

User Manual

802.11a/b/g/n/ac 2Tx2R + BT V4.2 LE USB Combo Module

WCBN4508M

User Manual

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FCC Statement:

Federal Communication Commission Interference 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 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 Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this 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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antenna(s) must not be co-located with any other transmitters except in accordance with FCC multi transmitter product procedures.

Referring to the multi transmitter policy, multiple transmitter(s) and module(s) can be operated simultaneously without C2PC.

IMPORTANT NOTE:**FCC 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 20 cm between the radiator & your body.

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated.

Additional testing and certification may be necessary when multiple modules are used.

20 cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

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

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20 cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: PPQ- WCBN4508M". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.

OEM Integrator Checklist

The party below will implement the LITE-ON Module in host systems in accordance with the instructions specified in this document and the documents referenced herein.

1. The OEM integrator will ensure the Module is integrated in a host systems using only the approved antenna model(s) described in this document.

2. The OEM integrator will ensure the antenna placement inside the host system will maintain the required spacing to end user for RF Exposure compliance, as specified in this document.
3. If other radios are integrated inside the host with the LITE-ON Module, the OEM integrator will contact its test lab, TCB or LITE-ON to determine if additional FCC compliance evaluation is required to meet FCC collocation rules.
4. The OEM integrator will ensure end user documentation will contain the specified regulatory wording and ensure the host system and the Module itself are labeled as specified in this document.
5. The OEM integrator will ensure the Module is programmed in the factory with compliant transmit power not exceeding the levels specified in this document.

LITE-ON requests that the OEM integrator acknowledge its receipt of this document and the above instructions. You may contact LITE-ON with any questions concerning this document or the responsibilities of the OEM integrator.

PRODUCT FEATURES

BT FEATURE:

- Bluetooth V4.2 LE system
Backwards compatible with BT version of 1.1, 1.2, 2.0, 2.1, 3.0+HS and 4.0
- Support Dual-mode Bluetooth
- BT using USB interface
- BT transmission speed including 1M (GFSK), 2M ($\pi/4$ -DQPSK) and 3Mbps (8DPSK) EDR and up to 54Mbps (Physical Rate) High Speed operations
- Support for Simple Pairing (SP) and Enhanced Inquiry Response (EIR) function
- Support master and slave piconet and scatternet
- Adaptive Frequency Hopping (AFH) using Packet Loss Rate (PLR)
- Enhanced low power scan mode

WI-FI FEATURE:

- Operate at ISM frequency Band (2.4/5GHz)
- IEEE Standards Support, 802.11a, 802.11b, 802.11g, 802.11n and 802.11ac
- Support for both 20 MHz/40 MHz channel width in 2.4GHz and 20 MHz/40 MHz/80MHz channel width in 5GHz
- Enterprise level security supporting: WEP, WPA, WPA2, WAPI
- Dual-stream IEEE 802.11n support for 20MHz and 40MHz channels provides PHY layer rates up to 300Mbps
- Dual-stream IEEE 802.11ac support for 80MHz channels provides PHY layer rates up to 867Mbps
- Support Wi-Fi Direct
- Support Wake On WLAN

COMMON FEATURE

- Support for BT & WLAN Co-existence
- Support Linux OS based
- RoHS compliance
- Low Halogen compliance

PRODUCT SPECIFICATIONS

MAIN CHIPSET

Marvell 88w8997

FUNCTIONAL SPECIFICATIONS

BT Function	
Standard	Bluetooth V4.2 LE
Bus Interface	USB
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
Receiver Sensitivity	< 0.1% BER at -80dBm
Wi-Fi Function	
Standard	IEEE802.11a; IEEE802.11b; IEEE 802.11g; IEEE 802.11n, IEEE 802.11ac
Bus Interface	USB 2.0
Data Rate	802.11b: 11, 5.5, 2, 1 Mbps
	802.11a/g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps
	802.11n: MCS 0 to 15 for HT20MHz MCS 0 to 15 for HT40MHz
	802.11ac: MCS 0 to 8 for HT20MHz MCS 0 to 9 for HT40MHz MCS 0 to 9 for HT80MHz
Media Access Control	CSMA/CA with ACK
Modulation Techniques	802.11b: CCK, DQPSK, DBPSK
	802.11a/g: 64QAM, 16QAM, QPSK, BPSK
	802.11n: 64QAM, 16QAM, QPSK, BPSK
	802.11ac: 256QAM, 64QAM, 16QAM, QPSK, BPSK

Network Architecture	Infrastructure mode
Operation Channel	2.4GHz 11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan 5GHz 12: United States 19: Europe 8: Japan
Frequency Range	802.11bg 2.412 ~ 2.462 GHz 802.11a 5.15 ~ 5.825 GHz
Receiver Sensitivity	802.11a: -86 dBm@6Mbps -70 dBm@54Mbps 802.11b: -88 dBm@1Mbps -82 dBm@11Mbps 802.11g: -86 dBm@6Mbps -70 dBm@54Mbps 802.11n(2.4GHz): 20MHz -86 dBm@MCS0 -69 dBm@MCS7 40MHz -83 dBm@MCS0 -66 dBm@MCS7 802.11n(5GHz): 20MHz -84 dBm@MCS0 -67 dBm@MCS7 40MHz -81 dBm@MCS0 -64 dBm@MCS7 802.11ac: 20MHz -64 dBm@MCS8 40MHz -62 dBm@MCS8 -59 dBm@MCS9 80MHz -59 dBm@MCS8 -54 dBm@MCS9
Security	WPA, WPA2, WEP 64bit & 128bit, IEEE 802.1X, IEEE802.11i

Common Function

Operating Voltage 5 V $\pm$ 10% I/O supply voltage

OS Supported Linux Based

Antenna Type PCB antenna

RECOMMENDED OPERATION CONDITIONS

For Module

Symbol	Rating	Min	Typ	Max	Units
VCC	5V Supply Voltage	4.5	5	5.5	V

For IC

Symbol	Parameter	Min	Typ	Max	Units
AVDD33	3.3V analog power supply	2.97	3.3	3.63	V
AVDD18	1.8V analog power supply	1.71	1.8	1.98	V
VPA	2.2V analog power supply	2.09	2.2	2.26	V
VIO	1.8V power supply for host interface	1.62	1.8	1.98	V
	3.3V power supply for host interface	2.97	3.3	3.63	V

PIN ASSIGNMENT

Pin.	Pin Define	Description	Status
1	+5V	5V source	YES
2	USB_D-	USB Data-	YES
3	USB_D+	USB Data+	YES
4	GND	Ground	YES

EEPROM INFORMATION

BT

Vendor ID	0x1286
Product ID	0x2052

Wi-Fi

Region Code	FCC SKU
	2.4G: CH1-11
	5G: U-NII-1, U-NII-2A, U-NII-2C, U-NII-3
	TBD
Vendor ID	0x1286
Device ID	0x204E

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)