

# PRODUCT SPECIFICATION

**Wi-Fi (11a/b/g/n 2Tx2R)+BT (V4.1LE) USB Combo Module**

**WCBN4508R(32U)**

**MediaTek MT7632U**

Version 1.0

## Change History

| Revision    | Date       | Author     | Change List |
|-------------|------------|------------|-------------|
| Version 1.0 | 2015/05/25 | Ben J Chen | Preliminary |

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**WCBN4508R(32U)**

**MediaTek MT7662U**

Version 1.0

**Networking B.U.**

**Lite-on Technology Corporation**

**4F, No. 90, Building C, Chien 1 Rd.,**

**Chung Ho, New Taipei City 235, Taiwan, R.O.C.**

**Customer Approval:** \_\_\_\_\_(Signature)

\_\_\_\_\_(Title)

\_\_\_\_\_(Company)

\_\_\_\_\_(Date)

(Please Sign Back by FAX. For Confirming the Spec Only, not an Official Agreement for OEM/ODM Business)

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## **PRODUCT FEATURES**

### **BT FEATURE:**

- Bluetooth V4.1 LE system  
Backwards compatible with BT version of 1.1, 1.2, 2.0, 2.1 and 3.0+HS
- Bluetooth Class 1 transmission power
- Best-in-class BT/Wi-Fi coexistence performance
- Support for Simple Pairing (SP) and Enhanced Inquiry Response (EIR) function
- Support for SCATTERNET and up to piconets simultaneously with background inquiry/page scan
- Support wide-band speech and hardware accelerated SBC codec for A2DP streaming
- Support Wake On Bluetooth

### **WI-FI FEATURE:**

- Operate at ISM frequency Band (2.4/5GHz)
- IEEE Standards Support, 802.11a ,802.11b, 802.11g, and 802.11n
- Support for both 20 MHz and 40 MHz channel width
- Enterprise level security supporting: WPS2.0,WAPI, WPA, WPA2
- Support 2 transmission and 2 receiving, transmission rate can up to 300Mbps (Physical Rate) in downstream and upstream
- QoS support of WFA WMM, WMMPS
- Support for WI-Fi Direct
- Support Wake On WLAN

### **COMMON FEATURE:**

- MT7632U is a single chip integrated IEEE 802.11 a/b/g/n and Bluetooth 4.1LE with a single USB interface
- PA, LNA, and T/R switch integration for Wi-Fi and Bluetooth
- Best-in-class active and idle power consumption performance
- Fully compliance with USB v2.0 specification
- Support OS: Linux based
- RoHS compliance
- Low Halogen compliance

## PRODUCT SPECIFICATIONS

### MAIN CHIPSET

MediaTek MT7632U

### FUNCTIONAL SPECIFICATIONS

| BT Function           |                                                                                                      |
|-----------------------|------------------------------------------------------------------------------------------------------|
| Standard              | Bluetooth V4.1LE                                                                                     |
| Bus Interface         | USB2.0                                                                                               |
| Data Rate             | 1 Mbps, 2Mbps and Up to 3Mbps                                                                        |
| Modulation Scheme     | GFSK, $\pi/4$ -DQPSK and 8-DPSK                                                                      |
| Frequency Range       | 2.402~2.480 GHz                                                                                      |
| Transmit Output Power | +4 ≤ Output Power ≤ +10dBm; Class 1 Device                                                           |
| Receiver Sensitivity  | < 0.1% BER at -80dBm                                                                                 |
| Wi-Fi Function        |                                                                                                      |
| Standard              | IEEE802.11a; IEEE802.11b; IEEE 802.11g; IEEE 802.11n                                                 |
| Bus Interface         | USB2.0                                                                                               |
| Data Rate             | <b>802.11a:</b><br>54, 48, 36, 24, 18, 12, 9, 6 Mbps                                                 |
|                       | <b>802.11b:</b><br>11, 5.5, 2, 1 Mbps                                                                |
|                       | <b>802.11g:</b><br>54, 48, 36, 24, 18, 12, 9, 6 Mbps                                                 |
|                       | <b>802.11n:</b><br>MCS 0 to 15 for HT20MHz<br>MCS 0 to 15 for HT40MHz                                |
|                       |                                                                                                      |
| Media Access Control  | CSMA/CA with ACK                                                                                     |
| Modulation Technique  | <b>802.11a:</b><br>64QAM, 16QAM, QPSK, BPSK                                                          |
|                       | <b>802.11b:</b><br>CCK, DQPSK, DBPSK                                                                 |
|                       | <b>802.11g:</b><br>64QAM, 16QAM, QPSK, BPSK                                                          |
|                       | <b>802.11n:</b><br>64QAM, 16QAM, QPSK, BPSK                                                          |
|                       |                                                                                                      |
| Network Architecture  | Ad-hoc mode (Peer-to-Peer)<br>Infrastructure mode                                                    |
| Operation Channel     | <b>2.4GHz</b><br>11: (Ch. 1-11) – United States<br>13: (Ch. 1-13) – Europe<br>14: (Ch. 1-14) – Japan |
|                       | <b>5GHz</b>                                                                                          |
|                       |                                                                                                      |
|                       |                                                                                                      |

|                                                         |                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                         | 21: USA<br>19: EU<br>8: Japan                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Frequency Range</b>                                  | <b>802.11bgn</b><br>2.400 ~ 2.4835 GHz<br><b>802.11a</b><br>5.15 ~ 5.85 GHz                                                                                                                                                                                                                                                                                                                          |
| <b>Transmit Output Power – 2x2 (Tolerance: ±1.5dBm)</b> | <b>802.11a:</b><br>13 dBm@6Mbps<br>13 dBm@54Mbps<br><b>802.11b:</b><br>15 dBm@1Mbps<br>15 dBm@11Mbps<br><b>802.11g:</b><br>14 dBm@6Mbps<br>14 dBm@54Mbps<br><b>802.11n(2.4G):</b><br><b>20MHz:</b><br>14 dBm@MCS0<br>14 dBm@MCS7<br><b>40MHz:</b><br>12 dBm@MCS0<br>12 dBm@MCS7<br><b>802.11n(5G):</b><br><b>20MHz:</b><br>13 dBm@MCS0<br>13 dBm@MCS7<br><b>40MHz:</b><br>11 dBm@MCS0<br>11 dBm@MCS7 |
| <b>Receiver Sensitivity</b>                             | <b>802.11a:</b><br>-86 dBm@6Mbps<br>-70 dBm@54Mbps<br><b>802.11b:</b><br>-88 dBm@1Mbps<br>-82 dBm@11Mbps<br><b>802.11g:</b><br>-86 dBm@6Mbps<br>-71 dBm@54Mbps<br><b>802.11n:</b><br><b>2.4/5G</b><br><b>20MHz</b><br>-86 dBm@MCS0<br>-70 dBm@MCS7<br>-68 dBm@MCS15<br><b>40MHz</b><br>-83 dBm@MCS0<br>-67 dBm@MCS7<br>-65 dBm@MCS15                                                                 |
| <b>Security</b>                                         | WPS, WPA, WPA2, WEP 64bit & 128bit, IEEE 802.1X, IEEE 802.11i                                                                                                                                                                                                                                                                                                                                        |
| <b>Common Function</b>                                  |                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Operating Voltage</b>                                | 5 V ±5% I/O supply voltage                                                                                                                                                                                                                                                                                                                                                                           |

| Power Consumption | Mode              | Average |       | Peak |    |
|-------------------|-------------------|---------|-------|------|----|
|                   |                   | 2.4G    | 5G    | 2.4G | 5G |
|                   | TX                | TBDmA   | TBDmA | 1A   | 1A |
|                   | RX                | TBDmA   | TBDmA |      |    |
|                   | Unassociated Idle | TBDmA   |       |      |    |
|                   | Standby WiFi+BT   | TBDmA   |       |      |    |

**Antenna Type**

Printed Antenna for WiFi&BT

## RECOMMENDED OPERATION CONDITIONS

For Module

| Symbol | Rating            | Min  | Typ | Max  | Units |
|--------|-------------------|------|-----|------|-------|
| VCC    | 5V Supply Voltage | 4.75 | 5   | 5.25 | V     |

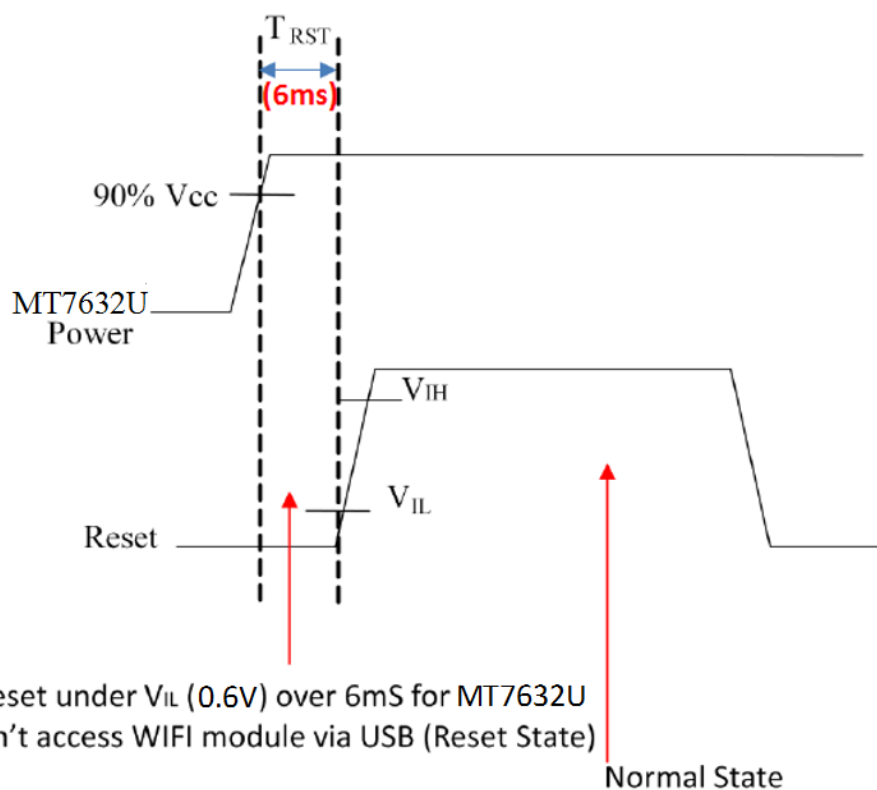
For IC

| Symbol | Rating              | Min   | Typ | Max   | Units |
|--------|---------------------|-------|-----|-------|-------|
| VDD33  | 3.3V Supply Voltage | 2.97  | 3.3 | 3.63  | V     |
| VDD12  | 1.2V Supply Voltage | 1.14  | 1.2 | 1.26  | V     |
| VDD15  | 1.5V Supply Voltage | 1.425 | 1.5 | 1.575 | V     |

## DC CHARACTERISTICS

| Symbol          | Parameter           | Min   | Typ | Max  | Units |
|-----------------|---------------------|-------|-----|------|-------|
| V <sub>IL</sub> | Input Low Voltage   | -0.28 | -   | 0.6  | V     |
| V <sub>IH</sub> | Input High Voltage  | 2.0   | -   | 3.63 | V     |
| V <sub>OL</sub> | Output Low Voltage  | -0.28 | -   | 0.4  |       |
| V <sub>OH</sub> | Output High Voltage | 2.4   | -   | 3.63 | V     |

## RESET TIMING SPEC

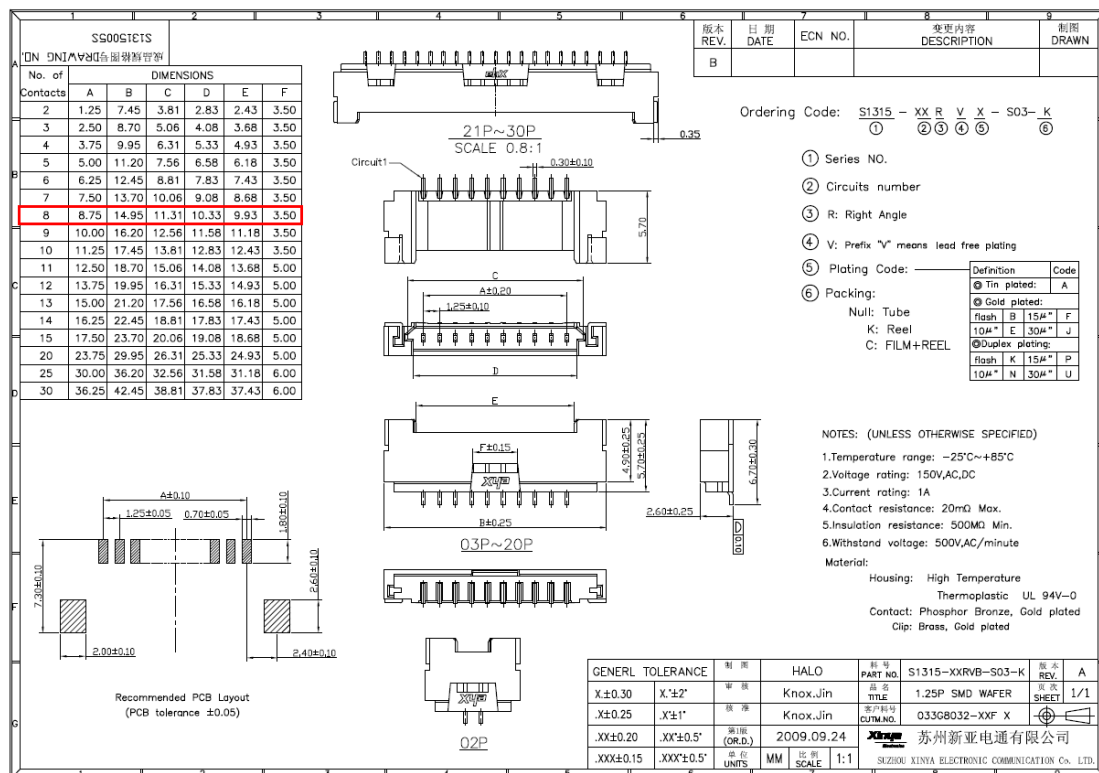


## PIN ASSIGMENT

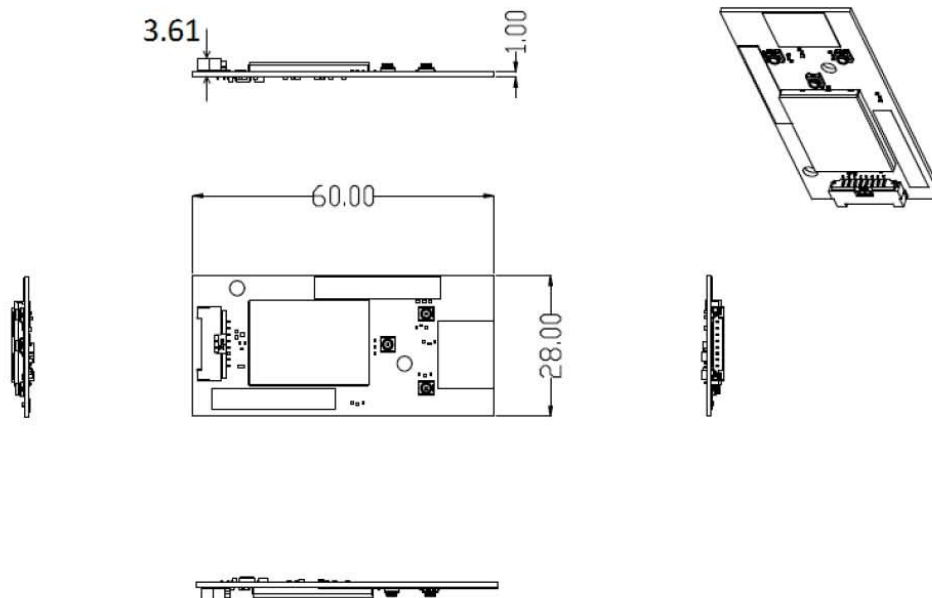
| Pin. | Pin Define | Description                         | Status |
|------|------------|-------------------------------------|--------|
| 1    | +5VCC      | 5V source                           | YES    |
| 2    | WoBT       | Wake up system via BT, low active   | YES    |
| 3    | WoWLAN     | Wake up system via wifi, low active | YES    |
| 4    | RESET#     | System reset MT7632U, low active    | YES    |
| 5    | GND        | Ground                              | YES    |
| 6    | USB_D+     | USB Data+                           | YES    |
| 7    | USB_D-     | USB Data-                           | YES    |
| 8    | GND        | Ground                              | YES    |



## USB CONNECTOR SPEC



**MECHANICAL**



**Unit:mm**

**Tolerance:**

| DEG<br>DIM | A     | B     | C     | D | ANGLE         |
|------------|-------|-------|-------|---|---------------|
| 0-5        | ±0.00 | ±0.00 | ±0.10 |   | 0°-30° ±0.1°  |
| 5-10       | ±0.05 | ±0.10 | ±0.15 |   | 31°-60° ±0.3° |
| 10-50      | ±0.10 | ±0.15 | ±0.20 |   | 61°-90° ±0.5° |
| 50-100     | ±0.15 | ±0.20 | ±0.25 |   |               |
| 100-       | ±0.15 | ±0.20 | ±0.25 |   |               |

## EEPROM INFORMATION

### BT

|                   |        |
|-------------------|--------|
| <b>Vendor ID</b>  | 0x0E8D |
| <b>Product ID</b> | 0x7632 |

### Wi-Fi

|                   |                                                                       |
|-------------------|-----------------------------------------------------------------------|
| <b>Reg Domain</b> | World Wide<br><b>2.4G/5G</b><br>Read from registry; Control by driver |
|                   | Offset 0x38 for 5G: 0xFF<br>Offset 0x39 for 2.4G: 0xFF                |
| <b>Vendor ID</b>  | 0x0E8D                                                                |
| <b>Device ID</b>  | 0x7632                                                                |

## ENVIRONMENTAL

### OPERATING

Operating Temperature: 0 to 70 °C (32 to 158 °F)

Relative Humidity: 5-90% (non-condensing)

### STORAGE

Temperature: -40 to 80 °C (-40 to 176 °F)

Relative Humidity: 5-95% (non-condensing)

## FCC WARNING STATEMENT

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.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

### FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

According to FCC 15.407(e), the device is intended to operate in the frequency band of 5.15GHz to 5.25GHz under all conditions of normal operation. Normal operation of this device is restricted to indoor use only to reduce any potential for harmful interference to co-channel MSS operations.

#### Information to OEM integrator

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 manual of the end product. The user manual which is provided by OEM integrators for end users must include the following information in a prominent location.

1. To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product transmitter product procedures.
2. Only those antennas with same type and lesser gain filed under this FCC ID number can be used with this device.
3. The regulatory label on the final system must include the statement: "Contains FCC ID: PPQ-WCBN4507R".
4. The final system integrator must ensure there is no instruction provided in the user manual or customer documentation indicating how to install or remove the transmitter module except such device has implemented two-way authentication between module and the host system.
5. If the end product integrating this module is going to be operated in 5.15 ~5.25GHz frequency range, the warning statement in the user manual of the end product should include the restriction of operating this device in indoor could void the user's authority to operate the equipment.

## IC WARNING STATEMENT

### Canada, Industry Canada (IC) Notices

This Class B digital apparatus complies with Canadian ICES-003 and RSS-247.

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.

### Canada, avis d'Industry Canada (IC)

Cet appareil numérique de classe B est conforme aux normes canadiennes ICES-003 et RSS-247.

IC Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer d'interférence et (2) cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

### Radio Frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Industry Canada (IC) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has also been evaluated and shown compliant with the IC RF Exposure limits under mobile exposure conditions. (antennas are greater than 20cm from a person's body).

### Informations concernant l'exposition aux fréquences radio (RF)

La puissance de sortie émise par l'appareil de sans fil est inférieure à la limite d'exposition aux fréquences radio d'Industry Canada (IC).

Utilisez l'appareil de sans fil de façon à minimiser les contacts humains lors du fonctionnement normal.

Ce périphérique a également été évalué et démontre conforme aux limites d'exposition aux RF d'IC dans des conditions d'exposition à des appareils mobiles (les antennes se situent à moins de 20 cm du corps d'une personne).

### Host device labeling requirement in accordance with RSP-100 Section 7.2:

The host device shall be properly labeled to identify the modules within the host device.

The Industry Canada certification label of a module shall be clearly visible at all times when installed in the host device; otherwise, the host device must be labeled to display the Industry Canada certification number for the module, preceded by the words "Contains transmitter module", or the word "Contains", or similar wording expressing the same meaning, as follows:

Contains transmitter module IC: 4491A-WCBN4507R

where 4491A-WCBN4507R is the module's certification number

## IC WARNING STATEMENT

- i. 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;
- ii. for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;
- iii. for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits specified for point-to-point and non-point-to-point operation as appropriate; and
- iv. the worst-case tilt angle(s) necessary to remain compliant with the e.i.r.p. elevation mask requirement set forth in Section 6.2.2(3) shall be clearly indicated.

High power radars are allocated as primary users (meaning they have priority) of 5250-5350 MHz and 5650-5850 MHz bands and these radars could cause interference and/or damage to LE-LAN (Licence-Exempt Local Area Network) devices.