

# WIFI-BT Module

## Product Specification

Version: A

COSMO AIoT Technology Co., Ltd

Product type: YIDTUWIFI-BT-XYJ

Product number: 0024000425F

## Content

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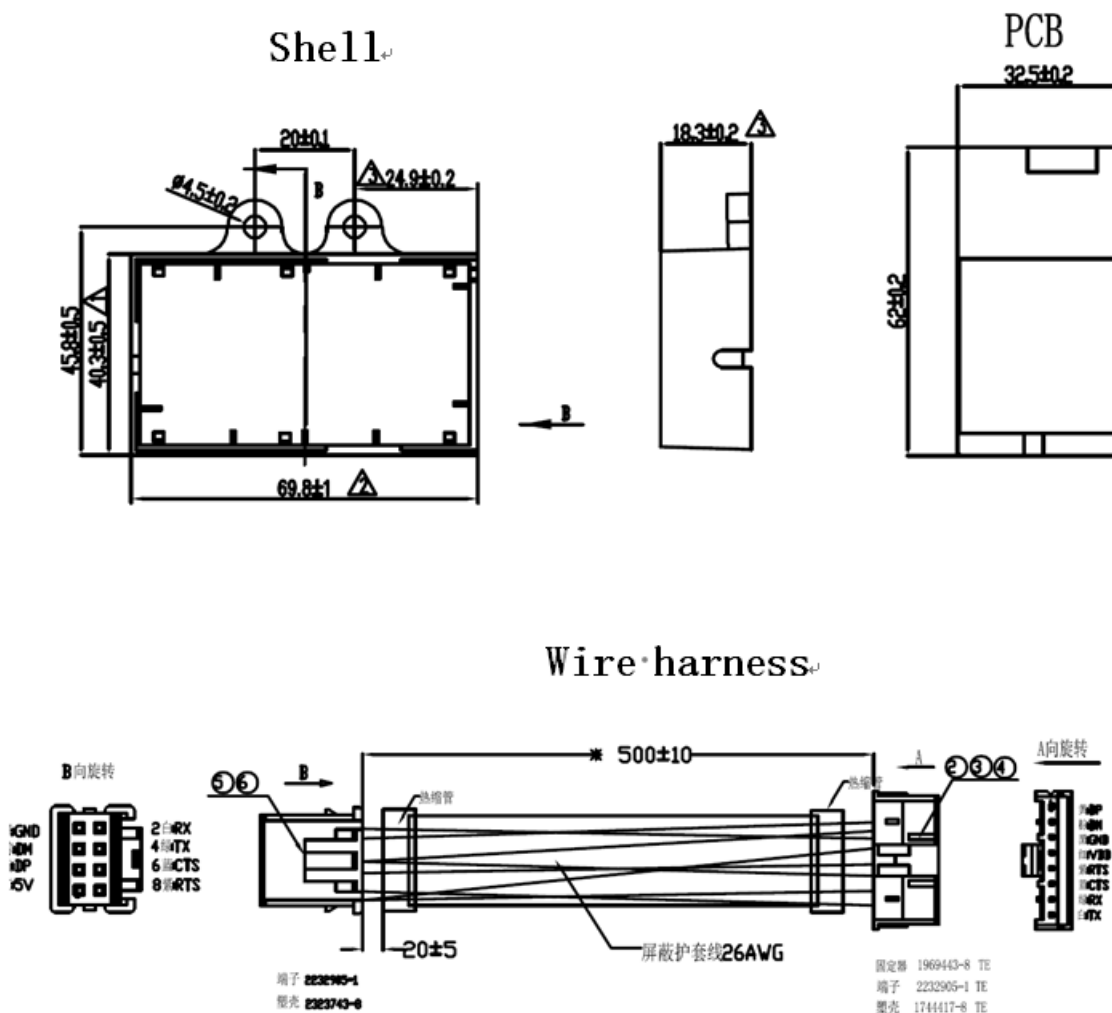
## 1. Revision History

| Update tag | Date        | Document revision | Reviser    | Change Content  |
|------------|-------------|-------------------|------------|-----------------|
|            | 2022. 2. 19 | V1.0              | Zhao Lijun | Initial version |
|            |             |                   |            |                 |
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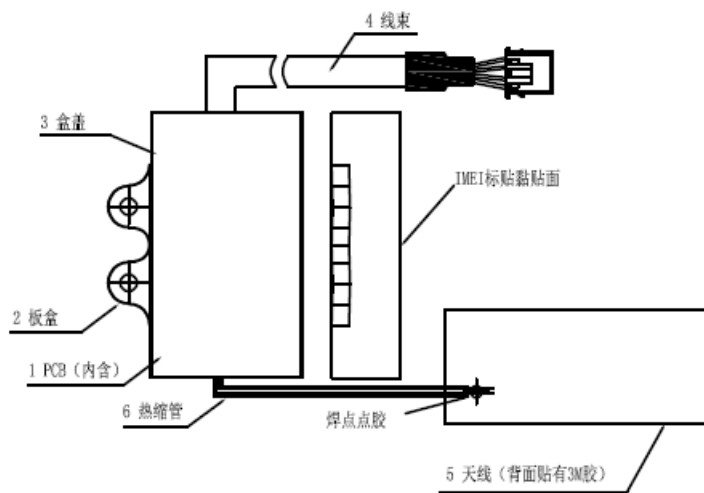
## 2. General Description

YIDTUWIFI-BT-XYJ product is designed base on LB-LINK BL-8188EU1 WIFI module and ITQN RB8762-25 BT module. It includes WiFi BT motherboard, wifi antenna, 8pin signal harness and shell. About wifi function, it supports IEEE802.11i safety protocol, along with IEEE 802.11e standard service quality. It supports the new data encryption on 64/128 bit WEP and safety mechanism on WPA-PSK/WPA2-PSK, WPA/WPA2. About Bluetooth function, it is an ultra-low consumption with intelligent PMU, supports Bluetooth 5 core specification and OTA programming mechanism for firmware upgrade. This module can be used for washing machine or dryer with display module for wireless data transmission and Bluetooth communication.

## 3. Dimension drawing



## WIFI-BT Module



## 4. Product Photo



## 5.2 WIFI Module Specification

### 5.2.1 Electrical and Performance Specification

|                       |                                                                                                                           |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------|
| Host Interface        | USB2.0                                                                                                                    |
| Standard              | IEEE 802.11b, IEEE 802.11g, IEEE 802.11n,                                                                                 |
| Frequency Range       | 2.4GHz~2.4835GHz                                                                                                          |
| Modulation Type       | 802.11b: CCK, DQPSK, DBPSK<br>802.11g: 64-QAM, 16-QAM, QPSK, BPSK<br>802.11n: 64-QAM, 16-QAM, QPSK, BPSK                  |
| Working Mode          | Infrastructure, Ad-Hoc                                                                                                    |
| Data Transfer Rate    | 1,2,5,6,11,12,18,22,24,30,36,48,54,60,90,120 and maximum of 150Mbps                                                       |
| Spread Spectrum       | IEEE 802.11b: DSSS (Direct Sequence Spread Spectrum)<br>IEEE 802.11g/n: OFDM (Orthogonal Frequency Division Multiplexing) |
| Sensitivity @PER      | 1M: -90dBm@8%PER<br>6M: -88dBm@10%PER<br>11M: -86dBm@8%PER<br>54M: -73dBm@10%PER<br>135M: -68dBm@8%PER                    |
| RF Power(Typical)     | 17dBm@11b, 17dBm@11g, 17dBm@11n 20, 16dBm@11n 40: (±2.0dBm)                                                               |
| Antenna type          | Connect to the external antenna through the half hole                                                                     |
| The transmit distance | Indoor 100M, Outdoor 300M, according the local environment                                                                |
| Dimension(L*W*H)      | 13.0 x 12.3 x 1.55mm (LxWxH) ;Tolerance: ±0.2mm                                                                           |
| Power supply          | 3.3V +/-0.2V                                                                                                              |
| Power Consumption     | standby mode 140mA@3.3V ,<br>TX mode 280mA@3.3V                                                                           |
| Clock source          | 40MHz                                                                                                                     |
| Working Temperature   | -10°C to +65°C                                                                                                            |
| Storage temperature   | -40°C ~ +85°C                                                                                                             |

### 5.2.2 DC Characteristic

|                             |                   |      |      |      |
|-----------------------------|-------------------|------|------|------|
| Terms                       | Contents          |      |      |      |
| Specification : IEEE802.11b |                   |      |      |      |
| Mode                        | DSSS / CCK        |      |      |      |
| Frequency                   | 2412 – 2484MHz    |      |      |      |
| Data rate                   | 1, 2, 5.5, 11Mbps |      |      |      |
| DC Characteristics          | min               | Typ. | max. | unit |
| TX mode                     | 300               | 310  | 320  | mA   |

|                             |                                         |      |      |      |
|-----------------------------|-----------------------------------------|------|------|------|
| Rx mode                     | 148                                     | 150  | 155  | mA   |
| Sleep mode                  | 140                                     | 145  | 146  | mA   |
| Specification : IEEE802.11g |                                         |      |      |      |
| Mode                        | OFDM                                    |      |      |      |
| Frequency                   | 2412 - 2484MHz                          |      |      |      |
| Data rate                   | 6, 9, 12, 18, 24, 36, 48, 54Mbps        |      |      |      |
| DC Characteristics          | min                                     | Typ. | max. | unit |
| TX mode                     | 280                                     | 285  | 288  | mA   |
| Rx mode                     | 140                                     | 145  | 150  | mA   |
| Sleep mode                  | 143                                     | 145  | 146  | mA   |
| Specification : IEEE802.11n |                                         |      |      |      |
| Mode                        | OFDM                                    |      |      |      |
| Frequency                   | 2412 - 2484MHz                          |      |      |      |
| Data rate                   | 6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps |      |      |      |
| DC Characteristics          | min                                     | Typ. | max. | unit |
| TX mode                     | 280                                     | 286  | 230  | mA   |
| Rx mode                     | 148                                     | 150  | 150  | mA   |
| Sleep mode                  | 144                                     | 145  | 146  | mA   |

### 5.2.3 RF Characteristic

| Mode | Rate(Mbps) | Power(dBm) |       |       | EVM(dB) |        |        | Sensitivity(dBm) |     |      |
|------|------------|------------|-------|-------|---------|--------|--------|------------------|-----|------|
|      |            | CH1        | CH7   | CH13  | CH1     | CH7    | CH13   | CH1              | CH7 | CH13 |
| 11b  | 1          | 17.52      | 17.45 | 17.39 | -28.36  | -28.00 | -27.95 | -95              | -95 | -94  |
|      | 11         | 18.00      | 17.86 | 17.77 | -23.51  | -24.11 | -24.30 | -86              | -86 | -86  |
| 11g  | 6          | 15.20      | 15.31 | 15.42 | -32.01  | -31.52 | -31.06 | -90              | -90 | -90  |
|      | 54         | 14.88      | 14.90 | 15.00 | -33.12  | -32.72 | -32.20 | -74              | -74 | -73  |
| 11n  | MCS0       | 15.11      | 15.21 | 15.42 | -32.25  | -31.75 | -32.99 | -90              | -90 | -90  |
| HT20 | MCS7       | 14.84      | 14.76 | 14.80 | -32.04  | -31.92 | -31.28 | -70              | -70 | -70  |

| Mode | Rate(Mbps) | Power(dBm) |       |       | EVM(dB) |        |        | Sensitivity(dBm) |     |      |
|------|------------|------------|-------|-------|---------|--------|--------|------------------|-----|------|
|      |            | CH3        | CH7   | CH11  | CH3     | CH7    | CH11   | CH3              | CH7 | CH11 |
| 11n  | MCS0       | 15.41      | 15.44 | 15.42 | -32.45  | -31.74 | -32.94 | -88              | -88 | -88  |
| HT40 | MCS7       | 14.74      | 14.70 | 14.82 | -32.15  | -31.93 | -31.29 | -68              | -68 | -68  |

## 5.3 Bluetooth Module Specification

### 5.3.1 Power Consumption

#### 1) Low Power Mode

| Power Mode | Always on Registers | 32k RCOSC/XTAL | Retention SRAM | CPU | Wakeup Method   | Current Consumption (Typical)             |
|------------|---------------------|----------------|----------------|-----|-----------------|-------------------------------------------|
| Power down | ON                  | OFF            | OFF            | OFF | Wakeup by GPIO  | 450nA                                     |
| Deep LPS   | ON                  | ON             | Retention      | OFF | Wakeup by timer | 2.5uA (with 160K SRAM in retention state) |

## 2) Active Mode

Condition: VDD\_BAT=3V,VDDIO=3V,Ambient Temperature:25℃

| Power Mode                      | Current Consumption (Typical) |
|---------------------------------|-------------------------------|
| Active RX mode                  | 7.3mA                         |
| Active TX mode(TX power:0dBm)   | 7.9mA                         |
| Active TX mode(TX power:4dBm)   | 9.6mA                         |
| Active TX mode(TX power:7.5dBm) | 11.3mA                        |

## 5.3.2 RF Characteristics

### 1) Receiver RF Specifications

| Parameter                       | Condition                                                                                      | Min. | Typ. | Max. |
|---------------------------------|------------------------------------------------------------------------------------------------|------|------|------|
| Frequency Range (MHz)           |                                                                                                | 2402 |      | 2480 |
| Sensitivity (dBm)               | PER≤30.8%                                                                                      | -94  |      |      |
| Maximum Input Level (dBm)       | PER≤30.8%                                                                                      |      | -1   |      |
| C/I                             | C/Ico-channel(dB)                                                                              | 21   |      |      |
|                                 | C/I+1MHz(dB)                                                                                   | 15   |      |      |
|                                 | C/I-1MHz(dB)                                                                                   | 15   |      |      |
|                                 | C/I+2MHz(dB)                                                                                   | -17  |      |      |
|                                 | C/I-2MHz(dB)                                                                                   | -15  |      |      |
|                                 | C/I+3MHz(dB)                                                                                   | -27  |      |      |
|                                 | C/IImage(dB)                                                                                   | -9   |      |      |
|                                 | C/IImage+1MHz(dB)                                                                              | -15  |      |      |
|                                 | C/IImage-1MHz(dB)                                                                              | -15  |      |      |
| Blocker Power (dBm)             | 30~2000MHz,<br>Wanted signal level=-67dBm                                                      | -30  |      |      |
|                                 | 2003~2399MHz,<br>Wanted signal level=-67dBm                                                    | -35  |      |      |
|                                 | 2484~2997MHz,<br>Wanted signal level=-67dBm                                                    | -35  |      |      |
|                                 | 3000MHz~12.75GHz,<br>Wanted signal level=-67dBm                                                | -30  |      |      |
| Max PER Report Integrity        | Wanted signal:-30dBm                                                                           |      | 50%  |      |
| Max Intermodulation level (dBm) | Wanted signal(f0):-64dBm<br>Worst intermodulation level@2f1-f2=f0,<br> f1-f2 =nMHz, n=3,4,5... | -50  |      |      |

Note1: Do not include spur channel;

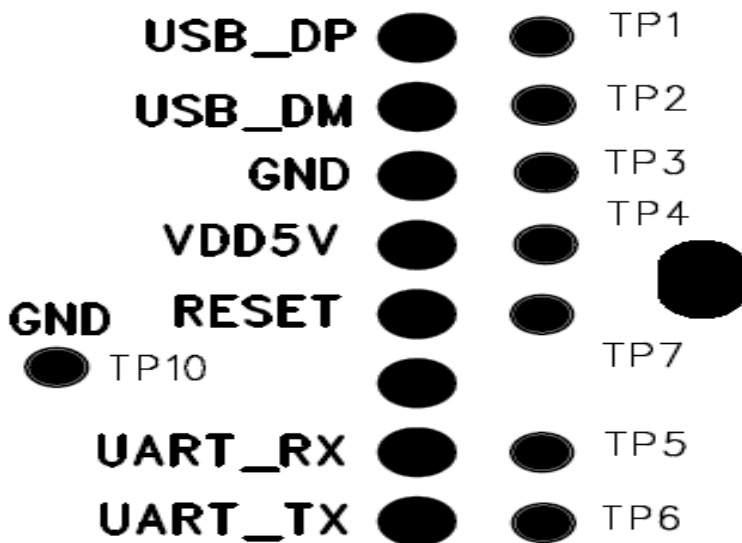
Note2: Depend on PCB design and registers setting.

## 2) Transmitter RF Specifications

| Parameter                             | Condition                            | Min. | Typ.          | Max. |
|---------------------------------------|--------------------------------------|------|---------------|------|
| Maximum Output Power (dBm)            | -                                    | -    | -             | 8    |
| Adjacent Channel Power Ratio (dBm)    | +2MHz                                | -    | -             | -20  |
|                                       | -2MHz                                | -    | -             | -20  |
|                                       | $\geq +3\text{MHz}$                  | -    | -             | -30  |
|                                       | $\leq -3\text{MHz}$                  | -    | -             | -30  |
| Modulation Characteristics            | $\Delta f_{1\text{avg}}$ (kHz)       | -    | 250           | -    |
|                                       | $\Delta f_{2\text{max}}$ (kHz)       | 185  | -             | -    |
|                                       | $\Delta f_{2\text{max}}$             | -    | 100           | -    |
|                                       | $\Delta f_{2\text{maxPassRate}}(\%)$ | -    | 0.88          | -    |
| Carrier Frequency Offset and Drift    | Average $F_n$ (kHz)                  | -    | 12.5          | -    |
|                                       | Drift Rate (kHz/50us)                | -    | 10            | -    |
|                                       | Avg Rate (kHz/50us)                  | -    | 10            | -    |
|                                       | Max Rate (kHz/50us)                  | -    | 10            | -    |
| Output Power of Second Harmonic (dBm) | -                                    | -    | -50<br>(note) | -    |
| Output Power of Third Harmonic (dBm)  | -                                    | -    | -50<br>(note) | -    |

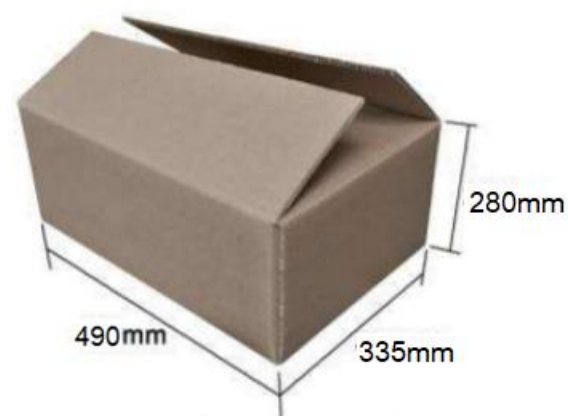
Note: Tested by EVB with RF PI network.

## 5.4 Pin Configuration and Function



| Pin No | Pin Name | Description                    |
|--------|----------|--------------------------------|
| 1      | USB_DP   | USB differential data line     |
| 2      | USB_DM   | USB differential data line     |
| 3      | GND      | Ground                         |
| 4      | VDD5V    | Power supply                   |
| 5      | RESET    | Hardware reset pin, low active |
| 6      | NULL     | NULL                           |
| 7      | UART_RX  | UART signal reception          |
| 8      | UART_TX  | UART signal transmit           |

## 6. Packing



**FCC Statement**

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 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 important announcement

Important Note:

**Radiation Exposure Statement**

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 and your body.

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

Country Code selection feature to be disabled for products marketed to the US/Canada.

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, and
2. The transmitter module may not be co-located with any other transmitter or antenna,
3. For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change. (if modular only test Channel 1-11)

As long as the three conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

**Important Note:**

In the event that these conditions cannot be met (for example certain laptop configurations or 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.

**End Product Labeling**

The final end product must be labeled in a visible area with the following" Contains FCC ID: **2A4ZZWIFI-BT** "

**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.

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

### 2.2 List of applicable FCC rules

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

### 2.3 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

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.

### 2.7 Antennas

This radio transmitter **FCCID: 2A4ZZWIFI-BT** has been approved by Federal Communications Commission 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.

| Model              | Type                | Connector | Peak gain ( dBi )  |                  |                  |                  |                  |
|--------------------|---------------------|-----------|--------------------|------------------|------------------|------------------|------------------|
|                    |                     |           | 2400-2483.5<br>MHz | 5150-5250<br>MHz | 5250-5350<br>MHz | 5470-5725<br>MHz | 5725-5850<br>MHz |
| 2400-2483.5<br>MHz | External<br>Antenna | /         | 4.32dBi            | /                | /                | /                | /                |
| 2400-2483.5<br>MHz | PCB<br>Antenna      | /         | 4.63dBi            | /                | /                | /                | /                |

### 2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains FCC ID:2A4ZZWIFI-BT".

### 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 15 B.

### **ISED Statement**

- English: This device complies with Industry Canada license - 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.

The digital apparatus complies with Canadian CAN ICES - 3 (B)/NMB - 3(B).

- French: 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 radio transmitter (ISED certification number: **28257-WIFIBT**) has been approved by Industry Canada to operate with the antenna types listed with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (ISED certification number: **28257-WIFIBT**) a été approuvé par Industrie 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, sont strictement interdits pour l'exploitation de l'émetteur.

### **Radiation Exposure Statement**

This equipment complies with Canada 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.

### **Déclaration d'exposition aux radiations**

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

This device is intended only for OEM integrators under the following condition:

The transmitter module may not be co-located with any other transmitter or antenna.

As long as the condition above is met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes:

Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 1 condition ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

### **Important Note:**

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC 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 Canada authorization.

**Note Importante:**

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considérée comme valide et l'IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

**End Product Labeling**

The final end product must be labeled in a visible area with the following: Contains IC: **28257-WIFIBT**.

**Plaque signalétique du produit final**

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: Contient des IC: **28257-WIFIBT**

**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.

**Manuel d'information à l'utilisateur final**

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.