

**IEEE802.11a/b/g/n/ac/2T/2R+Bluetooth/V2.1/4.2/5.1
USB2.0 Module
(MT7663BUN)**

| | | | | | |
|-------------|--|--------------------|---------------|--|--|
| board model | | Certification type | | | |
| WL00033 | | FCC | 2BBLK-WL6376B | | |
| WL00033 | | IC | 30729-WL6376B | | |
| WL00033 | | SRRC | | | |

| ISSUED BY | CHECKED BY | APPROVED BY |
|-------------------|--------------|---|
| | |  |
| CUSTOMER APPROVAL | | |
| CUSTOMER COMMENT: | APPROVED BY: | |
| | | |

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Document revision history

| release version | Date | implementer | Remarks |
|-----------------|------------|-------------|-------------------------|
| Version 1.0 | 2023-08-09 | | First edition release |
| Version 1.1 | 2023-09-03 | | Update product labels |
| Version 1.2 | 2023-11-03 | | Update product pictures |
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1. General Description

This document is to specify the product requirements for 802.11a/b/g/n/ac and BT combo module. This module based on MediaTek MT7663BUN chipset that complied with IEEE 802.11b, IEEE 802.11g, IEEE 802.11n standard from 2.4~2.5GHz and IEEE 802.11a, IEEE 802.11ac, IEEE 802.11n standard from 5.15GHz ~ 5.85GHz, and it can be used to provide up to 11Mbps for IEEE 802.11b, 54Mbps for IEEE 802.11g, 300Mbps for 802.11n, 866.7Mbps for 802.11ac to connect your wireless LAN. The Bluetooth part supports latest 5.0+HS operation.

2. Features

- Compatible with IEEE 802.11a standard to provide wireless 54Mbps data rate.
- Compatible with IEEE 802.11b standard to provide wireless 11Mbps data rate.
- Compatible with IEEE 802.11g standard to provide wireless 54Mbps data rate.
- Compatible with IEEE 802.11n standard to provide wireless 300Mbps data rate.
- Compatible with IEEE 802.11ac standard to provide wireless 866.7Mbps data rate.
- Support 20MHz, 40MHz bandwidth in 2.4GHz band
- Support 20MHz, 40MHz, 80MHz bandwidth in 5GHz band
- Support MU-MIMO RX
- Support STBC, LDPC, TX Beamformer and RX Beamformer
- Greenfield, mixed mode, legacy modes support
- IEEE 802.11 d/e/h/i/j/k/m/r/v/w support
- Security support for WPA WPA2/WPA3 personal, WPS2.0, WAPI
- QoS support of WFA WMM, WMMPS
- Operation at 2.4~2.5GHz and 5.15~5.825GHz frequency band to meet worldwide regulations
- Bluetooth specification 2.1+EDR
- Bluetooth 4.2 Low Energy (LE)
- Bluetooth 5.1
- High speed USB 2.0 interface
- RoHS compliant

3. Electrical and Thermal Characteristics

3.1 Temperature Limit Ratings

| Parameter | Minimum | Maximum | Units |
|-------------------------------|---------|---------|-------|
| Storage Temperature | -40 | +80 | C |
| Ambient Operating Temperature | 0 | 70 | C |
| Junction Temperature | 0 | 125 | C |

3.2 General Section

| | Feature | Detailed Description |
|-------|---------------------------|--|
| 4.2.1 | Antenna Type | • WIFI&BT: Wi-Fi Steel antenna&BT External Antenna |
| 4.2.2 | Operating Voltage | • 3.3V±10% |
| 4.2.3 | Current Consumption | • < 300mA@RX • < 1000mA@TX |
| 4.2.4 | Form Factor and Interface | • High Speed USB2.0 Interface |

4. Software

4.1 DRIVER Information

| | |
|----------|----------------------------------|
| Driver | Windows, Linux, Android |
| Security | 64/128-bits WEP, WPA, WPA2, WPA3 |

4.2 EEPROM Information

BT

| | |
|------------|---------|
| Vendor ID | default |
| Product ID | default |

WiFi

| | |
|------------|---|
| Reg Domain | Worldwide 2.4G/5G Read from registry ; Control by driver |
| | —— |
| Vendor ID | default |
| Product ID | default |

4.3 DC Characteristics

| Symbol | Parameter | Min | TYPE | Max | Unit |
|-----------------|--------------------|------|------|-------|------|
| V _{IL} | Input Low Voltage | -0.3 | | 0.825 | V |
| V _{IH} | Input High Voltage | 3.0 | | 3.6 | V |
| | | | | | |

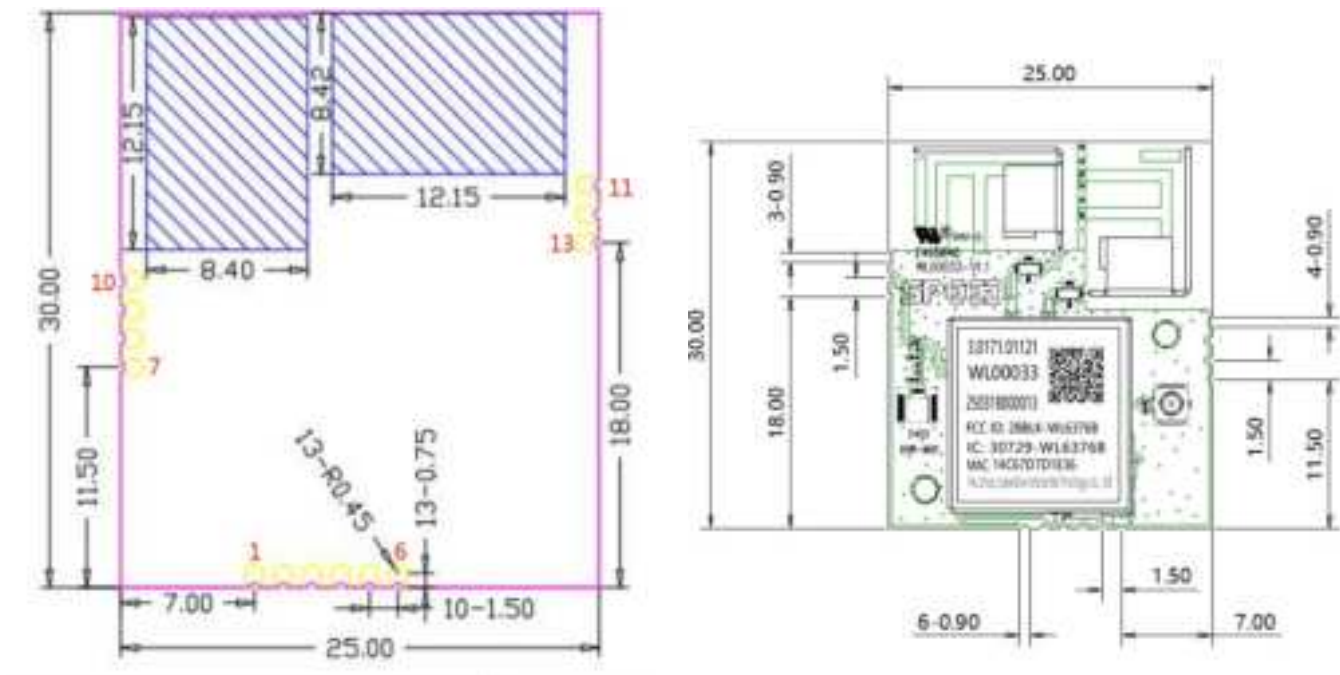
5. Mechanical Characteristics

5.1 Mechanical Requirements

| # | Feature | Detailed Description |
|-------|---------|---|
| 6.1.1 | Length | <ul style="list-style-type: none"> 30 mm |
| 6.1.2 | Width | <ul style="list-style-type: none"> 25mm |
| 6.1.3 | Height | <ul style="list-style-type: none"> 1.0 mm(PCB) MAX : 6.1 mm |

5.2 Mechanical Dimensions

BOTTOM



Size error range :

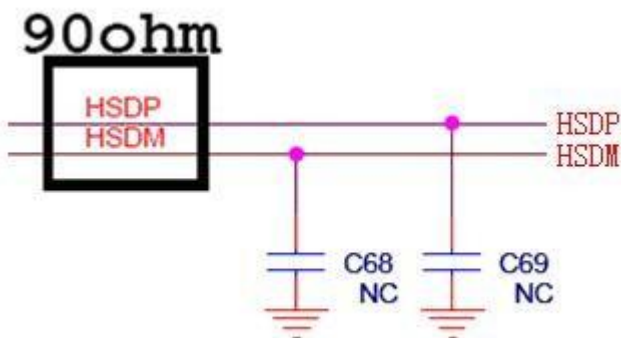
| DIM (MM) | Tolerance (MM) |
|-------------|-------------------|
| 0-5 | ± 0.15 |
| 5-10 | ± 0.20 |
| 10-50 | ± 0.30 |
| >50 | ± 0.40 |

5.3 Pin Description

| Pin | Symbol | description | I |
|-----|--------------|---|---|
| 1 | GND | Ground | - |
| 2 | USB_DP | USB Data+ | I |
| 3 | USB_DM | USB Data- | I |
| 4 | VCC 3.3V | 3.3v source | I |
| 5 | RESET | (Inside there is a 10K pull-up resistor, low level effective) | O |
| 6 | WL_HOST_WAKE | (Inside there is a 10K pull-up resistor, low level effective) | O |
| 7 | GND | Ground | - |
| 8 | NC | NC | - |
| 9 | BT_HOST_WAKE | (Inside there is a 10K pull-up resistor, low level effective) | O |
| 10 | GND | Ground | - |
| 11 | GND | Ground | - |
| 12 | BT_ANT | BT_ANT | - |
| 13 | GND | Ground | - |

| order numb | name of material | Manufacturer brand |
|------------|-------------------|-------------------------------|
| 1 | PCB | Xing Hai Rong/Ke Xiang |
| 2 | SMD Steel antenna | Xin tian he |
| 3 | Shield cover | Xin tian he |
| 4 | WIFI+BT IC | MTK |
| 5 | diplexer | Walsin/ACX |
| 6 | crystal | LUCKI |
| 7 | resistance | Walsin/Yageo/ROYALOHM/FH/TA-I |
| 8 | capacitance | Murata/Walsin/Yageo/SAMSUNG |
| 9 | inductance | Murata/FH/Sunlord |

5.3.1 USB interface electrical characteristics



Note: USB D+/D-Differential line impedance control of 90 OHM; C68, C69 please design reservation, default, Adjust according to the actual situation

5.4 Physical map

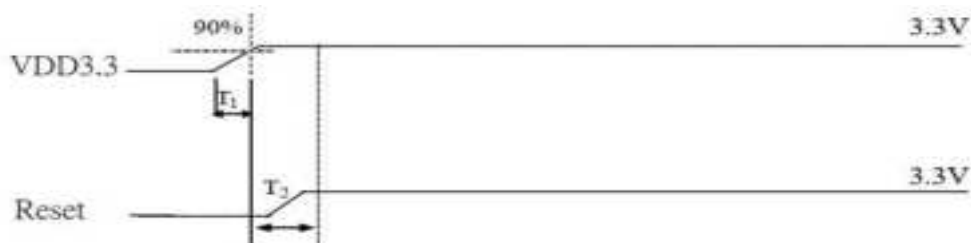


Top



Bottom

6. Power on sequence timing & Reset



The typical timing range

| | Unit | Min | Typical | Max |
|----------------|------|------|---------|-----|
| T ₁ | ms | 0.15 | 2 | 5 |
| T ₂ | ms | 1 | -- | -- |

Note: T₂ must be asserted after VDD3.3 ready

7. Environmental Requirements and Specifications TP Content

7.1 PCB Bending

The PCB bending spec shall be keep planeness under 0.1mm for both NATER and end assembly customer.

7.2 ESD

| Symbol | Ratings | Max | Unit |
|--------|--|------|------|
| (HBM) | Electrostatic discharge voltage (human body model) | 2000 | V |
| (CDM) | Electrostatic discharge voltage (charge device model) | 500 | |

Please handle it under ESD protection environment.

7.3 Terminals

The product is mounted with motherboard through half hole. In order to prevent poor soldering, please do not touch the pad by hand.

7.4 Falling

It will cause damage on the mounted components when the product is falling or receiving drop shock. It may cause the product mal-function

7.5 Storage Condition

5.1 Moisture barrier bag must be stored under 30 degree C, humidity under 85% RH. The calculated shelf life for the dry packed product shall be a 12 months from the bag seal date.

5.2 Humidity indicator cards must be blue, <30%

7.6 Baking Condition

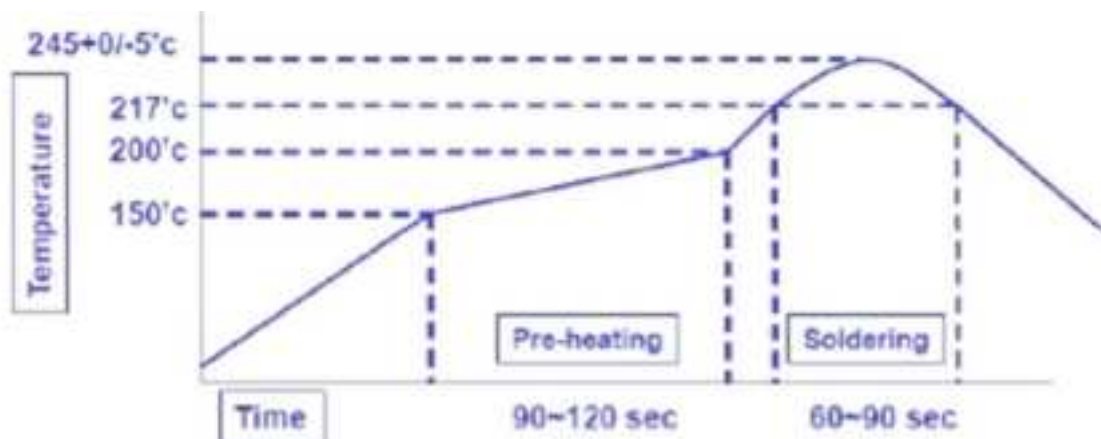
Products require baking before mounting if

- a) humidity indicator cards reads >30%
- b) temp <30 degree C, humidity < 70% RH, over 96 hours

Baking condition: 90 degree C, 12-24 hours

Baking times: 1 time

8. Soldering and reflow condition



Follow the solder paste composition to set the reflow profile

Lead free solder paste(SAC305, SAC387 or SAC405) reflow profile setting as above :

Ramp up rate (to Peak temp) : $< 1.2^{\circ}\text{C}/\text{sec}$, typically

Time above Liquidus(217°C) : 60~90Sec

Peak Temp : $245+0/-5^{\circ}\text{C}$

Ramp-down rate (Peak to RT) : $1\sim 3^{\circ}\text{C}/\text{sec}$, typically

8.1 Wireless module before the SMT note:

9.1.1. When customers Open stencil must be sure the hole bigger to the Wireless module plate, please press 1 to 1 and 0.7 mm is widened to open outward, the thickness of 0.12 mm.

9.1.2. Can't get the wifi module bare hands when needs, must we wear the gloves and static ring.

9.1.3. The furnace temperature according to the size of the customer the mainboard, generally like to stick on a tablet standard temperature of 250 ± 5 , can do 260 ± 5 .

Storage and use Wifi module control should pay attention to the following matters:

•Module of the storage life of vacuum packaging:

1-1. Storage life: 12 months. Storage conditions: $<40^{\circ}\text{C}$. Relative humidity : $< 90\%\text{R.H.}$

1-2. After this bag is opened, devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing must be:

1-3. Check the humidity card : stored at $\leq 20\%\text{RH}$. If: $30\%\sim 40\%$ (pink) or greater than 40% (red). Labeling module has moisture absorption.

① Factory environment temperature humidity control: $t \leq 30^{\circ}\text{C}$, $\leq 60\%\text{R.H.}$

② Once opened, the workshop the preservation of life for 168 hours.

1-4. If baking is required, devices may be baked for:

① Modules must be to remove module moisture problem.

② Baking temperature: 125°C , 8 hours.

③ After baking, put proper amount of desiccant to seal packages.

1-5. the actual number of module vacuum packing which is based on the actual number of packages to the customer requirements

2.Module reel packaging items as follows.

2-1. Storage life: 12 months. Storage conditions: $<40^{\circ}\text{C}$. Relative humidity : $< 90\%\text{R.H.}$

2-2. Module apart packing after 168 hours, To launch patch need to bake, to remove the module hygroscopic, baking temperature conditions: 125°C , 8hours.

2-3. the actual number of module reel packing which is based on the actual number of packages to the customer requirements。

3.Module pallet packaging items as follows:

3-1. Storage life: 3 months. Storage conditions: $<40^{\circ}\text{C}$. Relative humidity : $< 90\%\text{R.H.}$

3-2. Module if not used within 48 hours, before launch the need for baking, baking temperature: 125°C , 8 hours.

3-3. The actual number of module pallet packing which is based on the actual number of packages to the customer requirements.

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.

Warning: 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.

FCC Radio Frequency Exposure Statement:

The device has been evaluated to meet general RF exposure requirements.

The device can be used in fixed/mobile exposure condition. The min separation distance is 20cm.

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 and 15 SUBPART E have been investigated. It is applicable to the modular.

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

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

The Wi-Fi antennas were integrated on the module, the antenna gain is 2.16dBi/1.23dBi for 2.4GHz band, 3.57dBi/4.74dBi for 5GHz band.

The Bluetooth antenna is a FPC antenna with I-PEX connector, the antenna gain is 5.85dBi.

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following "Contains FCC ID: 2BBLK-WL6376B"

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.

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.

5250-5350MHz for indoor use only.

5250-5350MHz pour une utilisation en intérieur uniquement.

The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

Les dispositifs fonctionnant dans la bande de 5 150 à 5 250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

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 type | Antenna gain | Frequency Range | Input impedance |
|-------------------|--------------|--------------|-----------------|-----------------|
| Bluetooth Antenna | FPC | 5.85dBi | 2.4-2.5GHz | 50 Ω |
| WiFi Antenna 1 | Integral | 2.16dBi | 2.4-2.5GHz | 50 Ω |
| | | 3.57dBi | 5.15-5.85GHz | |
| WiFi Antenna 2 | Integral | 1.23dBi | 2.4-2.5GHz | 50 Ω |
| | | 4.74dBi | 5.15-5.85GHz | |

ISED Radio Frequency Exposure Statement:

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.

ISED Label Instructions:

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: 30729-WL6376B", or "Contains IC: 30729-WL6376B", 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: 30729-WL6376B" ou "contient: 30729-WL6376B", tout libellé similaire exprimant le même sens peut être utilisé.