

# 3357-P Product Manual v1.0

Version	Date	Note
1.0	December 22, 2020	Preliminary version

## Features

- a. Support IEEE802.11 b/g/n standards
- b. Support BLE4.2
- c. Support WEP, WPA and WPA2 encryption
- d. Support UART/PWM/ADC/GPIO/I2C interfaces
- e. Support STA/AP/AP+STA modes
- f. Support SmartConfig
- g. Support TLS/SSL/mDNS protocols
- h. Support PCB antenna
- i. 3.3V power supply
- j. Dimensions  $(13.3 \pm 0.2)$  mm \*  $(21 \pm 0.2)$  mm \*  $(3.2 \pm 0.2)$ mm (with shielding case)

## 1. Overview

BL3357-P is an embedded Wi-Fi module designed by BroadLink, which supports both 802.11 b/g/n and BLE4.2 standards and UART communication with other devices. 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.

The module integrates a KM4 micro-processor speed up to 100MHz with 384KB SRAM and 2MB flash.

### Basic Specification

#### 1.1.1 WLAN Parameter

Radio range	2.412 GHz - 2.462 GHz
Wireless standards	IEEE 802.11 b/g/n
Radio output	802.11b :7mW/MHz 802.11g:3mW/MHz 802.11n:2mW/MHz
Antenna type	Internal: PCB antenna External: Not supported
Receiving sensitivity	802.11b<-88dBm@11Mbps 802.11g<-76dBm@54Mbps 802.11n<-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/STA+AP/WIFI Direct

#### 1.1.2 Absolute Maximum Ratings

Symbol	Description	Min.	Max.	Units
Ts	Storage temperature	-40	125	°C

TA	Ambient operating temperature	-10	85	°C
Vdd	Supply voltage	<b>3.0</b>	<b>3.6</b>	V
Vio	Voltage on IO pin	0	VDD	V

### 1.1.3 DC Voltage and Current

Specifications	Min.	Typ.	Max.	Units
VDD	<b>3.0</b>	<b>3.3</b>	<b>3.6</b>	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
Io (Driving)	4		16	mA
Pull Resistance for IO		75		kΩ
Pull Resistance for SDIO		50		kΩ
RX				mA
11b 11Mbps@17.5dBm				mA
11g 54Mbps@16dBm				mA
11n MCS7@15.5dBm				mA
BLE @4dBm				mA

### 1.1.4 IEEE802.11b mode

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

TX Characteristics	Min	Typical	Max.	Unit
<b>Power@11Mbps</b>		<b>7</b>		mW/MHz
<b>Frequency Error</b>	<b>-10</b>		<b>+10</b>	ppm
<b>EVM@11Mbps</b>			<b>-13</b>	dB
<b>Transmit spectrum mask</b>				
<b>Pass</b>				

RX Characteristics	Min	Typical	Max.	Unit
<b>Minimum Input Level Sensitivity</b>				
11Mbps (FER ≅ 8%)			<b>-88</b>	dBm

### 1.1.5 IEEE802.11g mode

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

TX Characteristics	Min	Typical	Max.	Unit
<b>Power@54Mbps</b>		<b>3</b>		mW/MHz
<b>Frequency Error</b>	<b>-10</b>		<b>+10</b>	ppm
<b>EVM@54Mbps</b>			<b>-29</b>	dB
<b>Transmit spectrum mask</b>				
Pass				

RX Characteristics	Min	Typical	Max.	Unit
<b>Minimum Input Level Sensitivity</b>				
54Mbps			<b>-76</b>	dBm

### 1.1.6 IEEE802.11n 20MHz bandwidth mode

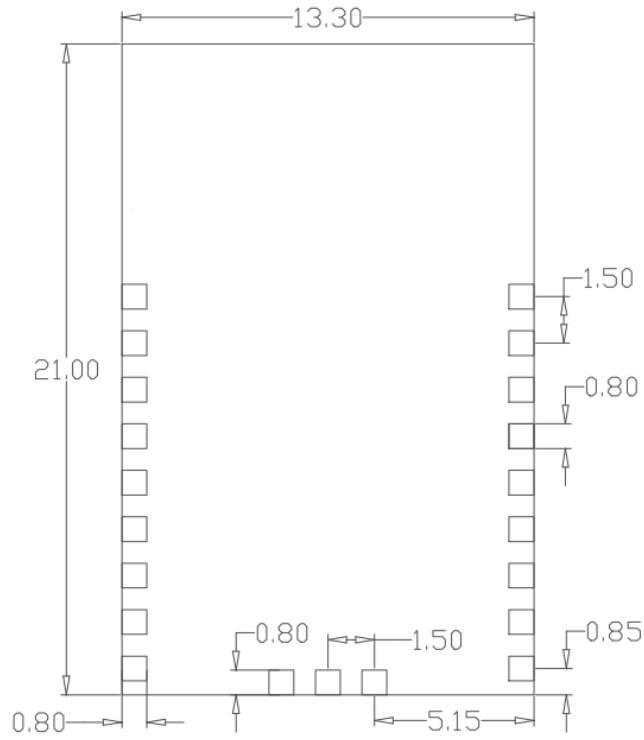
ITEM	Specification
Modulation Type	OFDM
Frequency range	2412 MHz~ 2462 MHz
Channel	CH1 to CH11
Data rate	MCS0/1/2/3/4/5/6/7

TX Characteristics	Min	Typical	Max.	Unit
<b>Power@HT20, MCS7</b>		<b>2</b>		mW/MHz
<b>Frequency Error</b>	<b>-10</b>		<b>+10</b>	ppm
<b>EVM@HT20, MCS7</b>			<b>-30</b>	dB
<b>Transmit spectrum mask</b>				
Pass				

RX Characteristics	Min	Typical	Max.	Unit
<b>Minimum Input Level Sensitivity</b>				
MCS7			<b>-73</b>	<b>dBm</b>

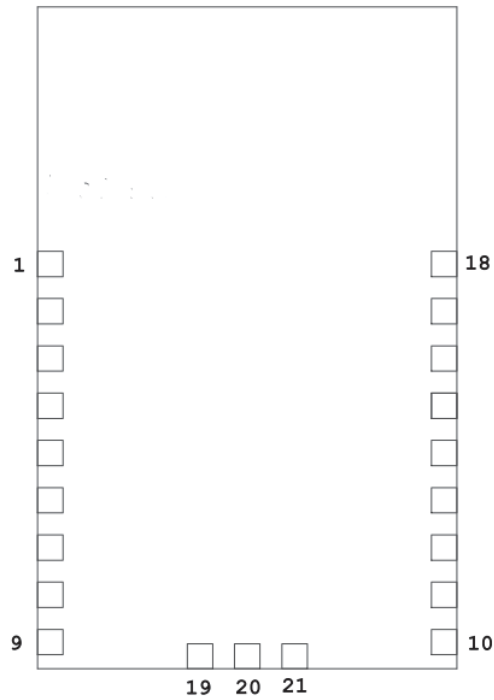
## 1.2 Hardware

### 1.2.1. Mechanical Dimensions



Stamp bonding pad diameter: 0.6mm

### 1.2.3. Pin Definitions



PINs	Function 1	Function 2	Function 3	Function 4	Function 5	Function 6
1	GPIOA2	U1_RX	I2C0_SCL	PWM2		
2	GPIOA3	U1_TX	I2C0_SDA	PWM3		
3	GPIOA4			PWM4		
4	GPIOA8					
5	GPIOA11	U0_TX	I2C0_SCL	PWM0		
6	GPIOA12	U0_RX	I2C0_SDA	PWM1		
7	GPIOA13			PWM7		
8	VD33					
9	GND					
10	CHIP_EN					
11	GPIOA7					
12	GPIOA17			PWM5		SD_CMD
13	GPIOA18			PWM6		SD_CLK
14	GPIOA19		I2C0_SCL	PWM7	SPI_MOSI	SD_D0
15	GPIOA20		I2C0_SDA	PWM0	SPI_MISO	SD_D1
16	GPIOA15	U2_RX	I2C0_SCL	PWM3	SPI_CS	SD_D2
17	GPIOA16	U2_TX	I2C0_SDA	PWM4	SPI_SCL	SD_D3
18	GND					
19	VD33					
20	GPIOA14			PWM2		SD_INT
21	GPIOA0					

**Note:**

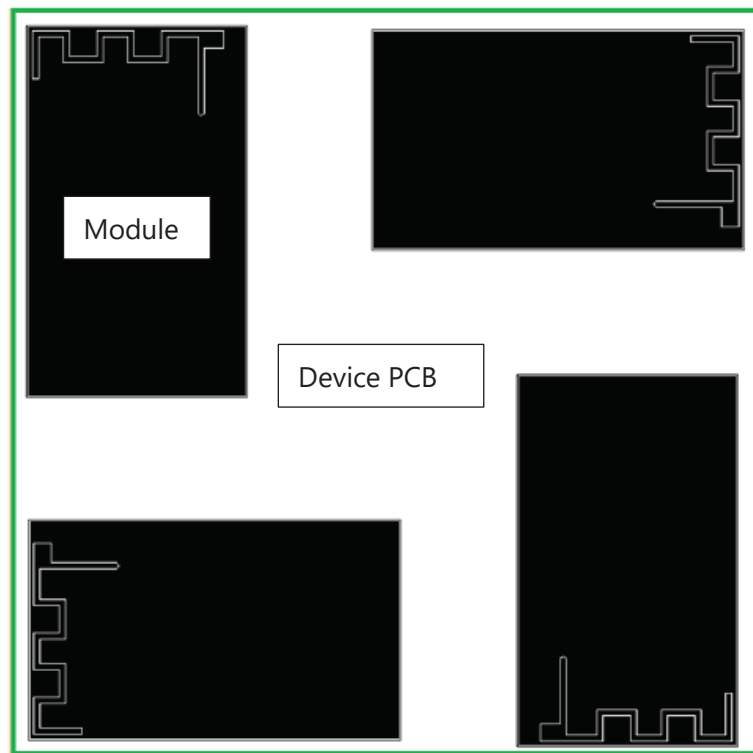
1. In default, UART2 (pin1 and pin2) are used for transparent communication and UART\_log (pin16 and pin17) are used for output of debugging information and burning firmware. Please refer to the description in DC Characteristics for UART output current level.
2. CHIP\_EN hardware reset pin and will be effective with VIL. Configuration information will be remained after module reset. The module has pull-up process for CHIP\_EN designed internally.
3. The pins for reset button and LED indication should be defined according to actual firmware and circuit
4. **GPIO0 is designed for specific hardware function**

GPIO0	1	Test Mode
	0	Normal

### 1.2.3. PCB Antenna

The following precautions should be considered during designing with PCB antenna:

1. 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
2. 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.
3. Do not use the module inside any metal case or containers with metal painting
4. Keep the antenna of wifi module next to the edge of main board during design of PCB to ensure better performance of antenna, as illustrated below

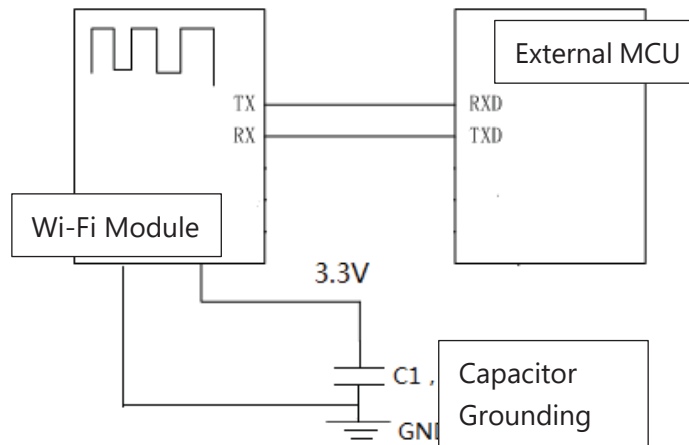




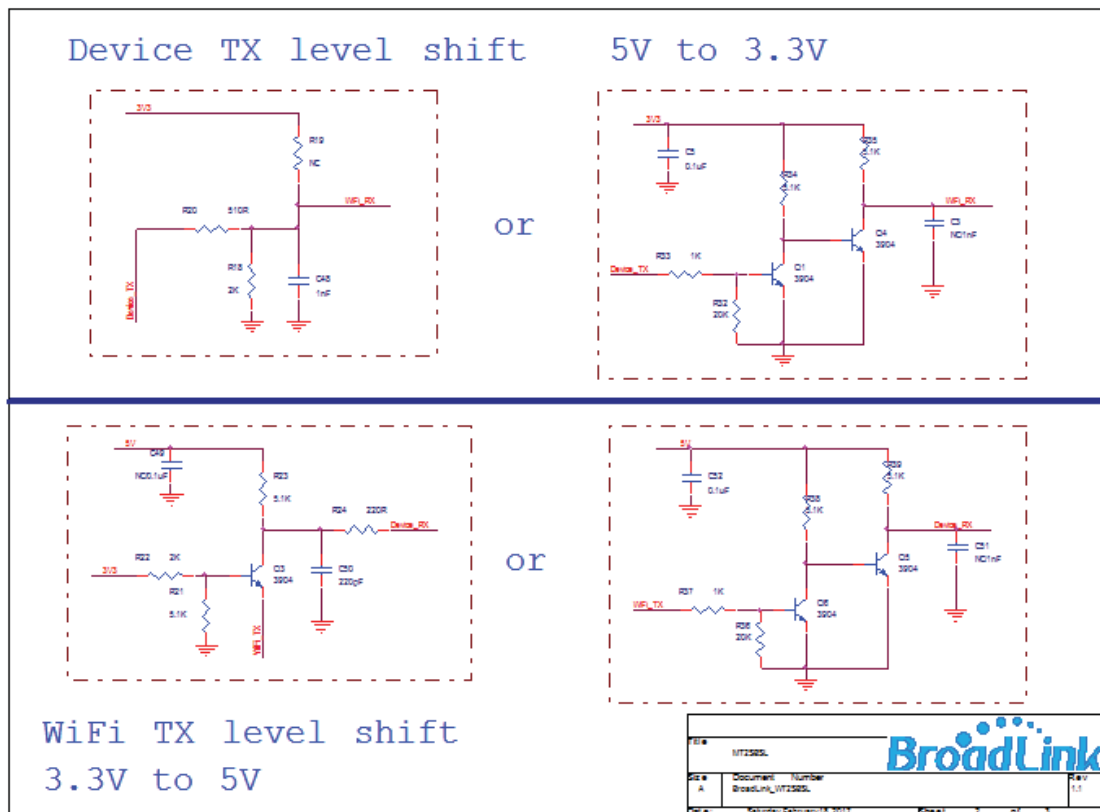
## 1.3. Reference Design

### 1.3.1. 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.



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



### 1.3.2. 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 400mA to ensure enough power supply to the module and avoid power down during data transmission.

### Label and compliance information

Remind end customers to add "Contain FCC ID: 2ATEV-BL3357-P ".

### Information on test modes and additional testing requirements

Contact Hangzhou BroadLink Technology 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.

### 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, Hangzhou BroadLink Technology Co., Ltd. shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

**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 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-BL3357-P" or "Contains transmitter module FCC ID: 2ATEV-BL3357-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 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.

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-BL3357P ".