



Product Specification

Revision	V1.0		
Date	2018-6-30		
Model Name	BL-R8812BU1		
ProductName	IEEE 802.11b/g/n/ac(2T2R) USB WLAN Module		
Bilian Approve Field			
Engineer	QC	Sales	
Customer Approve Field			
Engineer	QC	Manufactory	Purchasing

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Revision History

Date	Document Revision	Product Revision	Description
2018/5/29	0.1	V0.1	Preliminary release
2018/06/30	1.0	V1.0	Batch production

1. Introduction

1.1 General Description

BL-R8812BU2 module design is based on Realtek RTL8812BU solution, The RTL8812BU is a highly integrated single chip which has built in a 2x2 dual-band wireless LAN radio. The Module is a highly integrated MAC/BBP and 2.4/5GHz PA/LNA single chip which supports a 866.7Mbps PHY rate. The Module is designed to support standard-based features in the areas of security, quality of service, and international regulations, giving end users the greatest performance anytime and in any circumstance. This documentation describes the engineering requirements specification.

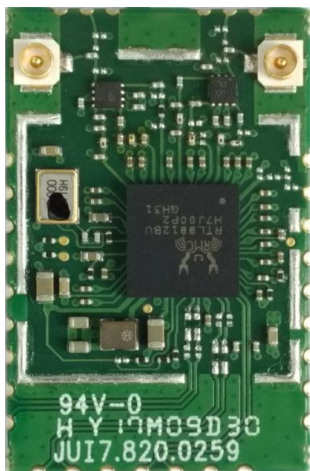


Figure 1 Top View



Figure 2 Bottom View

Note:The above pictures are for reference only

1.2 Features

- Operating Frequencies : 2.4~2.4835GHz and 5.15~5.85GHz
- Host Interface is USB2.0 (It only changes can support USB3.0)
- IEEE Standards : IEEE 802.11a/b/g/n/ac
- Wireless data rate can reach up to 867Mbps
- Connect to external antenna through the ipex connector
- Power Supply: 3.3V ± 0.2V

1.3 Applications

- MID
- IP Camera
- STB
- Smart TV
- E-book
- Other devices which need to be supported by wireless network

2. Functional Block Diagram

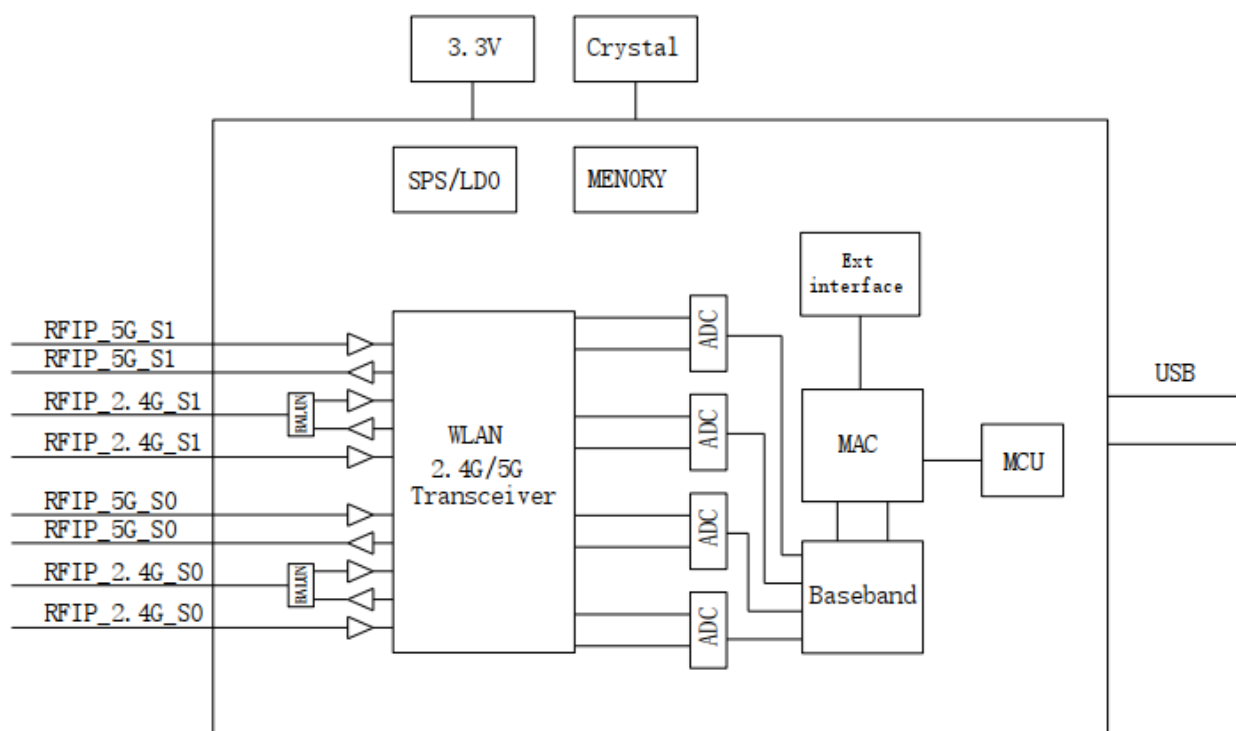


Figure 3 BL-R8812BU1 block diagram

3. Product Technical Specifications

3.1 General Specifications

Item	Description
Product Name	BL-R8812BU1
Main Chip	RTL8812BU-CG
Host Interface	USB2.0
IEEE Standards	IEEE 802.11a/b/g/n/ac
Operating Frequencies	2.4GHz~2.4835GHz /5.15~5.85Hz
Modulation	WIFI: 802.11b: CCK, DQPSK, DBPSK

	802.11a/g: 64-QAM,16-QAM, QPSK, BPSK 802.11n: 64-QAM,16-QAM, QPSK, BPSK 802.11ac: 256-QAM,64-QAM,16-QAM, QPSK, BPSK
Working Mode	Infrastructure, Ad-Hoc
Wireless Data Rate	WIFI: 802.11b: 1, 2, 5.5, 11Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: HT20 reach up to 144.4Mbps, HT40 reach up to 300Mbps 802.11ac: VHT20 reach up to 173.3Mbps, VHT40 reach up to 400Mbps, VHT80 reach up to 866.7Mbps
Rx Sensitivity	-95dBm (Min)
TX Power	18.5dBm (Max)
Antenna Type	Connect to external antenna through the half hole connector
Dimension(L*W*H)	27.0*17.8*2.8mm (L*W*H) , Tolerance: ± 0.15 mm
Power Supply	3.3V ± 0.2 V
Power Consumption	Standby 187mA (Max) TX mode 638mA (Max)
Clock Source	40MHz
Working Temperature	0° C to +60° C
Storage Temperature	-40° C to +85° C

ESD CAUTION: Although this module is designed to be as robust as possible, Electrostatic Discharge (ESD) can damage this module. It must be protected from ESD at all times and handled under the protection of ESD.

3.2 DC Power Consumption

Vcc=3.3V, Ta= 25 °C, unit: mA				
Supply current	Typ.		Max	
Standby (RF disabled)	187		208	
802.11b	1Mbps		11Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	396	423	344	369
Rxmode	195	218	196	216
802.11g	6Mbps		54Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	387	419	303	368
Rxmode	196	218	198	216

802.11n HT20	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	385	412	301	362
Rxmode	195	216	193	215
802.11n HT40	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	369	401	272	373
Rxmode	193	218	196	217
802.11a	6Mbps		54Mbps	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	388	412	337	410
Rxmode	194	210	197	215
802.11n HT40(5G)	MCS0		MCS7	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	365	403	298	386
Rxmode	192	212	196	213
802.11ac	MCS0		MCS9	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	354	402	289	386
Rxmode	189	208	190	203
2T2R				
802.11n HT40(2.4G)	MCS8		MCS15	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	521	596	396	542
Rxmode	200	223	198	221
802.11n HT40(5G)	MCS8		MCS15	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	553	586	437	538
Rxmode	197	225	200	218
802.11ac(5G)	NSS2-MCS0		NSS2-MCS9	
Supply current	Typ.	Max.	Typ.	Max.
TX mode	548	638	423	620
Rxmode	198	225	203	214

3.3 RF Specifications

WiFi 2.4G	Frequency (MHz)	Frequency (MHz)	Power Target (dBm)	Tolerance (dBm)	Max. Tune-up Power(dBm)
IEEE 802.11b 1Mbps	1	2412	21.5	±1.5	23.0
	6	2437	21.0	±1.5	22.5
	11	2462	20.5	±1.5	22.0
IEEE 802.11g 6Mbps	1	2412	17.5	±1.5	19.0
	6	2437	20.0	±1.5	21.5
	11	2462	17.0	±1.5	18.5
IEEE 802.11n 20MHz MCS0	1	2412	17.5	±1.5	19.0
	6	2437	20.0	±1.5	21.5
	11	2462	17.0	±1.5	18.5
IEEE 802.11n 40MHz MCS0	3	2422	17.0	±1.5	18.5
	6	2437	19.5	±1.5	21.0
	9	2452	16.5	±1.5	18.0

WiFi 5G Band 1	Frequency (MHz)	Frequency (MHz)	Power Target (dBm)	Tolerance (dBm)	Max. Tune-up Power(dBm)
IEEE 802.11a 6Mbps	36	5180	18.0	±2	20.0
	44	5220	17.5	±2	19.5
	48	5240	17.5	±2	19.5
IEEE 802.11n 20MHz MCS0	36	5180	18.5	±2	20.5
	44	5220	18.5	±2	20.5
	48	5240	17.5	±2	19.5
IEEE 802.11n 40MHz MCS0	38	5190	17.5	±2	19.5
	46	5230	19.0	±2	21.0
IEEE 802.11ac 80MHz MCS0	42	5210	13.0	±2	15.0

WiFi 5G Band 2	Frequency (MHz)	Frequency (MHz)	Power Target (dBm)	Tolerance (dBm)	Max. Tune-up Power(dBm)
IEEE 802.11a 6Mbps	52	5260	16.5	±2	18.5
	56	5280	16.0	±2	18.0
	64	5320	16.0	±2	18.0
IEEE 802.11n 20MHz MCS0	52	5260	17.0	±2	19.0
	56	5280	17.0	±2	19.0
	64	5320	17.0	±2	19.0
IEEE 802.11n 40MHz MCS0	54	5270	19.0	±2	21.0
	62	5310	16.0	±2	18.0
IEEE 802.11ac 80MHz MCS0	58	5290	9.0	±2	11.0

WiFi 5G Band 4	Frequency (MHz)	Frequency (MHz)	Power Target (dBm)	Tolerance (dBm)	Max. Tune-up Power(dBm)
IEEE 802.11a 6Mbps	149	5745	18.0	±2	20.0
	157	5785	17.0	±2	19.0
	165	5825	17.0	±2	19.0
IEEE 802.11n 20MHz MCS0	149	5745	15.5	±2	17.5
	157	5785	16.0	±2	18.0
	165	5825	17.0	±2	19.0
IEEE 802.11n 40MHz MCS0	151	5755	18.5	±2	20.5
	159	5795	18.0	±2	20.0
IEEE 802.11ac 80MHz MCS0	155	5775	15.0	±2	17.0

RFTest Report										
PathA										
2.4G										
Mode	Rate(Mbps)	Power(dBm)			EVM(dB)			Sensitivity(dBm)		
		CH1	CH7	CH13	CH1	CH7	CH13	CH1	CH7	CH13
11b	1	16.94	16.89	17.14	-24.74	-24.62	-24.95	-95	-95	-95
	11	16.99	16.85	17.85	-23.21	-23.10	-23.22	-86	-85	-85
11g	6	16.21	16.44	16.26	-27.89	-27.13	-27.16	-91	-91	-91
	54	14.32	14.14	14.21	-32.02	-31.86	-31.20	-74	-73	-73
Mode	Rate(Mbps)	Power(dBm)			EVM(dB)			Sensitivity(dBm)		
		CH3	CH7	CH11	CH3	CH7	CH11	CH3	CH7	CH11
11n	MCS0	15.52	15.47	15.43	-28.28	-28.19	-28.41	-87	-87	-87
HT40	MCS7	13.34	13.68	13.39	-34.07	-33.78	-33.82	-68	-68	-68
PathB										
Mode	Rate(Mbps)	Power(dBm)			EVM(dB)			Sensitivity(dBm)		
		CH1	CH7	CH13	CH1	CH7	CH13	CH1	CH7	CH13
11b	1	17.03	16.55	16.84	-25.14	-25.07	-23.91	-95	-95	-95
	11	17.16	17.11	17.83	-25.02	-25.07	-23.13	-86	-86	-86
11g	6	16.41	16.28	16.20	-24.30	-24.45	-24.43	-91	-91	-91
	54	14.53	14.54	14.27	-30.53	-29.40	-29.29	-74	-74	-74
Mode	Rate(Mbps)	Power(dBm)			EVM(dB)			Sensitivity(dBm)		
		CH3	CH7	CH11	CH3	CH7	CH11	CH3	CH7	CH11
11n	MCS0	15.47	15.21	15.32	-28.07	-28.09	-27.49	-88	-88	-88
HT40	MCS7	13.54	13.53	13.40	-32.69	-32.80	-32.21	-69	-69	-69

RFTest Report													
PathA													
5G													
Mod e	Rate(Mbps)	Power(dBm)				EVM(dB)				Sensitivity(dBm)			
		CH 36	CH 100	CH 140	CH 161	CH 36	CH100	CH140	CH161	CH 36	CH 100	CH 140	CH 161
11a	6	16.34	16.55	16.35	16.22	-22.13	-22.90	-26.63	-23.98	-91	-91	-91	-91
	54	13.97	14.10	14.07	14.32	-31.99	-31.73	-32.66	-30.13	-75	-75	-75	-75
Mod e	Rate(Mbps)	Power(dBm)				EVM(dB)				Sensitivity(dBm)			
		CH 38	CH 102	CH 142	CH 159	CH 38	CH102	CH142	CH159	CH 38	CH 102	CH 142	CH 159
11n 40	MCS0	15.36	15.53	15.47	15.64	-28.53	-29.50	-28.80	-26.69	-88	-89	-89	-89
	MCS7	13.73	13.61	13.61	13.32	-32.25	-31.65	-31.33	-30.24	-70	-70	-70	-70
Mod e	Rate(Mbps)	Power(dBm)				EVM(dB)				Sensitivity(dBm)			
		CH 42	CH 106	CH 138	CH 155	CH 42	CH106	CH138	CH155	CH 42	CH 106	CH 138	CH 155
11ac	MCS0	14.56	14.76	14.45	14.22	-30.03	-29.74	-29.70	-30.45	-85	-85	-85	-84
	MCS9	12.52	12.41	12.33	12.64	-33.86	-33.24	-34.71	-33.56	-61	-61	-61	-61
PathB													
5G													
Mod e	Rate(Mbps)	Power(dBm)				EVM(dB)				Sensitivity(dBm)			
		CH 36	CH 100	CH 140	CH 161	CH 36	CH100	CH140	CH161	CH 36	CH 100	CH 140	CH 161
11a	6	15.54	15.27	15.45	15.65	-29.53	-30.68	-31.02	-30.09	-91	-91	-91	-91
	54	13.52	13.72	14.10	13.78	-31.10	-30.69	-30.30	-30.10	-75	-75	-75	-75
Mod e	Rate(Mbps)	Power(dBm)				EVM(dB)				Sensitivity(dBm)			
		CH 38	CH 102	CH 142	CH 159	CH 38	CH102	CH142	CH159	CH 38	CH 102	CH 142	CH 159
11n 40	MCS0	15.54	15.27	15.45	15.65	-29.53	-30.68	-31.02	-30.09	-88	-88	-88	-88
	MCS7	13.52	13.72	13.41	13.63	-32.93	-31.73	-32.19	-33.19	-70	-70	-70	-70
Mod e	Rate(Mbps)	Power(dBm)				EVM(dB)				Sensitivity(dBm)			
		CH 42	CH 106	CH 138	CH 155	CH 42	CH106	CH138	CH155	CH 42	CH 106	CH 138	CH 155
11ac	MCS0	14.74	14.71	14.35	14.41	-31.42	-30.56	-32.12	-31.43	-84	-84	-84	-84
	MCS9	12.63	12.52	12.71	12.69	-34.21	-33.65	-34.28	-33.81	-60	-59	-59	-59

4. Pin Assignments

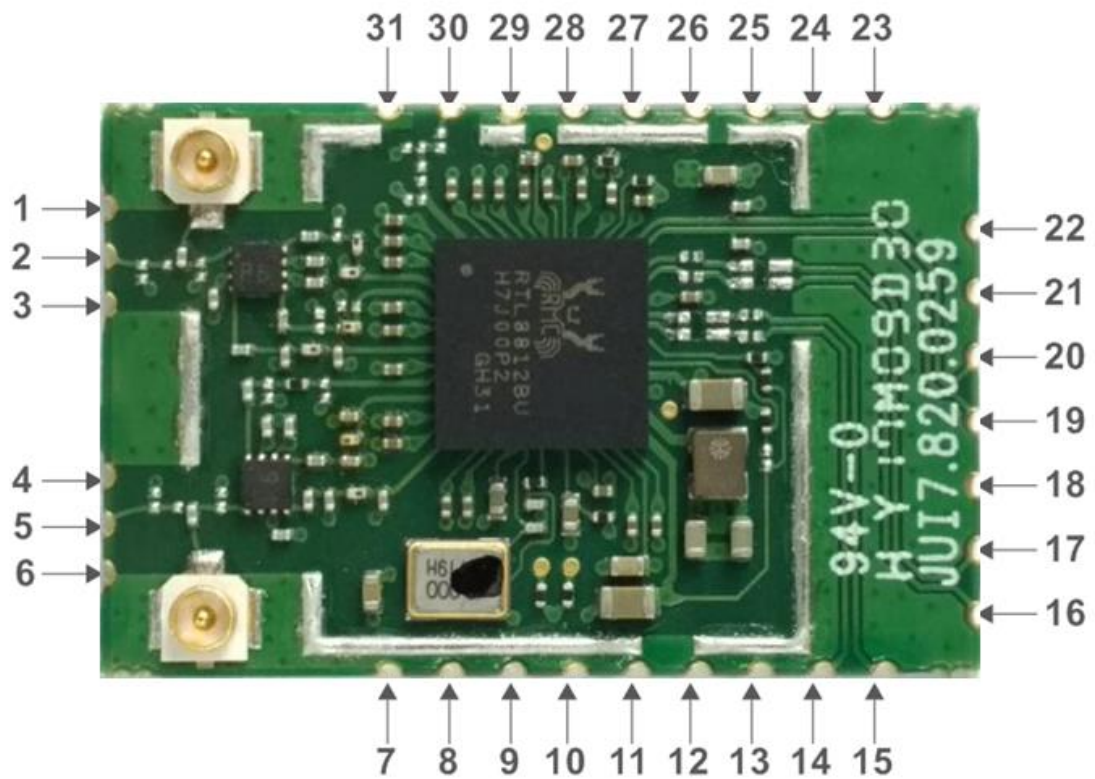


Figure 4 Pin Assignments (Top view)

The following signal type codes are used in the tables:

I:Input

O:Output

O/D: Open Drain

P:Power Pin

Pin No:	Pin Name	Type	Description
1	GND	P	Ground
2	RF_WL_B	I/O	RF(WIFI) port B

3	GND	P	Ground
4	GND	P	Ground
5	RF_WL_A	I/O	RF(WIFI) port A
6	GND	P	Ground
7	GND	P	Ground
8	OPT_A	/	NC
9	OPT_B	/	NC
10	GND	P	Ground
11	RSV	/	NC
12	WL_WAKE_HOST	I/O	WLAN to wake up HOST
13	GND	P	Ground
14	NC	O	NC
15	NC	O	NC
16	NC	I	NC
17	NC	I	NC
18	GND	P	Ground
19	HSDP	I/O	USB2.0 Transmitter/Receiver Differential Pair
20	HSDM	I/O	USB2.0 Transmitter/Receiver Differential Pair
21	VDD33	P	VDD 3.3V Power Supply
22	RESET	I	PDN
23	NC	O	NC
24	HOST_WAKE_WL	I	HOST wake up WLAN device
25	NC	I	NC
26	SUSCLK	I	NC
27	WL_DIS	I	NC
28	NC	I	NC
29	GND	P	Ground
30	NC	/	NC
31	GND	P	Ground

5. Application Information

5.1 Typical Application Circuit

RF reference circuit

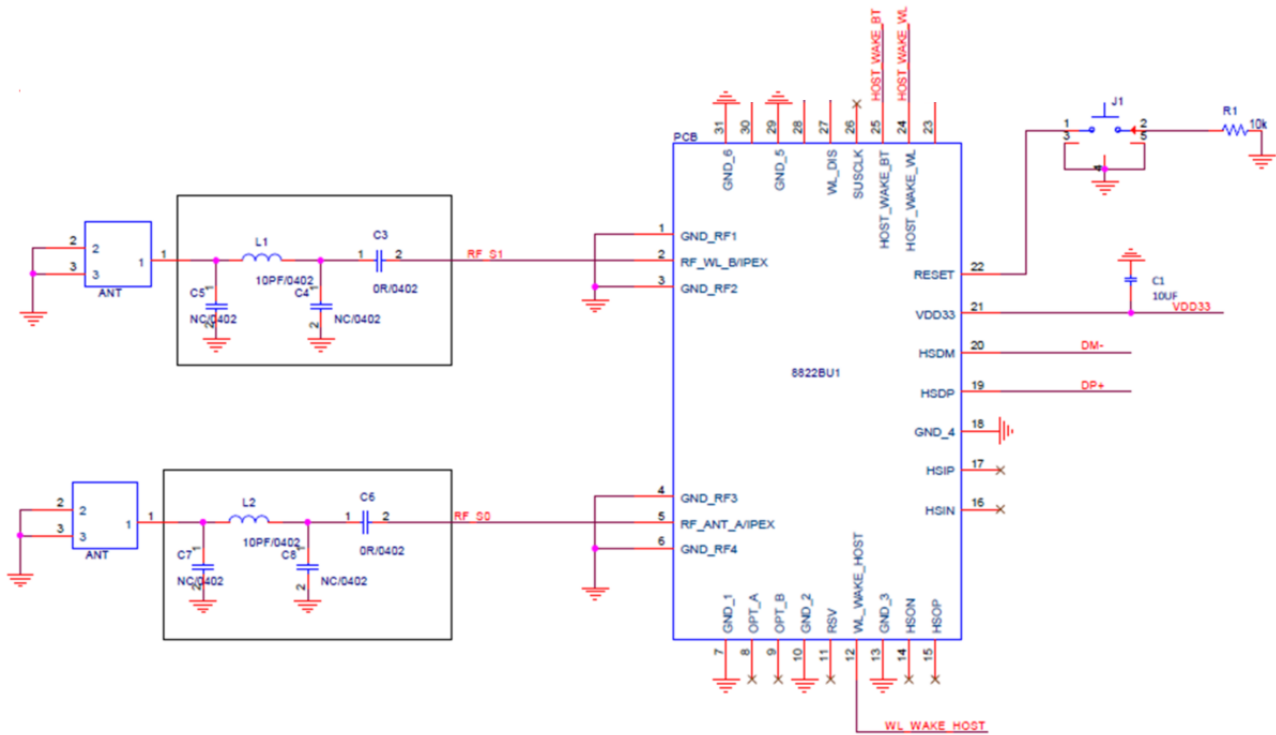


Figure 5 Typical application circuit

- NOTE:**
- 1、RF trace need to keep 50 ohm impedance.
 - 2、RF(WIFI) connect to external antenna through the ipex connector, if choose the RF signals connect to the half hole, please refer to the black box matching circuit.

6. Mechanical Specifications

Module dimension: Typical (L*W * H): 17.8mm*27.0mm*2.8mm Tolerance : +/-0.15mm

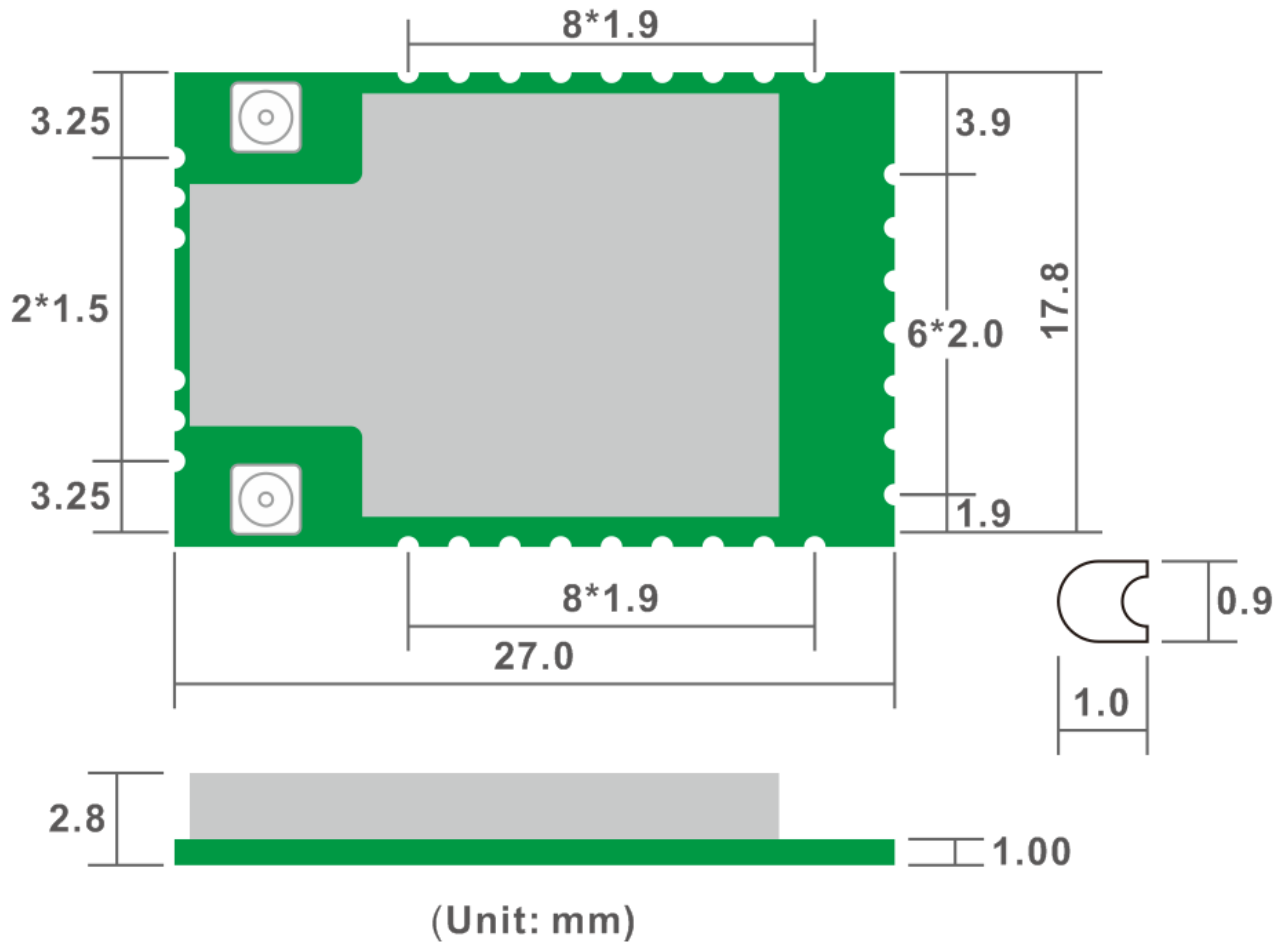


Figure 6 Module dimension

7. Others

7.1 Package Information



Figure 7 Package Information

7.2 Storage Temperature and Humidity

1. Storage Condition: Moisture barrier bag must be stored under 30°C, humidity under 85% RH.

The calculated shelf life for the dry packed product shall be a 12 months from the bag seal date.

Humidity indicator cards must be blue, <30%.

2.Products require baking before mounting if humidity indicator cards reads > 30% temp < 30℃, humidity < 70% RH, over 96 hours.

Baking condition: 125℃, 12 hours.

Baking times: 1 time.

7.3 Recommended Reflow Profile

Reflow soldering shall be done according to the solder reflow profile,Typical Solder Reflow Profile is illustrated in Figures 8. The peak temperature is 245℃.

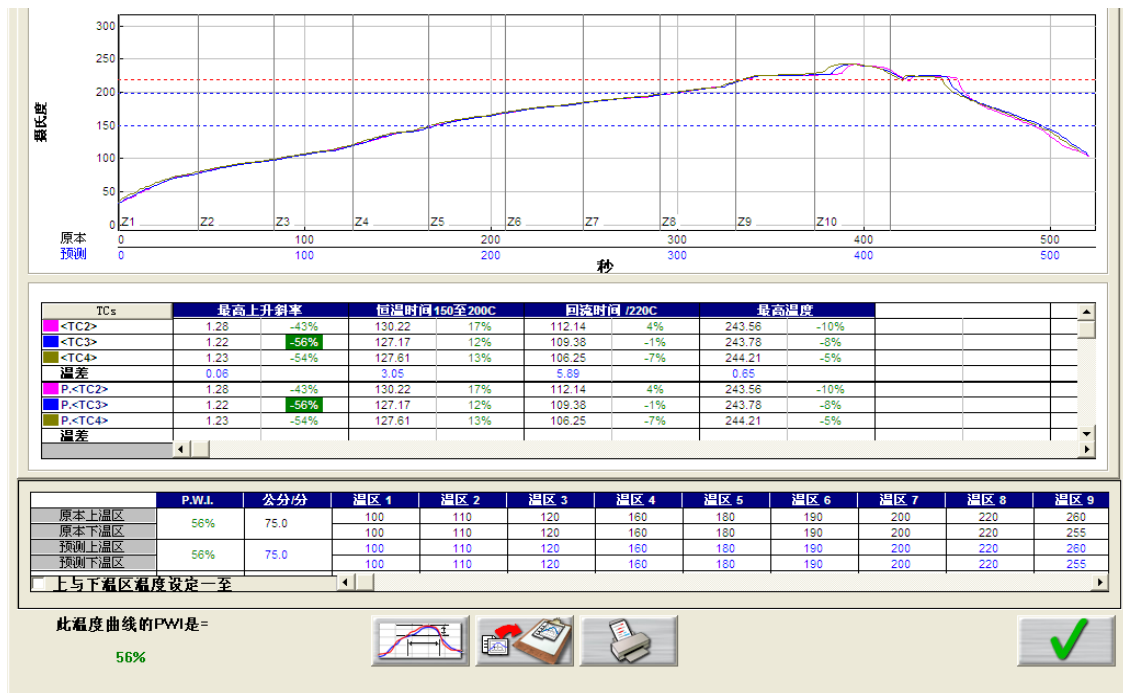


Figure 8 Typical Solder Reflow Profile



FCC 15.19 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 of the device.

FCC 15.105 Warning

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

- 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 15.21 Warning

Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

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

This equipment complies with FCC 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.

Modular Approval

OEM INTEGRATION INSTRUCTIONS:

This device is intended only for OEM integrators under the following conditions: 1) The module must be installed in the host equipment such that 20 cm is maintained between the antenna and users, and 2) the transmitter module may not be co-located with any other transmitter or antenna. As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

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

IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

USERS MANUAL OF THE END PRODUCT:

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's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: W3TR8812BU1 ". 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.

IC Warning

RSS-Gen Issue 4 8.4

This device complies with Industry Canada's licence-exempt RSSs. 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.

Industry Canada ICES-003 Compliance Label:

CAN ICES-3 (A)/NMB-3(A)

Co-located

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet appareil et son antenne (s) ne doivent pas être situés ou fonctionner en conjonction avec une autre antenne ou émetteur.

This radio transmitter (26044- R8812BU1) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

- (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; (For devices installed in vehicles point i. is not required.)
- (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) where applicable, antenna type(s), antenna models(s), and 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.

Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

(i) l'appareil pour fonctionner dans la bande 5150-5250 MHz est réservé à une utilisation en intérieur afin de réduire les risques d'interférences nuisibles à la co-canal systèmes mobiles par satellite;

(ii) pour les appareils avec antenne (s) détachable, le gain d'antenne maximal autorisé pour les appareils dans les bandes 5250-5350 MHz et 5470-5725 MHz doit être telle que l'équipement satisfait encore la pire limite;

(iii) pour les appareils avec antenne (s) détachable, le gain d'antenne maximal autorisé pour les appareils dans la bande 5725-5850 MHz doit être telle que l'équipement satisfait encore la pire limites spécifiées pour le point-à-point et non point-à-point, le cas échéant; opération et

(iv) l'angle d'inclinaison du pire (s) nécessaire pour rester conforme à la pire exigence de masque d'élévation énoncées dans la section 6.2.2 (3) doit être clairement indiqué.

Devraient également être informés les utilisateurs que les radars à haute puissance sont désignés comme utilisateurs principaux (c.-à-utilisateurs prioritaires) des bandes 5250-5350 MHz et 5650-5850 MHz et que ces radars pourraient provoquer des interférences et / ou endommager les appareils LE-LAN.

Modular Approval

OEM INTEGRATION INSTRUCTIONS:

This device is intended only for OEM integrators under the following conditions: 1)The module must be installed in the host equipment such that 20 cm is maintained between the antenna and users, and 2)the transmitter module may not be co-located with any other transmitter or antenna. As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

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

IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the ISSED authorization for this module in combination with the host equipment is no longer considered valid and the ISSED ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

USERS MANUAL OF THE END PRODUCT:

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's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

LABEL OF THE END PRODUCT:

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains transmitter module IC: 26044- R8812BU1