PRODUCT SPECIFICATION

Version 1.0

IEEE 802.11 a/b/g/n 1T/1R Low-Energy WLAN Module

Model Number: WL6BR1500

客户认可 Custom Approval Section		
Custom Name		
Department		
Approval		Date：

拟制 DESIGN	审核 CHECK	批准 APPROVAL

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Document revision history

Rev.	Date	Author	Remarks
Version 1.0	2017/7/31	GH	Draft

1. General Description

This document is to specify the product requirements for 802.11b/g/n 1T1R Module. It is based on Realtek RTL8710BN low-power chipset that complied with IEEE 802.11n,and it is also backward complied with IEEE 802.11b/g standard from 2.4~2.5GHz. It can be used to provide up to 54Mbps for IEEE 802.11g,11Mbps for IEEE 802.11b and 150Mbps for IEEE 802.11n to connect your wireless LAN.

With seamless roaming, fully interoperability and advanced security with WEP standard, 802.11b/g/n Module offers absolute interoperability with different vendors 802.11g, 802.11b, 802.11n Access Points through the wireless LAN.

2. Features

- **Compatible with IEEE 802.11b standard to provide wireless 11Mbps data rate.**
- **Compatible with IEEE 802.11g standard to provide wireless 54Mbps data rate.**
- **Compatible with IEEE 802.11n standard to provide wireless 150Mbps data rate.**
- **Operation at 2.4~2.5GHz frequency band to meet worldwide regulations**
- **Dynamic data rate scaling at 6,9,12,18,24,36,48,54 for IEEE802.11g**
- **Dynamic data rate scaling at 1,2,5.5, and 11Mbps for IEEE802.11b**
- **Maximum reliability, throughput and connectivity with automatic data rate switching**
- **Support wireless data encryption with 64/128-bit WEP for security**
- **Support infrastructure networks via Access Point and ad-hoc network via peer-to-peer communication**
- **Communicate with other devices by the UART port**
- **High speed UART interface with baud rate up to 4MHz**
- **RoHS compliant.**

3. Application Diagrams

3.1 Functional Block Diagram

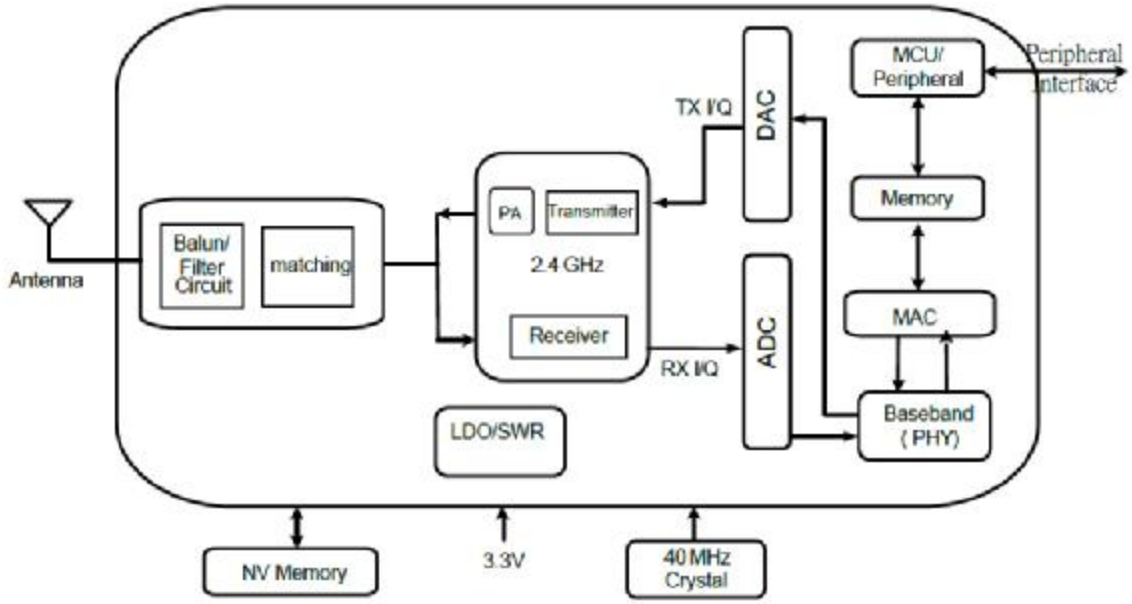


Figure 1

3.2 General Requirements

3.2.1 IEEE 802.11b Section

	Feature	Detailed Description
3.2.1.1	Standard	● IEEE 802.11b
3.2.1.2	Radio and Modulation Schemes	● DQPSK , DBPSK , DSSS , and CCK
3.2.1.3	Operating Frequency	● 2400 ～ 2497MHz ISM band
3.2.1.4	Channel Numbers	● 11 channels for United States 13 channels for Europe Countries(Default) 14 channels for Japan
3.2.1.5	Data Rate	● 11, 5.5, 2, and 1Mbps
3.2.1.6	Media Access Protocol	● CSMA/CA with ACK
3.2.1.7	Transmitter Output Power at Antenna Connector	● Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25degree C ● 17±2dBm at 1,2,5.5,11Mbps
3.2.1.8	Receiver Sensitivity at Antenna Connector	● Typical Sensitivity at Which Frame(1000-byte PDUs)Error Rate=8% ● -86dBm at 1Mbps ● -83dBm at 2Mbps ● -79dBm at 5.5Mbps ● -76dBm for 11Mbps

3.2.2 IEEE 802.11g Section

	Feature	Detailed Description
3.2.2.1	Standard	● IEEE 802.11g
3.2.2.2	Radio and Modulation Type	● QPSK , BPSK , 16QAM ,64QAM with OFDM
3.2.2.3	Operating Frequency	● 2400 ～ 2483.5MHz ISM band
3.2.2.4	Channel Numbers	● 11 channels for United States 13 channels for Europe Countries(Default) 13 channels for Japan
3.2.2.5	Data Rate	● 6,9,12,18,24,36,48,54Mbps
3.2.2.6	Media Access Protocol	● CSMA/CA with ACK
3.2.2.7	Transmitter Output Power at Antenna Connector	● Typical RF Output Power(tolerance±2dB) at each RF chain, Data Rate and at room Temp. 25degree C ● 16±2dBm at 6～18Mbps ● 15±2dBm at 36 and 24Mbps ● 15±2dBm at 54 and 48Mbps
3.2.2.8	Receiver Sensitivity at Antenna Connector	● Typical Sensitivity at Which Frame(1000-byte PDUs)Error rate<=10% ● -82dBm at 6Mbps ● -81dBm at 9Mbps ● -79dBm at 12Mbps ● -77dBm for 18Mbps ● -74dBm at 24Mbps ● -70dBm at 36Mbps ● -66dBm at 48Mbps ● -65dBm for 54Mbps

3.2.3 IEEE 802.11n Section

	Feature	Detailed Description
3.2.3.1	Standard	● IEEE 802.11n
3.2.3.2	Radio and Modulation Type	● BPSK , QPSK , 16QAM ,64QAM with OFDM
3.2.3.3	Operating Frequency	● 2400 ～ 2483.5MHz ISM band ● Channel Frequency for HT20: 2412～2472MHZ ● Channel Frequency for HT40: 2422～2462MHZ
3.2.3.4	Data Rate(Mbps)	● TX/RX: MCS0 ～MCS7
3.2.3.5	Media Access	● CSMA/CA with ACK

MCS	GI=800ns		GI=400ns	
	20MHz	40MHz	20MHz	40MHz
0	6.5	13.5	7.2	15
1	13	27	14.4	30
2	19.5	40.5	21.7	45
3	26	54	28.9	60
4	39	81	43.3	90
5	52	108	57.8	120
6	58.5	121.5	65.0	135
7	65	135	72.2	150

	Protocol	
3.2.3.6	Transmitter Output Power at Antenna Connector	● Typical RF Output Power(tolerance±2dB) at each RF chain, Data Rate and at room Temp. 25degree C HT 20 ● 16±2dBm at MCS 0,1 ● 16±2dBm at MCS 2,3 ● 15±2dBm at MCS 4,5 ● 13±2dBm at MCS 6,7 HT 40 ● 16±2dBm at MCS 0,1 ● 16±2dBm at MCS 2,3 ● 15±2dBm at MCS 4,5 ● 13±2dBm at MCS 6,7
3.2.3.7	Receiver Sensitivity at Antenna Connector	● Typical Sensitivity at Which Frame(1000-byte PDUs)Error Rate=10% HT20 ● -82dBm at MCS0 ● -79dBm at MCS1 ● -77dBm at MCS2 ● -74dBm at MCS3 ● -70dBm at MCS4 ● -66dBm at MCS5 ● -65dBm at MCS6 ● -64dBm at MCS7 HT40 ● -79dBm at MCS0 ● -76dBm at MCS1 ● -74dBm at MCS2 ● -71dBm at MCS3 ● -67dBm at MCS4 ● -63dBm at MCS5 ● -62dBm at MCS6 ● -61dBm at MCS7

4. Electrical and Thermal Characteristics

4.1 Temperature Limit Rating

Parameter	Minimum	Maximum	Units
Storage Temperature	-40	+80	□ ℃
Ambient Operating Temperature	0	60	□ ℃
Junction Temperature	0	125	□ ℃

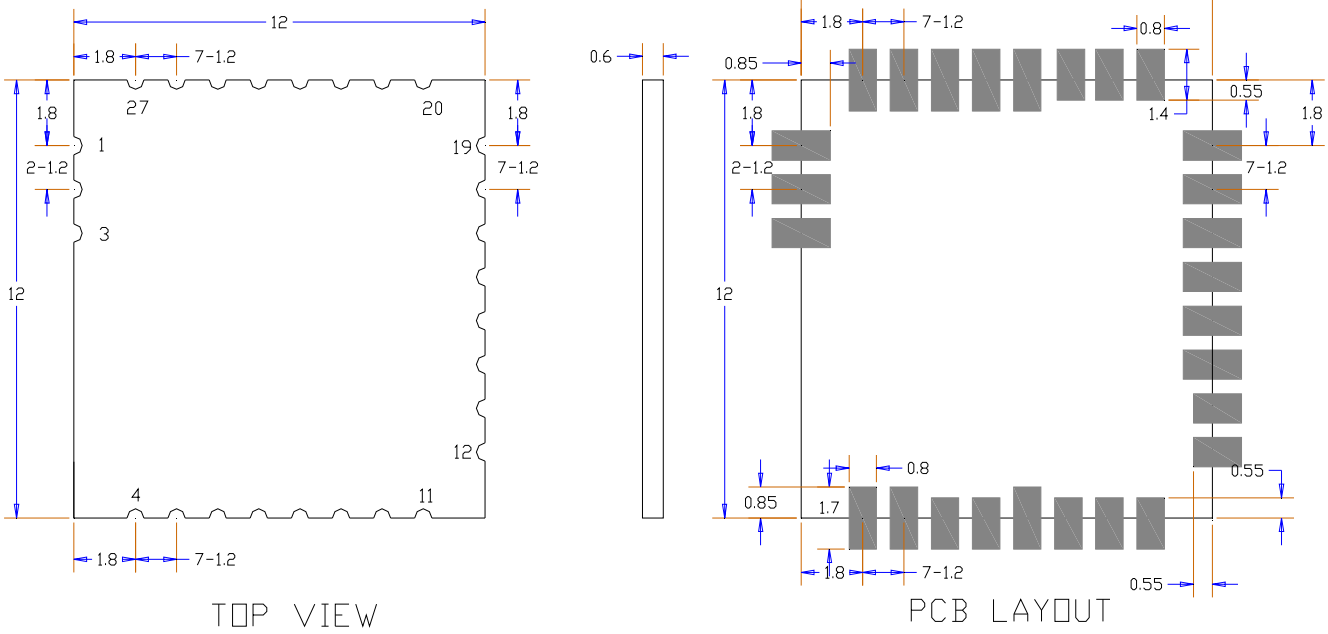
4.2 General Section

	Feature	Detailed Description
4.2.1	Antenna Type	● external antenna
4.2.2	Operating Voltage	● 3.3V±10%
4.2.3	Current Consumption	● ＜120mA@RX ● ＜300mA@TX

4.3 Mechanical Requirements

	Feature	Detailed Description
4.3.1	Length	● 12mm
4.3.2	Width	● 12mm
4.3.3	Height	● 0.6mm(PCB)

4.4 Mechanical Dimensions



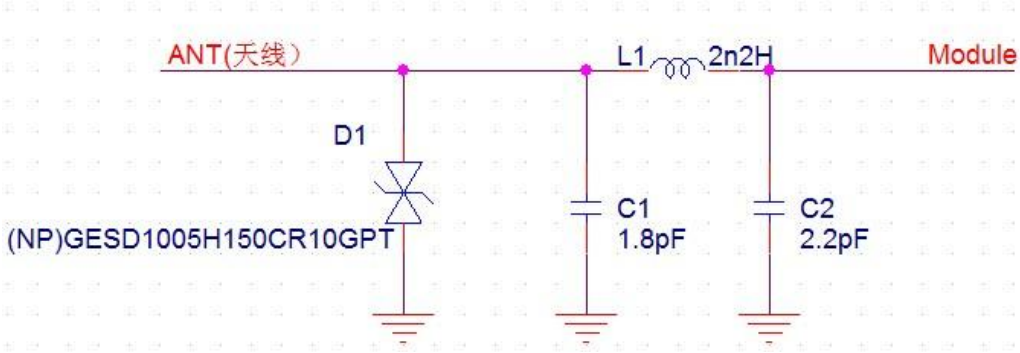
*** TOLERANCES ARE +/-0.3mm UNLESS OTHERWISE SPECIFIED**

*** UNITE :mm**

4.5 Connector Pin Definitions

Pin	Definition	Pin	Definition
1	GND	15	UART_Log_TXD
2	RF OUT	16	UART_RX
3	GND	17	UART_TX
4	GND	18	SWD_CLK
5	VCC33	19	SWD_DATA
6	nc	20	nc
7	nc	21	nc
8	VBAT_MEAS	22	nc
9	nc	23	Wake pin
10	nc	24	GND
11	nc	25	GND
12	nc	26	nc
13	nc	27	nc
14	UART_Log_RXD	/	/

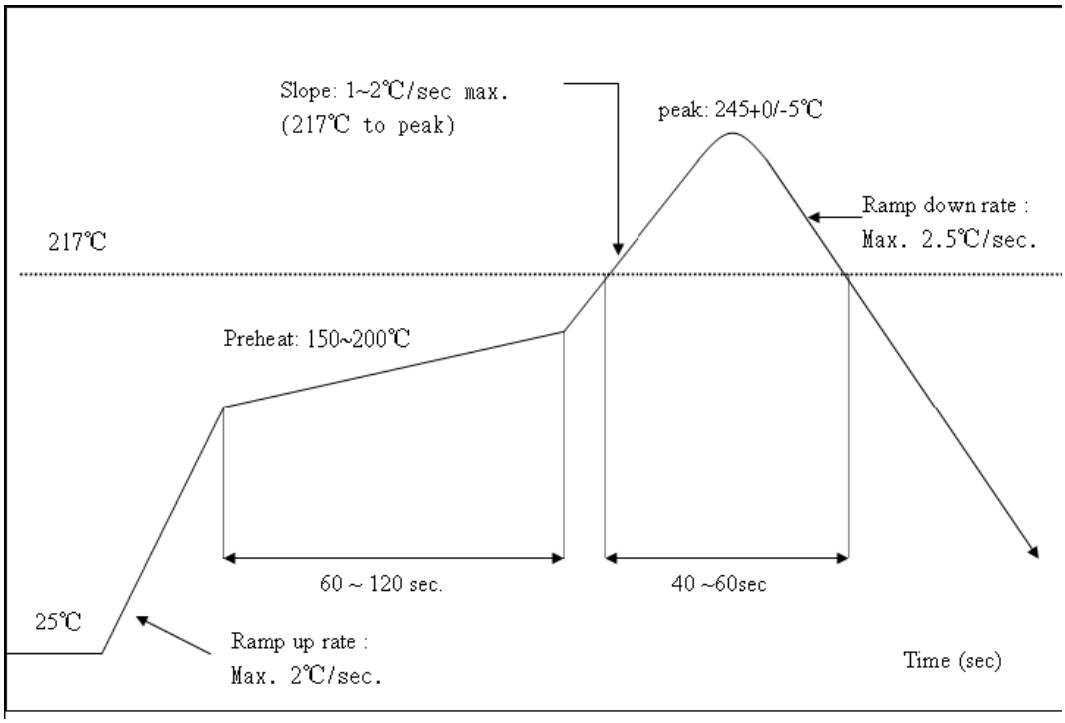
5. WIFI ANT MATCHING



1、主板上天线匹配电路**C1**、**C2**、**L1**请提前预留出来，具体值根据实际测试进行调整
2、主板的**RF**输入部分请保证**50**欧姆阻抗，不建议有**90**度的走线，线长不超过**20mm**
3、强烈建议在焊天线端加一个 **TVS** 管，防止 **ESD** 静电打坏 **WIFI** 模组（如上图参考电路）

6. Recommended Reflow Profile

Referred to IPC/JEDEC standard. Peak Temperature : <250°C Number of Times : ≤ 2 times



7. Wireless module before the SMT note:

1.When customers Open stencil must be sure the hole bigger to the Wireless module plate, please press 1 to 1 and 0.7 mm is widened to open outward, the thickness of 0.12 mm.
2.Can't get the wifi module bare hands when needs, must we wear the gloves and static ring.
3.The furnace temperature according to the size of the customer the mainboard ,generally like to stick on a tablet standard temperature of 250 +/- 5,can do 260+/- 5.

Storage and use Wifi module control should pay attention to the following matters:

- **Module of the storage life of vacuum packaging：**

1-1.Storage life:12 months. Storage conditions:<40℃. Relative humidity:<90%R.H.
1-2.After this bag is opened , devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing must be :
1-3.Check the humidity card :stored at≦ 20%RH.If :30%~40%(pink)or greater than 40%(red). Labeling module has moisture absorption.
① Mounted within 168 hours at factory conditions of: t≦ 30%℃，≦ 60%R.H.
② Once opened, the workshop the preservation of life for 168 hours.
1-4.If baking is required, devices may be baked for:
① Modules must be to remove module moisture problem.
② Baking temperature: 125 ℃, 8 hours.
③ After baking, put proper amount of desiccant to seal packages.
1-5. The actual number of module vacuum packing which is based on the actual number of packages to the customer requirements,
2.Module reel packaging items as follows.
2-1.Storage life:12 months. Storage conditions:<40℃. Relative humidity:<90%R.H.
2-2.Module apart packing after 168 hours，To launch patch need to bake, to remove the module hygroscopic, baking temperature conditions：125℃, 8hours.
2-3. The actual number of module reel packing which is based on the actual number of packages to the customer requirements,
3.Module pallet packaging items as follows：
3-1.Storage life：3 months. Storage conditions:<40℃. Relative humidity:<90%R.H.
3-2.Module if not used within 48 hours, before launch the need for baking, baking temperature: 125 ℃, 8 hours.
3-3. Pallet packaging each plate is 100 PCS. The actual number of module pallet packing which is based on the actual number of packages to the customer requirements.