BL3383-P

Embedded Wi-Fi Module

Product

Version：1.1   Release date：   May 06, 2021

Features

- 100MHz 32bits MCU

- 256KB SRAM/2MB FLASH

- Support AES, MD5, SHA1

- Support XIP

- Working voltage: DC 3.3V

- Support BLE4.2

- Wi-Fi related features

  - Support 802.11 b/g/n standard

  - Support station and soft AP

  - Support SmartConfig and AP configuration

  - Support WEP/WPA2

  - Support multiple cloud services

  - Integrated balun/PA/LNA

  - TCP/IP stack optimized for IoT application

  - PCB antenna

- Peripherals:

  - 3x UART

  - 1x SPI

  - 8x PWM

  - Up to 13GPIOs

- Working temperature: 0℃ to +85℃

- Stamp style SMD for surface mounting production

Applications

- Smart transportation

- Smart home / appliances

- Instruments

- Health care

- Industrial automation

- Intelligent security

- Smart energy

Model

Model	Antenna type	Note
BL3383-P	PCB antenna	Default

Content

1. Overview

BL3383-P is a cost-effective embedded Wi-Fi module designed by BroadLink, highly integrated with 32-bit MCU speed up to 100MHz, 256KB SRAM and 2MB flash, with 3.3V power supply.

The module integrates radio transceiver, MAC, baseband, all Wi-Fi protocols, configurations and network stack. It can be widely used in applications like smart home devices, remote monitoring devices and medical care instruments.

2. Basic Specifications

2.1. Power Consumption

Please refer to Table 1 for power consumption data.

Table 1　BL3383-P Power Consumption Data

Specifications	Min.	Typ.	Max.	Units
VDD	3.0	3.3	3.6	V
VIL(input low voltage)			0.8	V
VIH(input high voltage)	2.0		3.6	V
VOL(output low voltage)			0.4	V
VOH(output high voltage)	2.4		3.6	V
Standby (RX)		60		mA
pulse current @TX 11b @17.5dBm　11Mbps			280	mA
pulse current @TX 11g @15.5dBm　54Mbps			245	mA
pulse current @TX 11n @15.5dBm　65Mbps			245	mA

BLE @4dBm			150	

2.2. Working Environment

Please refer to Table 2 for working environment data.

Table 2　BL3383-P Working Environment Data

Symbol	Description	Min.	Max.	Units
Ts	Storage temperature	-40	125	℃
T$_A$	Ambient operating temperature	0	85	℃
Vdd	Supply voltage	3.0	3.6	V
Vio	Voltage on IO pin	0	3.6	V

3. Radio Specifications

3.1. Basic Radio Specification

Please refer to Table 3 for radio specification.

Table 3　BL3383-P Radio Specification

Radio range	2402-2480MHz
Wireless standards	IEEE 802.11 b/g/n
Radio output (conductive)	802.11b:18.6±1.5dBm@11Mbps
	802.11g: 16.81±1.5dBm@54Mbps
	802.11n: 16.9±1.5dBm@MCS7/HT20
	BLE: 4±2dBm
Antenna type	Internal: PCB antenna
	External: Not supported
Receiving sensitivity	802.11b≦-89dBm@11Mbps
	802.11g≦-76dBm@54Mbps
	802.11n/HT20≦-73dBm@MCS7
Stack	IPv4, TCP/UDP/FTP/HTTP/HTTPS/TLS/mDNS

Data rate (max)	11M@802.11b, 54M@802.11g, MCS7@802.11n
Security	Encryption standard: Open/WEP-Open/WPA/WPA2
	Encryption algorithm: WEP64/WEP128/TKIP/AES
Network types	STA/AP

3.2. Radio Performance

3.2.1 IEEE802.11b

Table 4 Basic specifications under IEEE802.11b

ITEM	Specification
Modulation Type	DSSS / CCK
Frequency range	2412 MHz~ 2462 MHz
Channel	CH1 to CH11
Data rate	1, 2, 5.5, 11Mbps

Table 5 Transmitting performance under IEEE802.11b

TX Characteristics	Min.	Typical	Max.	Unit
Power@11Mbps		17.5		dBm
Frequency Error	-10		+10	ppm
EVM@11Mbps			-14	dB
Transmit spectrum mask				
Pass				

Table 6 Receiving performance under IEEE802.11b

RX Characteristics	Min.	Typical	Max.	Unit
11Mbps Input Level Sensitivity				
Minimum Input Level (FER ≦ 8%)			-89	dBm

3.2.2 IEEE802.11g

Table 7 Basic specifications under IEEE802.11g

ITEM	Specification
Modulation Type	OFDM
Frequency range	2412 MHz~ 2462 MHz
Channel	CH1 to CH11
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps

Table 8 Transmitting performance under IEEE802.11g

TX Characteristics	Min.	Typical	Max.	Unit
Power@54Mbps		**16**		dBm
Frequency Error	**-10**		**+10**	ppm
EVM@54Mbps			-30	dB
Transmit spectrum mask				
Pass				

Table 9 Receiving performance under IEEE802.11g

RX Characteristics	Min.	Typical	Max.	Unit
54Mbps Input Level Sensitivity				
Minimum Input Level (FER ≦ 10%)			**-76**	dBm

3.2.3 IEEE802.11n

IEEE802.11n 20MHz bandwidth mode

Table 10Basic specifications under IEEE802.11n with 20MHz

ITEM	Specification

Modulation Type	OFDM
Frequency range	2412 MHz~ 2462 MHz
Channel	CH1 to CH11
Data rate	MCS0/1/2/3/4/5/6/7

Table 11 Transmitting performance under IEEE802.11n with 20MHz

TX Characteristics	Min.	Typical	Max.	Unit
Power@HT20, MCS7		15.5		dBm
Frequency Error	-10		+10	ppm
EVM@HT20, MCS7			-30	dB
Transmit spectrum mask				
Pass				

Table 12 Receiving performance under IEEE802.11n with 20MHz

RX Characteristics	Min.	Typical	Max.	Unit
MCS7 Input Level Sensitivity				
Minimum Input Level (FER≦10%)			-73	dBm

4. BL3383-P Hardware Information

4.1. PIN Sequence

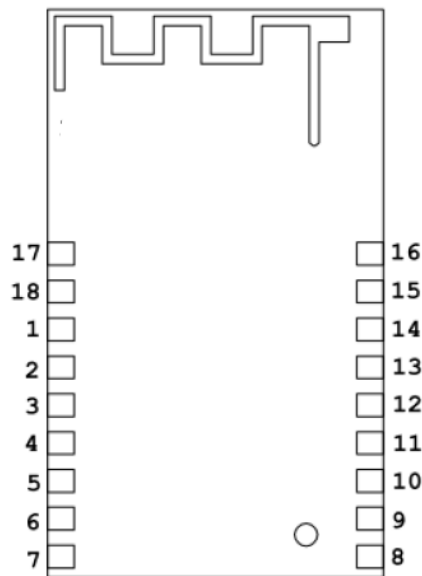Please refer to Fig 1 for the pin sequence.

Fig 1　BL3383-P pin sequence

4.2. PIN Definitions

Please refer to Table 13 for pin definitions.

PIN	Function 1	Function 2	Function 3	Function 4	Function 5
1	GDN				
2	VDD				
3	RST				
4	GPIO14	TX0			
5	GPIO13	RX0			
6	GPIO16	TX2			SI-SCL
7	GPIO15	RX2			SPI-CS
8	GPIO0		PWM0		
9	GPIO17		PWM5		
10	GPIO18		PWM6		
11	GPIO19		PWM7		SPI-MOSI
12	GPIO20		PWM0		SPI-MISO
13	VDD				
14	GND				
15	GPIO1		PWM1		
16	GPIO4		PWM4		
17	GPIO3	TX1	PWM2	I2C-SDA	
18	GPIO2	RX1	PWM3	I2C-SCL	

Table 13 BL3383-P pin definitions

Note:

1. In default, UART2 (pin4 and pin5) are used for bypass communication and UART2 (pin6 and pin7) are used for output of debugging information and burning firmware. Please refer to the description in DC Characteristics for UART output current level.
2. RST is the reset pin and will be effective with VIL. Configuration information will be remained after module reset. The module has pull-up process for RST designed internally.
3. The pins for reset button and LED indication should be defined according to actual firmware and circuit
4. **GPIO0 and GPIO1 are hardware function pins and DO NOT pull up these two pins before power-up.**
5. Pulling up both GPIO0 and GPIO3 will switch the module to firmware programming mode.

4.3 Recommendations

The following precautions should be considered during PCB designing:

Do not place any electrical components or grounding in antenna area on main board and it's better to leave this area blank on PCB.

It is recommended to not place any electrical components within 10mm range of module antenna and not design any circuit or bond copper on main board under this area.

Do not use the module inside any metal case or containers with metal painting.

Keep the antenna of Wi-Fi module next to the edge of main board (as shown in Fig 5) during design of PCB to ensure better performance of antenna.
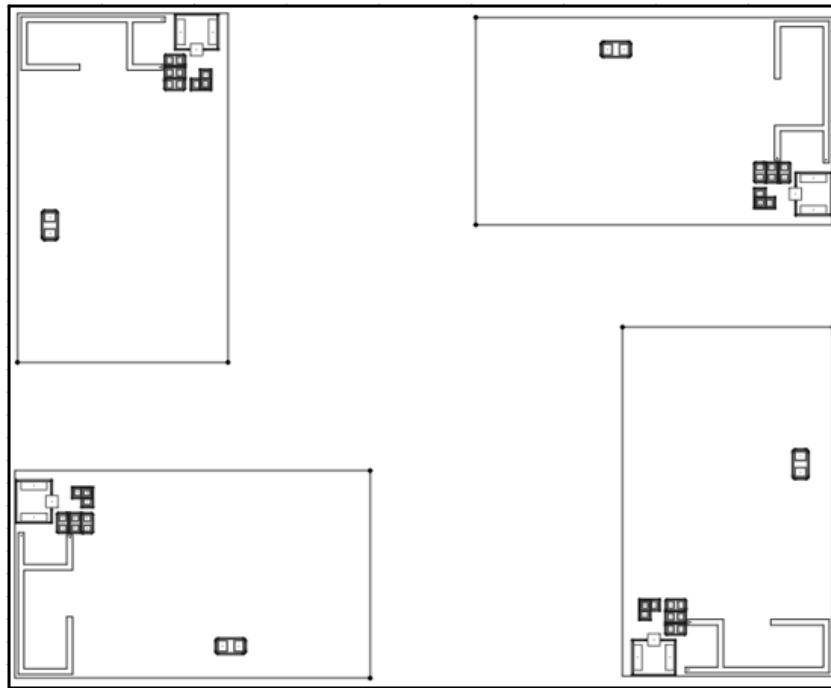
Fig 2 BL3383-P Recommended PCB layout

4.4. Mechanical Dimensions

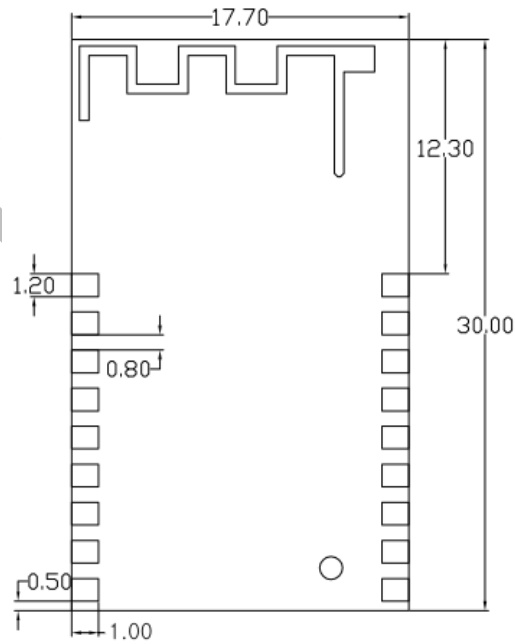Please refer to Fig 3 for the dimensions of module.

Fig   3 BL3383-P Module Dimensions

Note: Dimensions (17.7±0.2) mm * (30±0.2) mm * (3.2)mm (with shielding case)

4.5. Recommended Pad Size
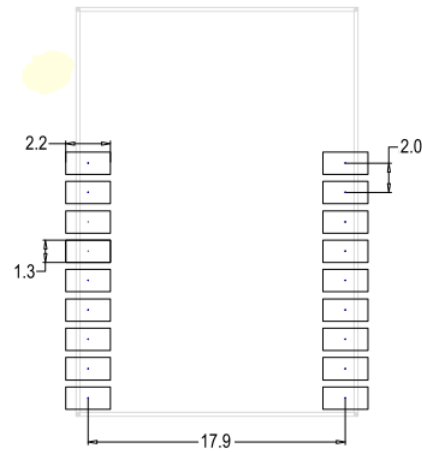
Please refer to Fig 4 for the recommended pad size

Fig 4 BL3383-P Recommended pad size

4.6. Certifications

1. Compliant and certified with SRRC standard (CMIIT ID: 2020DP13621).
2. Compliant with requirement of RoHS 2.0.
3. Compliant with requirement of REACH.

4.7. Label

Fig 5 BL3383-P label content

Please refer to Fig 8 for the content description on label.

Model: *******   : Module model

SN: 00ACA3FE75D7: Module unique MAC address

4.7. Mechanical Dimensions

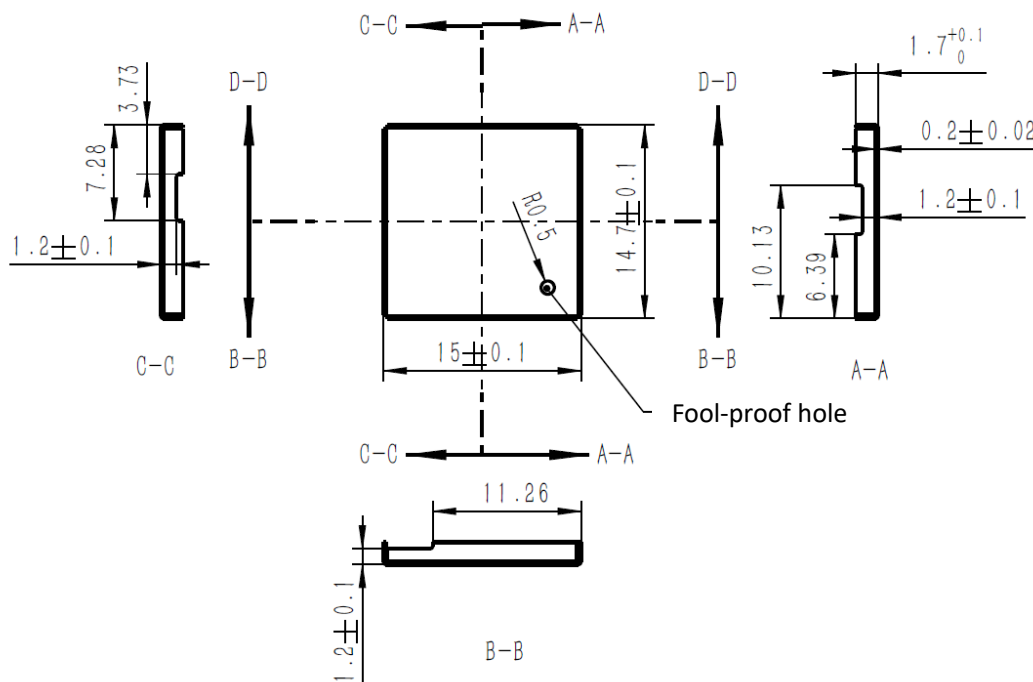Please refer to Fig 6 for the dimensions of shielding case.

Fig 6 BL3383-P Dimensions of shielding case

(Unit: mm)

4.8. Packaging

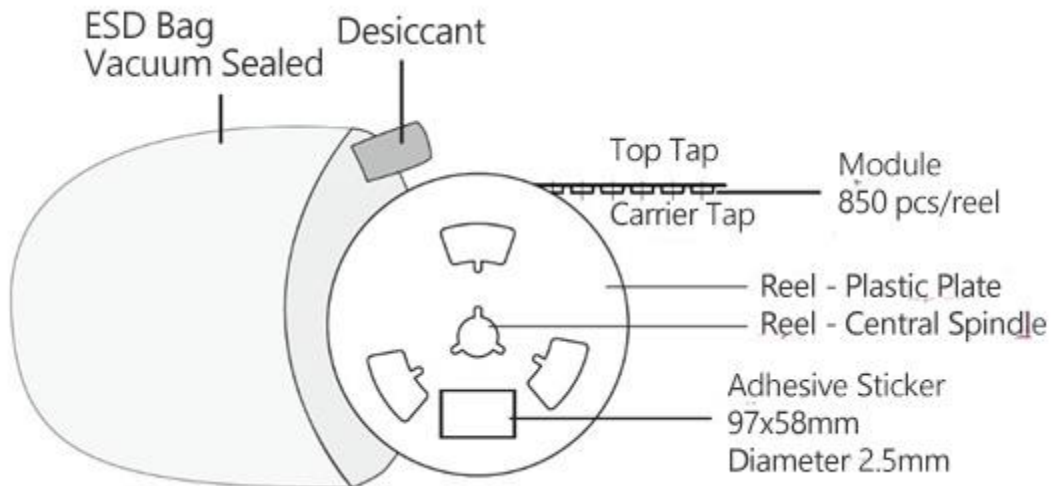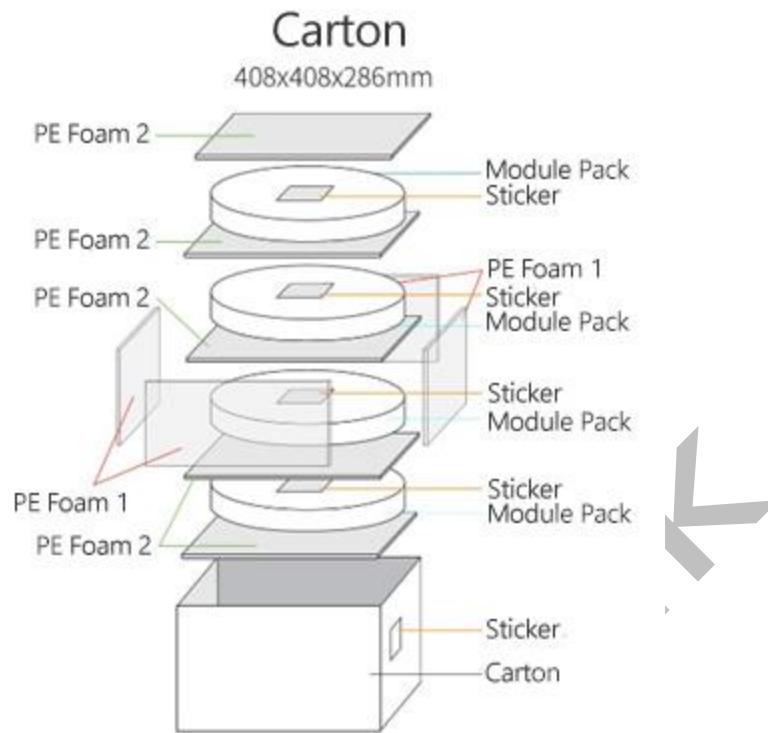Please refer to Fig 7 and Fig 8 for the details of packaging.

Fig 7 Packaging

Note: Stick size 97x58mm on each module pack (4pcs/ctn)

Fig 8 Carton

BL3383-P is packed in reel with 850 pcs/reel.

5. Reference Design

5.1. UART Interface Design

For devices with 3.3V power supply, you can directly connect the device UART port with module UART port according to the illustration in Fig 12.
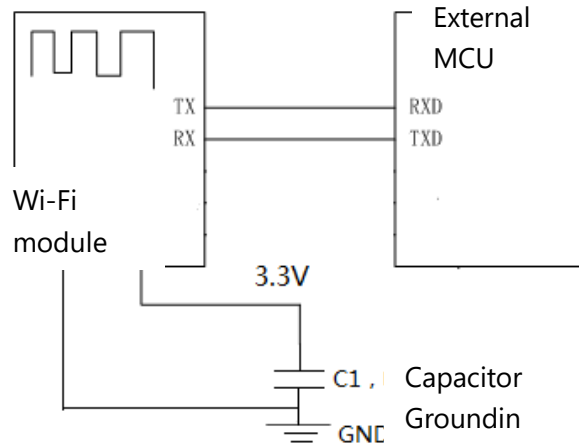
Fig 9 Circuit diagram (3.3V)

If your device is powered by 5V, you can refer to the circuit shown in Fig 10 or design your own circuit for power conversion. The value of resistor can be adjusted according to actual circuit design.
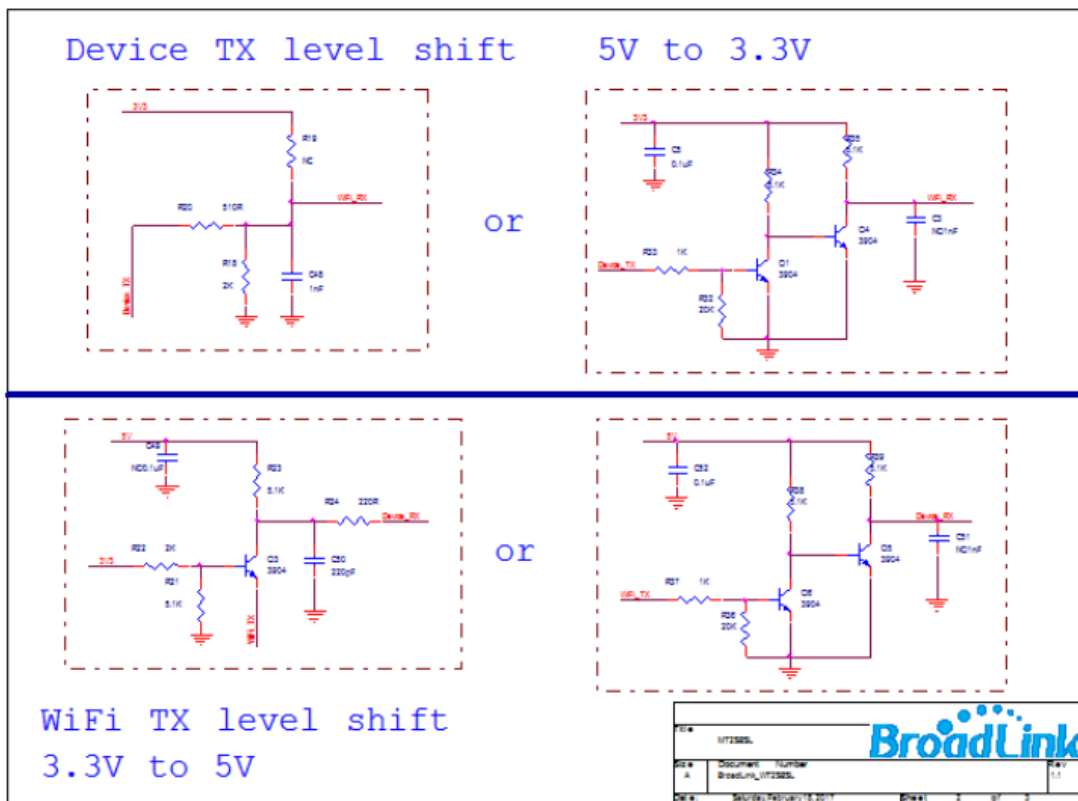

Fig 10 Circuit diagram (5V)

5.2. Power Supply Requirement

If an LDO is used to supply the module with 3.3V power, C1 capacitor can be considered to be used with 10uF-22uF; If a DCDC is used to supply 3.3V power, C1 capacitor can be considered to be used with 22uF.

It is recommended to supply the module with power higher than 450mA to ensure enough power supply to the module and avoid power down during data.

The module is designed with 2x 3.3V pins. You can power the module with either pin or both pins.

FCC 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.

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, Hangzhou BroadLink Technology 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: 2ATEV-BL3383-P" or "Contains transmitter module FCC ID: 2ATEV-BL3383-P".

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.

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-localisés ou fonctionnement 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.

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

The final end product must be labeled in a visible area with the following " Contains IC: 25062-BL3383P ".

Revision History

Date	Version	Updated Content
April 28, 2021	1.0	Preliminary version
May 06, 2021	1.1	Updated SRAM

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Contact Us

Ms Zhou

Hangzhou BroadLink Technology Co., Ltd.

Add: Building C, 57 Jiang' er Road, Binjiang District, Hangzhou, P.R.China

Postcode: 310052

Tel: +86-571- 85071744- 8010

Email: bingqi.zhou@broadlink.com.cn

For more information of BroadLink Wi-Fi modules, please visit our website:

www.broadlink.com.cn