power on.

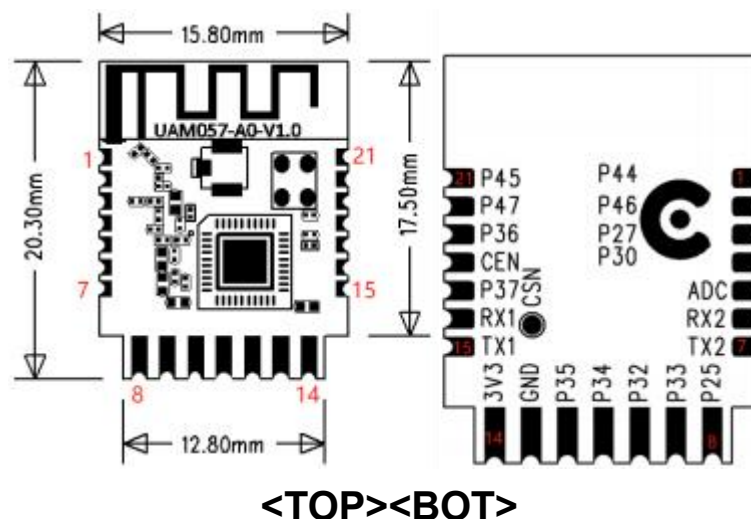
## 3 WiFi Specification.

| Features            | Descriptions                                                                                                                                            |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Main Chipset        | BEKEN: BK7235                                                                                                                                           |
| Operating Frequency | Wi-Fi: 2.412~2.484GHz<br>BLE: 2.402~2.480GHz                                                                                                            |
| Operating Voltage   | 3.0~3.6V                                                                                                                                                |
| WIFI Standard       | IEE 802.11b/g/n/ax                                                                                                                                      |
| PHY Data rates      | Wi-Fi:802.11b: 11, 5.5, 2, 1 Mbps<br>802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps<br>HT20 MCS0-MCS7<br>HT40 MCS0-MCS7<br>HE20 MCS0-MCS7<br>HE40 MCS0-MCS7 |

|                                |                                                                                                                                                                                            |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EVM                            | 802.11b /11Mbps: EVM≤-10dB<br>802.11g /54Mbps: EVM≤-25dB<br>802.11n /HT20 MCS7: EVM-27dB<br>802.11n /HT40 MCS7: EVM-27dB<br>802.11ax /HE20 MCS7: EVM-27dB<br>802.11nax/HE40 MCS7: EVM-27dB |
| Receiver Sensitivity<br>(HT20) | 802.11b@8% PER11Mbps -88dBm                                                                                                                                                                |
|                                | 802.11g@10% PER54Mbps -74dBm                                                                                                                                                               |
|                                | 802.11n@10% PER MCS 7 -70dBm                                                                                                                                                               |
| Operating Channel              | Wi-Fi 2.4GHz:<br>11: (Ch. 1-13) – United States(North America)<br>13: (Ch. 1-13) – Europe<br>14: (Ch. 1-14) – Japan                                                                        |
| Antenna                        | PCB onboard antenna<br>External antenna with I-PEX connector                                                                                                                               |

## 4 Pin Descriptions.

### 4.1 Pin Outline.



### 4.2 PinDefinition.

| Pin No. | Name | Type | Description            | Voltage |
|---------|------|------|------------------------|---------|
| 1       | P44  | I/O  | P44/CAN_TX/SCK1/ADC10  |         |
| 2       | P46  | I/O  | P46/CAN_STB/MOSI1/TS14 |         |
| 3       | P27  | I/O  | P27/CIS_MCLK           |         |
| 4       | P30  | I/O  | P30/HSYNC/TS4          |         |
| 5       | P28  | I/O  | P28/RXEN/ADC4/TS2      |         |
| 6       | P1   | I/O  | P1/RX2/SDA2            |         |
| 7       | P0   | I/O  | P0/TX2/SCL2            |         |
| 8       | P25  | I/O  | P25/IRDA/PWM5/ADC1     |         |

|    |     |     |                                                                                      |  |
|----|-----|-----|--------------------------------------------------------------------------------------|--|
| 9  | P33 | I/O | P33/PXD1/PWM7/TS7                                                                    |  |
| 10 | P32 | I/O | P32/PXD0/PWM6/TS6                                                                    |  |
| 11 | P34 | I/O | P34/PXD2/PWM8/TS8                                                                    |  |
| 12 | P35 | I/O | P35/PXD3/PWM9/TS9                                                                    |  |
| 13 | GND | P   | Ground                                                                               |  |
| 14 | VCC | P   | Supply 3.3V                                                                          |  |
| 15 | P11 | I/O | P11/TX1                                                                              |  |
| 16 | P10 | I/O | P1/RX1/SDA2                                                                          |  |
| 17 | P37 | I/O | P37/PXD5/PWM11/TS11                                                                  |  |
| 18 | CEN | I   | Module enabled (highly effective) internally pulled up, can be suspended without use |  |
| 19 | P36 | I/O | P36/PXD4/PWM10/TS10                                                                  |  |
| 20 | P47 | I/O | P47/MISO1/TS15                                                                       |  |
| 21 | P45 | I/O | P45/CAN_RX/CSN1/ADC11                                                                |  |

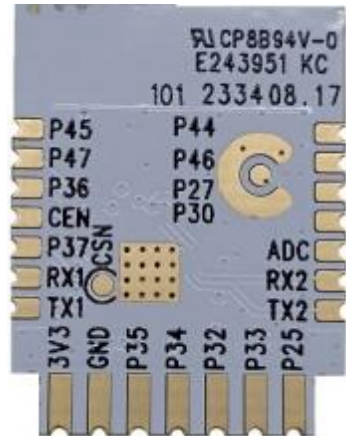
※P:POWER I:INPUT O:OUTPUT

## 5 Dimensions.

### 5.1 Module Picture.



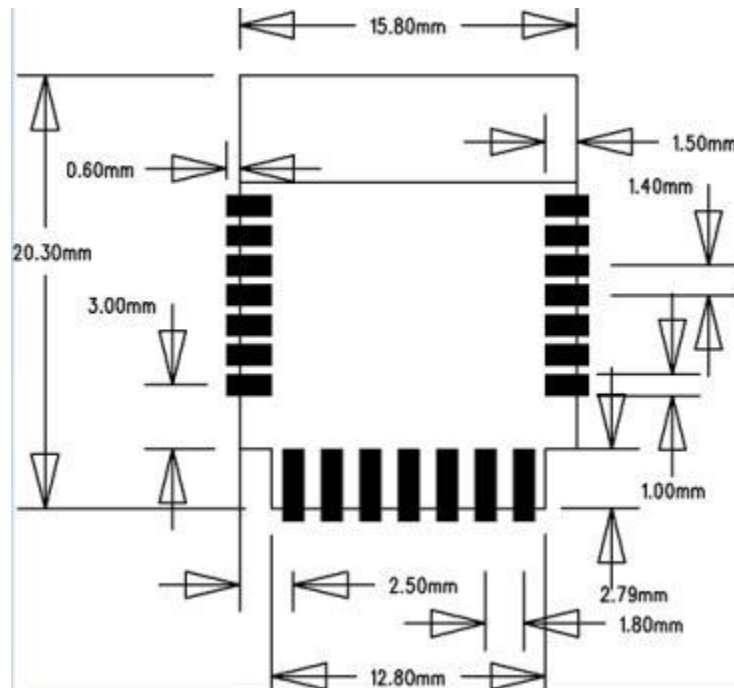
TOP



BOTTOM



### 5.3 PCB Layout Reference.



(unit=mm)

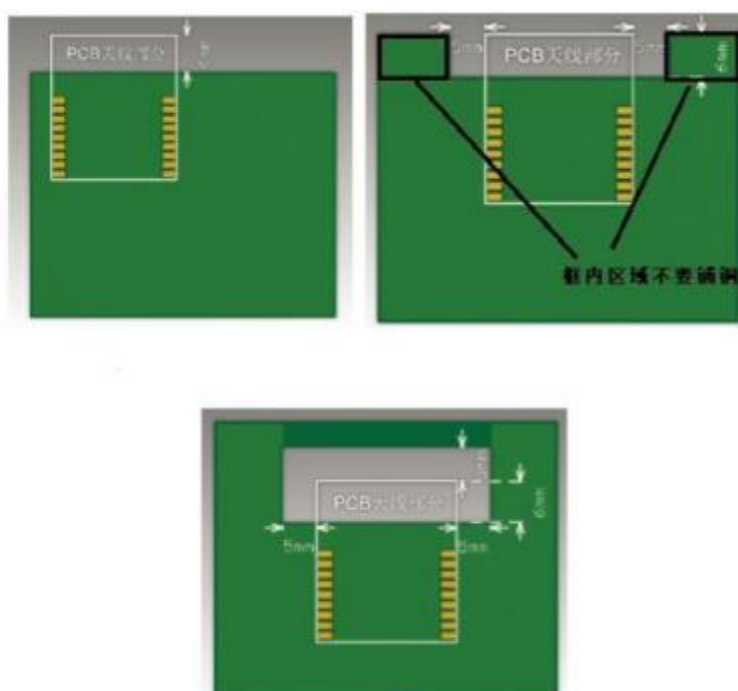
## 6 Antenna Information.

### 6.1 Antenna type.

This module antenna type is PCB on-board antenna with antenna gain of -1.3dBi (MAX), and external antenna with I-PEX connector, with antenna gain of 2.0dBi (MAX)

### 6.2 Module layout considerations.

The UAM057-A0 module shall be welded to the PCB board. In order to obtain the best RF performance. Under the PCB on-board antenna, there should be no copper laying, device and wiring. During PCB design, the corresponding area should be cleared. As shown in the following figure.



## 7 Environmental Requirements.

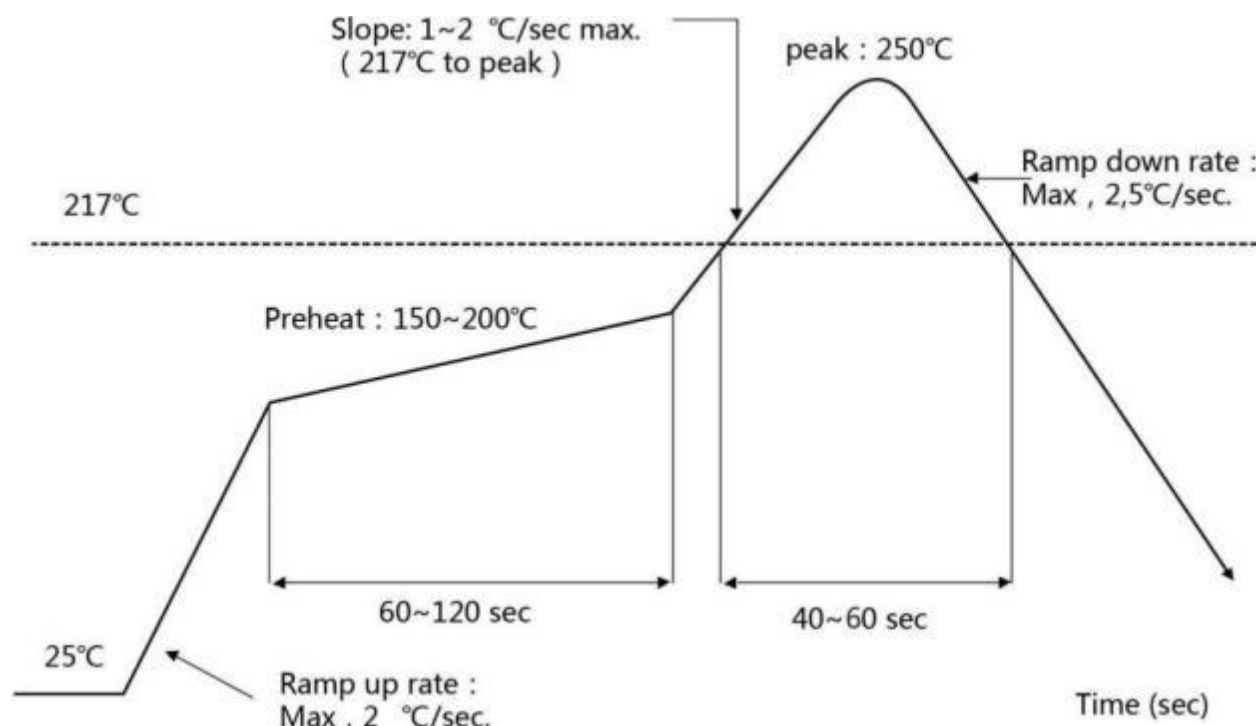
### 7.1 Recommended ReflowProfile.

Referred to IPC/JEDEC standard.

Peak Temperature : <245°C

Number of Times : ≤2 times





## 7.2 Note.

Note: Take and use the module, please insure the electrostatic protective measures.

1. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at  $250 \pm 5$  °C for the MID motherboard.

About the module packaging, storage and use of matters needing attention are as follows:

2. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in:  $< 40$  °C, relative humidity:  $< 90\%$  r.h.

3. The module vacuum packing once opened, time limit of the assembly:

Card: 1) check the humidity display value should be less than 30% (in blue), such as: 30% ~ 40% (pink), or greater than 40% (red) the module have been moisture absorption. 2.) factory environmental temperature humidity control:  $\leq -30$  °C,  $\leq 60\%$  r.h..

3). Once opened, the workshop the preservation of life for 168 hours.

4. Once opened, such as when not used up within 168 hours:

1). The module must be again to remove the module moisture absorption.

2). The baking temperature: 125 °C, 8 hours.

3). After baking, put the right amount of desiccant to seal packages.

## 7.3 Humidity sensitive control.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                              |                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <h1 style="margin: 0;">CAUTION</h1> <p style="margin: 0;">This bag contains<br/>MOISTUR-SENSITIVE DEICES</p> | <p><b>LEVEL</b></p> <div style="border: 1px solid black; padding: 10px; display: inline-block;"> <h2 style="margin: 0;">3</h2> </div> <p style="font-size: small;">If blank, see adjacent<br/>bar code label</p> |
| <ol style="list-style-type: none"> <li>1. Calculatied shelf life an sealed bag: 12 months at &lt; 40°C and &lt;90% relative humidity(RH)</li> <li>2. Peak package body temperature : <u>260</u> °C</li> <li>3. After bag is opened ,devices that will be subjected to reflow solder of other high temperature process must               <ol style="list-style-type: none"> <li>a) Mounted within: <u>168</u> hrs. of factory confitions<br/>≤30°C/60%RH, OR</li> <li>b) Stored at&lt;10% RH</li> </ol> </li> <li>4. Devices require bake,before mounting, if:               <ol style="list-style-type: none"> <li>a) Humidity Indicator Care is &gt; 10% when read at 23 ± 5°C</li> <li>b) 3a or 3b not met.</li> </ol> </li> <li>5. If baking is required , devices may be baked for 48 hrs. at 125 ± 5°C</li> </ol> |                                                                                                              |                                                                                                                                                                                                                  |
| <p><b>Note :</b> If device containers cannot be subjected to high temperature of shorted bake times are desired, reference IPC/JDEC J-STD-033 for bake procedure</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                              |                                                                                                                                                                                                                  |
| <p>bag Seal Date : _____</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                              |                                                                                                                                                                                                                  |
| <p><b>Note :</b> level and body temperature defined by IPC/JEDEC J-STD-020</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                              |                                                                                                                                                                                                                  |

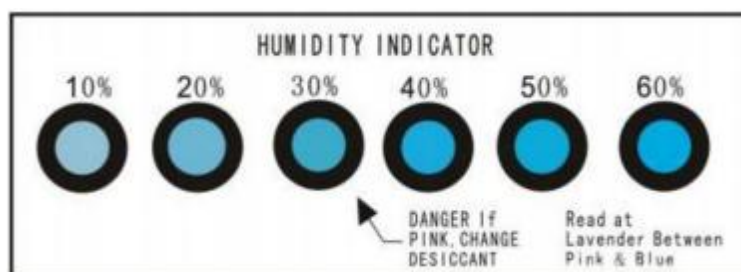
## 8 Package style.

### 8.1 Packaging Detail.

The module and the humidity indicator card are placed together in vacuum anti-static packaging, separated by a certain amount of paper, and neatly placed in the packaging box. The packaging must have reliable moisture-proof and anti-collision measures.

**Note1:**

There is a "triangular arrow" on the humidity indicator card indicating at 30%RH (as shown in the picture below). If the chemical changes to pink in the circle it points to, the element is damp and needs baking.



**Note2:**

Please confirm the packaging style with our sales staff before purchasing this product. If no packing style is specified before purchase, we will ship the goods by our own choice of packing method.

## 9 Transport regulations.

In the process of logistics or express transportation, attention should be paid to handling with care to avoid direct rain and snow.

## 10 Disclaimer and copyright notice.

All information in this document is provided according to the product status quo and subject to change without notice.

The contents of this document disclaim any warranties, including any warranties of fitness for sale, fitness for a particular purpose or non-infringement, and any warranties mentioned elsewhere in any proposal, specification or sample.

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## 11 FCC statements:

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular.

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.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or changes to this equipment. Such modifications or changes could void the user's authority to operate the equipment.

The device has been evaluated to meet general RF exposure requirement,

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 minimum distance 20cm between the radiator & your body.

This device is intended only for OEM integrators under the following conditions: 1. The antenna must be installed such that 20 cm is maintained between the antenna and users. 2. The transmitter module may not be co-located with any other transmitter or antenna. As long as the two conditions above are met, additional transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required for the installed module.

Important Note: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Federal Communications Commission of the U.S. Government (FCC) and the Canadian Government authorizations are no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator shall be responsible for re-evaluating the end-product (including the transmitter) and obtaining a separate FCC authorization in the U.S. and Canada. OEM Integrators End Product Labeling Considerations: This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains, FCC ID: 2A4G9-021". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

OEM Integrators End Product Manual Provided to the End User: The OEM integrator shall not provide information to the end user regarding how to install or remove this RF module in end product user manual. The end user manual must include all required regulatory information and warnings as outlined in this document.

Additional testing, Part 15 Subpart B disclaimer: 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 such as Part 15B.

## ISED Statement:

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

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

Le présent appareil est conforme aux CNR d'Industrie 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, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment complies with 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

L'appareil est conforme aux limites d'exposition aux rayonnements spécifiées par la pour les environnements non contrôlés. La distance entre le radiateur et le corps doit être d'au moins 20 cm lors de l'installation et du fonctionnement de l'appareil.

The outside of final products that contains this module device must display a label referring to the enclosed module. This exterior label can use wording such as: "Contains Transmitter Module IC: 26865-15", or "Contains IC: 26865-15", any similar wording that expresses the same meaning may be used.

L'extérieur des produits finis contenant ce module doit afficher une étiquette faisant référence au module inclus. Cette étiquette extérieure peut utiliser des libellés tels que: "contient le module émetteur IC: 26865-15" ou "contient: 26865-15", tout libellé similaire exprimant le même sens peut être utilisé.

This radio transmitter [IC: 30729-WL6376B] 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.

Le présent émetteur radio [IC: 30729-WL6376B] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

| Antenna                                      | Antenna gain | Frequency Range | Input impedance |
|----------------------------------------------|--------------|-----------------|-----------------|
| Onboard PCB antenna                          | -1.3dBi      | 2.4-2.5GHz      | 50Ω             |
| External dipole antenna with I-PEX connector | 2.0dBi       | 2.4-2.5GHz      | 50Ω             |

## **OEM/Integrators Installation Manual(KDB 996369 D03)**

**2.2 List of applicable FCC rules** This module has been tested and found to comply with part 15.247 requirements for Modular Approval.

### **2.3 Summarize the specific operational use conditions**

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

### **2.4 Limited module procedures**

Not applicable.

### **2.5 Trace antenna designs**

Not applicable.

### **2.6 RF exposure considerations**

To maintain compliance with FCC's RF Exposure guidelines, this equipment should be installed and operated with minimum distance of 20cm from your body. If used in any other way, such as portable or with other transmitters simultaneously, requires additional evaluation, testing, or testing and Class 2 permissive change.

### **2.7 Antennas**

| Frequency Range | Antenna Type           | Antenna Gain | Input impedance |
|-----------------|------------------------|--------------|-----------------|
| 2.4-2.5GHz      | PCB antenna            | -1.3dBi      | 50Ω             |
|                 | External I-PEX antenna | 2.0dBi       | 50Ω             |

### **2.8 Label and compliance information**

The final end product must be labeled in a visible area with the following" Contains FCC ID: 2A4G9-021"

### **2.9 Information on test modes and additional testing requirements**

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

### **2.10 Additional testing, Part 15 Subpart B disclaimer**

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15B.