

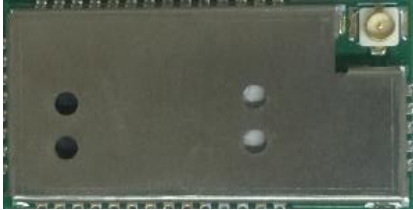
## Chapter1 Introduction

### 1.1 composition and function

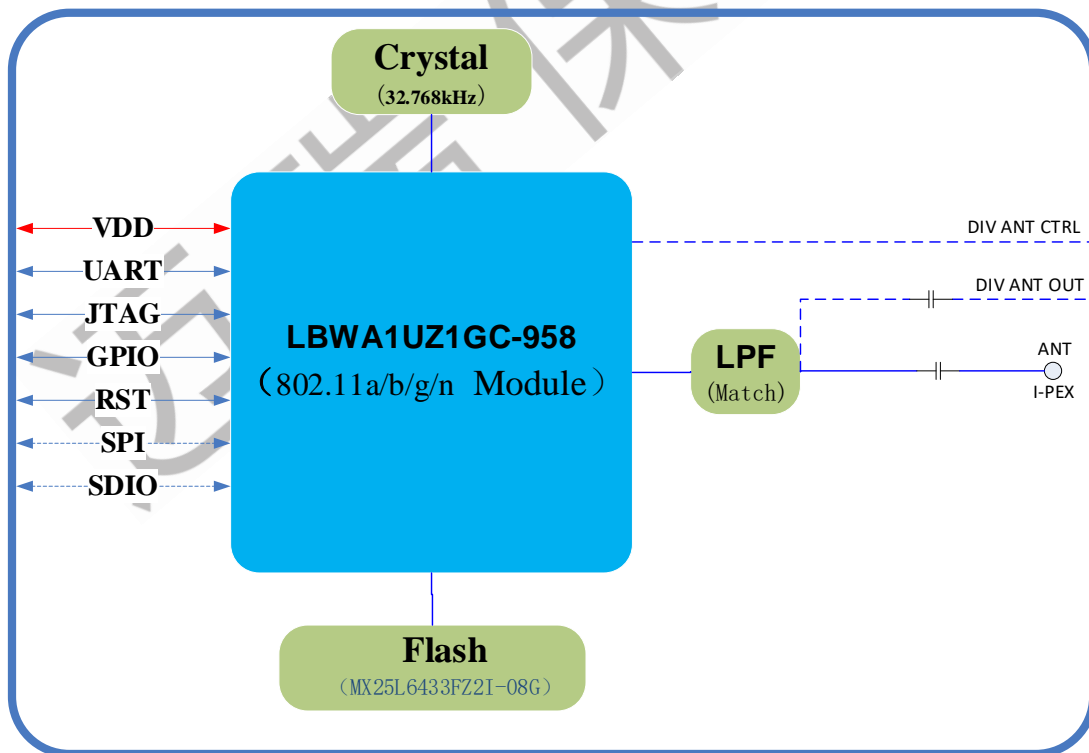
Wlink provides a solution for converting UART to low-power WiFi.

Wlink runs its own TCP/IP protocol stack, which means lower performance requirements for the host mcu.

Wlink PCBA is shown as follows:



The block diagram of Wlink PCBA is as follows, based on Murata's LBWA1UZ1GC-958 module, whose core chip is Cypress's CYW43907



### 1.2 application scenario

Wlink PCBA is integrated into the internal motherboard or carrier board of the product by soldering. The

antenna is connected to the I-pex socket MHF I on the module through a RF cable.

Wlink is suitable for products that do not require high WiFi throughput, or need to achieve WiFi function isolation, such as pumps, AEDs, defibrillation, etc.

迈瑞 保密

## Chapter2 Product specification

|                       |   |
|-----------------------|---|
| Protocol              | Support 802.11a/b/g/n   |
| Modulation            | BPSK, QPSK, 16-QAM, 64-QAM  |
| Tx power              | Not less than the flowing values when operating at the lowest datarate:<br>11a, 6Mbps: 11dBm;<br>11b, 1Mbps: 15dBm,<br>11g, 6Mbps:11dBm;<br>11n, MCS0: 10dBm。       |
| sensitivity           | Not bigger than the flowing values when operating at the lowest datarate:<br>11a, 6Mbps: -90dBm,<br>11b, 1Mbps: -92dBm,<br>11g, 6Mbps:-90dBm;<br>11n, MCS0: -90dBm。 |
| ANT port              | One Ipex MHF I connector  |
| Communicating port    | UART  |
| Power port            | 3.13V~3.6V  |
| Frequency range       | 2412MHz~2462MHz<br>5180MHz~5320MHz, 5500MHz~5700MHz, 5745MHz~5825MHz  |
| datarate              | IEEE 802.11a: 6-54 Mbps<br>IEEE 802.11b: 1-11 Mbps<br>IEEE 802.11g: 6-54 Mbps<br>IEEE 802.11n: MCS0-MCS7, support HT20 and HT40 when at 5Ghz band                   |
| security              | standards:<br>OPEN, WPA/WPA2-PSK, WPA/WPA2-Enterprise<br>EAP method:<br>EAP-TLS,PEAP-MsCHAPv2, EAP-TTLS<br>encryption:<br>TKIP and AES                              |
| Operation temperature | 0~70°C  |
| Contain FCC ID        | ZLZ-WLINK   |

## Chapter3 Product interface

### 1.1 pin definition

SDIO, SPI ports are reserved for future use.

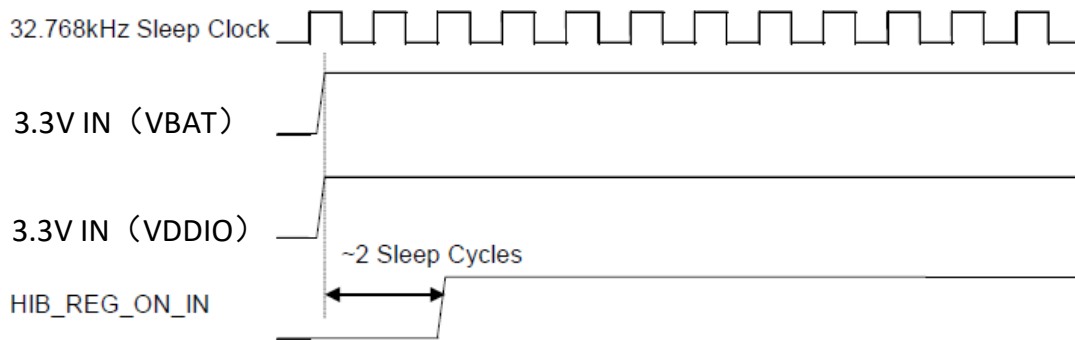
| Pin # | Pin name                          | type   | description             |
|-------|-----------------------------------|--------|-------------------------|
| 1     | GND                               | A      | GND                     |
| 2     | UART0_TXD_OUT                     | O      | Uart out                |
| 3     | UART0_RXD_IN                      | I      | Uart in                 |
| 4     | VDD                               | Power  | power, typically 3.3VDC |
| 5     | JTAG_RESET_N                      | I      | JTAG reset              |
| 6     | GPIO_2_JTAG_TCK                   | I      | JTAG clock              |
| 7     | GPIO_4_JTAG_TDI                   | I      | JTAG TDI                |
| 8     | GPIO_5_JTAG_TDO                   | O      | JTAG TDO                |
| 9     | VBAT                              | Power  | power, typically 3.3VDC |
| 10    | GPIO_3_JTAG_TMS                   | I      | JTAG TMS                |
| 11    | GPIO_6_JTAG_TRST_L                | I      | JTAG TRST               |
| 12    | HIB_REG_ON_IN                     | I      | Reset in                |
| 13    | VDD                               | Power  | power, typically 3.3VDC |
| 14    | GND                               | A      | GND                     |
| 15    | GND                               | A      | GND                     |
| 16    | RF_SW_CTRL_8_UART2_RX             | I      | Dubug uart input        |
| 17    | RF_SW_CTRL_9_HIB_LPO_SEL_UART2_TX | O      | Dubug uart output       |
| 18    | SDIO_DATA1                        | I/O    | SDIO DATA               |
| 19    | SDIO_DATA0                        | I/O    | SDIO DATA               |
| 20    | SDIO_CMD                          | I/O    | SDIO CMD                |
| 21    | SDIO_CLK                          | I      | SDIO CLK                |
| 22    | GND                               | A      | GND                     |
| 23    | GND                               | A      | GND                     |
| 24    | WAKE_OUT                          | O      | WAKE UP OUTPUT          |
| 25    | WAKE_IN                           | I      | WAKE UP IN              |
| 26    | SDIO_DATA2                        | I/O    | SDIO DATA               |
| 27    | SDIO_DATA3                        | I/O    | SDIO DATA               |
| 28    | UART0_RTS_OUT                     | O      | reserved                |
| 29    | UART0_CTS_IN                      | I      | reserved                |
| 30    | VDD                               | Power  | power, typically 3.3VDC |
| 31    | EXT_SLEEP_CLK                     | clk IN | power, typically 3.3VDC |
| 32    | SPI_0_CS                          | I      | reserved                |
| 33    | SPI_0_MOSI                        | I      | reserved                |

|    |              |   |          |
|----|--------------|---|----------|
| 34 | SPI_0_MISO   | O | reserved |
| 35 | SPI_0_CLK    | I | reserved |
| 36 | GND          | A | GND      |
| 37 | RF_SW_CTRL_4 | O | reserved |
| 38 | RF_SW_CTRL_5 | O | reserved |
| 39 | GND          | A | GND      |
| 40 | ANT          | A | reserved |
| 41 | GND          | A | GND      |

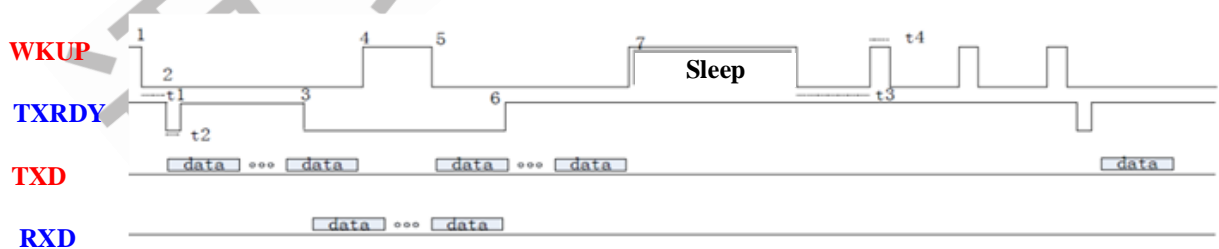
Pins that are not used can be left NC.

## 1.2 timing

The power-on sequence requirements for Wlink modules are as follows:



The serial communication timing requirements are as follows:



WKUP and TXD are the output signals of the upper computer. After WKUP changes from high to low, TXRDY signal must respond to the low level of T2 length within T1 time. After that, the host computer sends serial port commands. Before Wifi module sends serial data, it needs to drive TXRDY signal to low.

## 1.3 power

Wlink works with single DC power supply, the power supply voltage range is 3.13V~3.6V.

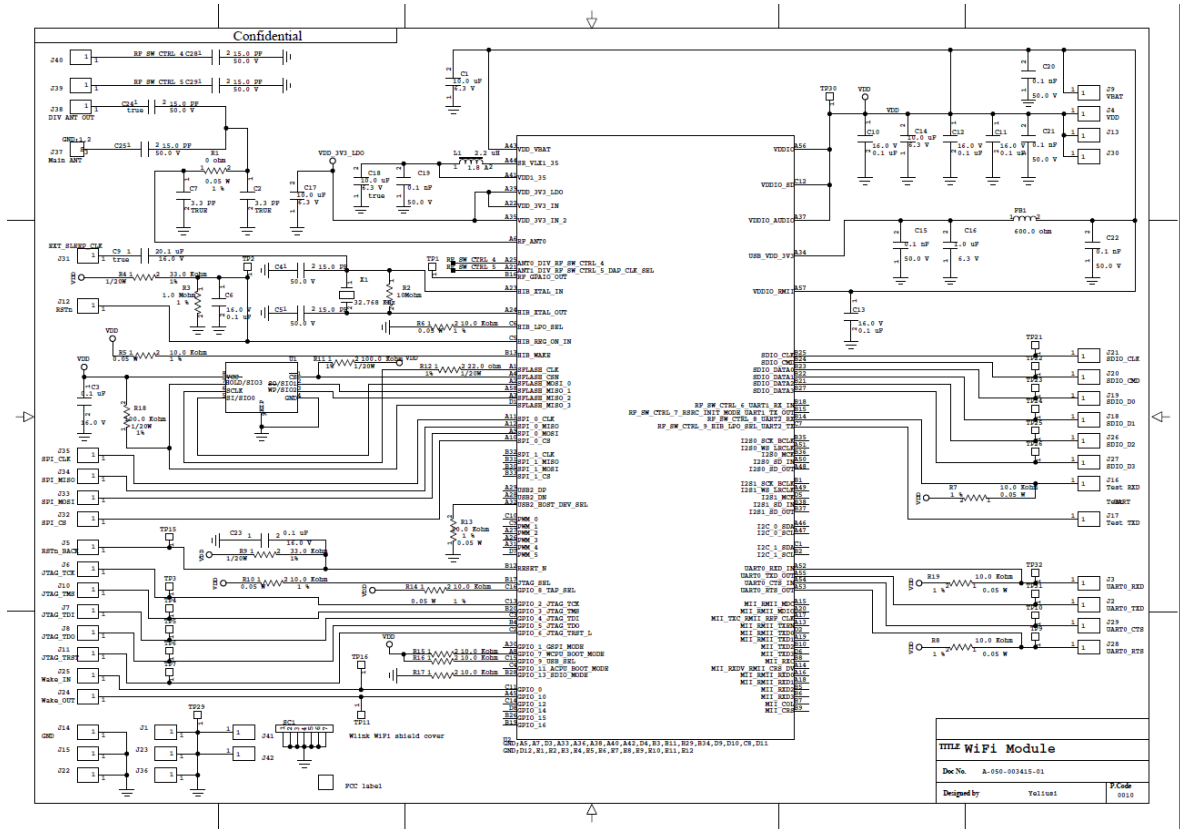
When the supply voltage is 3.3V, the peak current is typically 250mA and the maximum is 399mA.

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## Chapter4 Requirement and notes

### 1.1 Schematic and layout design guide

The schematic diagram of Wlink is as follows:



Precautions for carrier board layout:

- 1, The right half of Wlink is an analog circuit with antenna interface and diversity antenna circuit, as shown in the figure below. Avoid running high-speed clock lines on the carrier board near the Wlink analog circuit. Grounding is recommended.

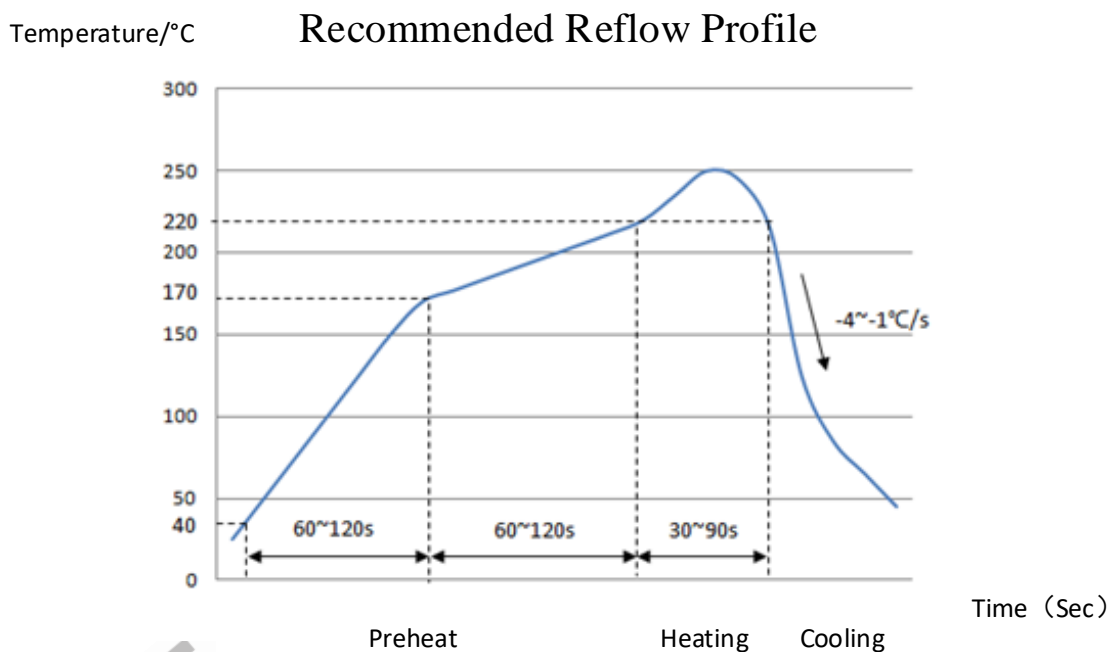


- 2, There are test points on the bottom of Wlink, and the surface of the carrier board should avoid the risk of short circuit caused by copper opening.



## 1.2 manufacturing requirements

Wlink is a sub-part of the carrier board PCBA, and the welding temperature curve requirements are as follows:



## 1.3 mechanical constraints

The length and width is 28mm\*14.3mm.

The maximum height without socket is 2.82mm.

The maximum height with socket is 3.5mm.

## 1.4 other notes:

1. When the machine is integrated, it is necessary to prevent Wlink from receiving 2.4G/5G electromagnetic interference (such as magnetic couple devices, CPU, DDR, 2.4G wifi antenna, etc.) from other part of the machine, otherwise it will reduce the radio frequency sensitivity and reduce the communication distance.
2. Wlink is a radio frequency module. System integration needs to consider avoiding radio frequency signals



from interfering with other sensitive circuits.

3. The ESD protection capability of the radio frequency module, especially the antenna port, is weak. ESD protection is required during transportation and use.

4. The ESD protection capability of the WiFi module itself is relatively weak. If the WiFi antenna needs to be led out of the machine, ESD protection measures need to be added to the lead-out path.

## 1.5 warning

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

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

## 2.2 List of applicable FCC rules

FCC Part 15.247 and FCC Part 15E

## 2.3 Specific operational use conditions

This product is a Single-modular transmitter policy independent of any host. Not applicable.

## 2.4 Limited module procedures

This product is a Single-modular transmitter. It is not a limited module. Not applicable.

## 2.5 Trace antenna designs

This product has an External Antenna. Not applicable.

## 2.6 RF exposure considerations

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

## 2.7 Antennas

This product has an External Antenna. As follow,

| No. | Antenna Type       | Gain                          | Impedance |
|-----|--------------------|-------------------------------|-----------|
| 1   | FPC dipole         | 2.4G: 2.79dBi;<br>5G: 3.38dBi | 50ohm     |
| 2   | FPC dipole         | 2.4G:2.79dBi<br>5G: 3.38dBi   | 50ohm     |
| 3   | FPC dipole         | 2.4G:2.6dBi<br>5G: 3.1dBi     | 50ohm     |
| 4   | Copper pipe dipole | 2.4G:1.32dBi<br>5G: 2.75dBi   | 50ohm     |
| 5   | Copper pipe dipole | 2.4G:1.87dBi<br>5G: 0.94dBi   | 50ohm     |
| 6   | FPC PIFA           | 2.4G:1dBi<br>5G: 1dBi         | 50ohm     |
| 7   | FPC PIFA           | 2.4G:1.56dBi<br>5G: 4.17dBi   | 50ohm     |

## 2.8 Label and compliance information

Remind end customers to add "Contain FCC ID: ZLZ-WLINK"

## 2.9 Information on test modes and additional testing requirements

Contact SHENZHEN MINDRAY BIO-MEDICAL ELECTRONICS CO., LTD. will provide stand-alone modular transmitter test mode. Additional testing and certification may be necessary when multiple modules are used in a host.

## 2.10 Additional testing, Part 15 Subpart B disclaimer

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. Since this may depend on the details of how the module is integrated with the host, SHENZHEN MINDRAY BIO-MEDICAL ELECTRONICS CO., LTD. shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

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**FCC Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance.

This module certified that complies with RF exposure requirement under mobile or fixed condition, this module is to be installed only in mobile or fixed applications.

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

A fixed device is defined as a device is physically secured at one location and is not able to be easily moved to another location.

**Note 2:** Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

**Note 3:** Additional testing and certification may be necessary when multiple modules are used.

**Note 4:** The module may be operated only with the antenna with which it is authorized. Any antenna that is of the same type and of equal or less directional gain as an antenna that is authorized with the intentional radiator may be marketed with, and used with, that intentional radiator.

**Note 5:** 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. Since this may depend on the details of how the module is integrated with the host, SHENZHEN MINDRAY BIO-MEDICAL ELECTRONICS CO., LTD. shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

**Note 6:** FCC ID label on the final system must be labeled with "Contains FCC ID: ZLZ-WLINK" or "Contains transmitter module FCC ID: ZLZ-WLINK".

**Note 7:** 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.

## IC WARNING

This device contains licence-exempt transmitter(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.

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 radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

*This radio transmitter [enter the device's ISED certification number] 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.*

| No. | Antenna Type       | Gain                         | Impedance |
|-----|--------------------|------------------------------|-----------|
| 1   | FPC dipole         | 2.4G: 2.79dBi<br>5G: 3.38dBi | 50ohm     |
| 2   | FPC dipole         | 2.4G:2.79dBi<br>5G: 3.38dBi  | 50ohm     |
| 3   | FPC dipole         | 2.4G:2.6dBi<br>5G: 3.1dBi    | 50ohm     |
| 4   | Copper pipe dipole | 2.4G:1.32dBi<br>5G: 2.75dBi  | 50ohm     |
| 5   | Copper pipe dipole | 2.4G:1.87dBi<br>5G: 0.94dBi  | 50ohm     |
| 6   | FPC PIFA           | 2.4G:1dBi<br>5G: 1dBi        | 50ohm     |
| 7   | FPC PIFA           | 2.4G:1.56dBi<br>5G: 4.17dBi  | 50ohm     |

**IC Radiation Exposure Statement:**

This device and its antenna(s) must not be co-located with any other transmitters except in accordance with IC multi-transmitter product procedures. Referring to the multi-transmitter policy, multiple-transmitter(s) and module(s) can be operated simultaneously without reassessment permissive change.

Cet appareil et son antenne (s) ne doit pas être co-localisé ou fonctionner en association avec une autre antenne ou transmetteur.

This equipment complies with IC RSS-102 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.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.

This module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products. Additional testing and certification may be necessary when multiple modules are used.

Ce module est limité à l'installation OEM uniquement et ne doit pas être vendu aux utilisateurs finaux, l'utilisateur final n'a pas d'instructions manuelles pour retirer ou installer l'appareil, seul le logiciel ou la procédure d'exploitation doit être placé dans le manuel d'utilisation de l'utilisateur final des produits finaux. Des tests et une certification supplémentaires peuvent être nécessaires lorsque plusieurs modules sont utilisés.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

Tout changement ou modification non expressément approuvé par le fabricant peut annuler le droit de l'utilisateur à utiliser cet équipement.

The final end product must be labeled in a visible area with the following " Contains IC: 9726A-WLINK ".

Le produit final doit être étiqueté dans une zone visible avec la mention "Contient IC: 9726A-WLINK".