

HK NATER TECH LIMITED

Product Specification

Module Name	RL-UM02SP-8192DU-V1.3		
Module Description	RTL8192DU WiFi Module With I-pex Connectors Or SMD		
	IEEE 802.11a/b/g/n 2T2R USB Interface Dual-frequency		
Reversion	V2.0		
Date			
Nater Approve Field			
Engineer	QC	Sales	
Cruz.Zeng	Mike.Liu	Lingo.Wang 13510620050	
Customer Approve Field			
Engineer	Purchasing	Manufactory	QC

Customer:

Add:

Tel:

Fax:

Attn:

E-mail:

Provider: NATER TECH

Add: 2F,NO.27,2 Baomin Rd.,Baoan Dist.SZ City,China

Tel: +86-755-61522172/13510620050

Fax: +86-755-85250145

Attn: Lingo

E-mail: hsdgood@163.com

1.Overview

General CMOS MAC, Baseband PHY, and RF in a single chip for IEEE 802.11a/b/g/n compatible WLAN Complete 802.11n MIMO solution for 2.4GHz and 5GHz band 2x2 MIMO technology for extended reception robustness and exceptional throughput Maximum PHY data rate up to 144.4 Mbps using 20MHz bandwidth, 300Mbps using 40MHz bandwidth Complies with 802.11n specification Backward compatible with 802.11a/b/g devices while operating at 802.11n data rates Host Interface Complies with USB 2.0 Standards Supported IEEE 802.11a/b/g/n compatible WLAN IEEE 802.11e QoS Enhancement (WMM) IEEE 802.11i (WPA, WPA2). Open, shared key, and pair-wise key authentication services IEEE 802.11h TPC, Spectrum Measurement IEEE 802.11k Radio Resource Measurement WAPI (Wireless Authentication Privacy Infrastructure) certified. PHY Features IEEE 802.11n MIMO OFDM Two Transmit and Two Receive paths (2T2R) 20MHz and 40MHz bandwidth transmission Supports 2.4GHz and 5GHz band channels Short Guard Interval (400ns) DSSS with DBPSK and DQPSK, CCK modulation with long and short preamble OFDM with BPSK, QPSK, 16QAM, and 64QAM modulation. Convolutional Coding Rate: 1/2, 2/3, 3/4, and 5/6 MAC Features Frame aggregation for increased MAC efficiency (A-MSDU, A-MPDU)	Low latency immediate High-Throughput Block Acknowledgement (HT-BA) Long NAV for media reservation with CF-End for NAV release PHY-level spoofing to enhance legacy compatibility MIMO power saving mechanism Channel management and co-existence Multiple BSSID feature allows the RTL8192DU-VC to assume multiple MAC identities when used as a wireless bridge Supports Wake-On-WLAN via Magic Packet and Wake-up frame Transmit Opportunity (TXOP) Short Inter-Frame Space (SIFS) bursting for higher multimedia bandwidth Dual MAC architecture allows dual band or dual network access, or operation as a station and an AP concurrently WiFi Direct supports wireless peer to peer applications Peripheral Interfaces General Purpose Input/Output (12 pins) Three configurable LED pins Configurable Bluetooth Coexistence Interface Maximum data rate 54Mbps in 802.11a/g and 300Mbps in 802.11n OFDM receive diversity with MRC using up to 2 receive paths. Switch diversity used for DSSS/CCK Hardware antenna diversity Selectable digital transmit and receiver FIR filters Programmable scaling in transmitter and receiver to trade quantization noise against increased probability of clipping Fast receiver Automatic Gain Control (AGC) On-chip ADC and DAC QFN76 9x9mm package
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2.General Specification

Model	RL-UM02SP-8192DU-V1.3
Product Name	WLAN 11a/b/g/n USB module
Major Chipset	Realtek RTL8192DU
Standard	IEEE802.11n current draft、IEEE 802.11g、IEEE 802.11b、IEEE 802.11a、IEEE 802.3、IEEE 802.3u、IEEE 802.3x
Data Transfer Rate	1,2,5.5,6,11,12,18,22,24,30,36,48,54,60,90,120 and maximum of 300Mbps
Modulation Method	BPSK, QPSK, CCK and OFDM (BPSK/QPSK/16-QAM/ 64-QAM)
Frequency Band	2.4/5.8GHz
Spread Spectrum	IEEE 802.11a: ISM(Industrial Scientific Medical) IEEE 802.11b: DSSS (Direct Sequence Spread Spectrum) IEEE 802.11g/n:OFDM (Orthogonal Frequency Division Multiplexing)
Operation Mode	Ad hoc, Infrastructure
Operation Range	Up to 180 meters in open space
OS Support	Windows 2000,XP32-64,Vista 32/64,Win7 32/64,Linux,Mac, Android, WIN CE
Security	WEP, TKIP, AES, WPA, WPA2
Interface	USB 2.0
Power Consumption	DC3.3V Power consumption in the normal Internet is 312mA
Operating Temperature	-10 ~ +70° C ambient temperature
Storage Temperature	-10 ~ 70°C ambient temperature
Humidity	5 to 90 % maximum (non-condensing)
Dimension	27.0 x 17.8537 x 1.9mm (LxWxH) +-0.2MM

3. Electrical Specifications

1) DC Characteristics

Module	Voltage	Current Consumption (linking)
RL-UM02SP-8192DU-V1.3	3.3V 2.4G	260MA (上网或者看电影时的功耗)
	3.3V 5G	356MA (上网或者看电影时的功耗)

2) 2.4G RF Characteristics for IEEE802.11b (11Mbps mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11b (Data Rate 11M CCK)			
Data Rate	11, 5.5, 2, 1 Mbps			
Channel frequency	2412 ~ 2484 MHz			
RX (per $\leq$ -85dBm@8%)	-85 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (17 $\pm$ 2 dBm)		17		dBm
EVM (<-18)		-18		

3) 2.4G RF Characteristics for IEEE802.11g (54Mbps mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11g (Data Rate 54M OFDM)			
Data Rate	54, 48, 36, 24, 18, 12, 9, 6 Mbps			
Channel frequency	2412 ~ 2484 MHz			
RX (per $\leq$ -70dBm@10%)	-70 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (14 $\pm$ 2 dBm)		14		dBm
EVM (<-28)		-28		dB

4) 2.4G RF Characteristics for IEEE802.11n (MCS 0 to 7 for HT20MHz)

Items	Contents			
Specification	IEEE802.11n (MCS 0 to 7 for HT20MHz)			
Data Rate	65 Mbps			
Channel frequency	2412 ~ 2484 MHz			
RX (per $\leq$ -65dBm@10%)	-65 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (13 $\pm$ 2 dBm)		13		dBm
EVM (<-28)		-28		dB

5) 2.4G RF Characteristics for IEEE802.11n (MCS 0 to 7 for HT40MHz)

Items	Contents			
Specification	IEEE802.11n (MCS 0 to 7 for HT40MHz)			
Data Rate	135 Mbps			
Channel frequency	2412 ~ 2484 MHz			
RX (per≤-65dBm@10%)	-65 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (13±2 dBm)		13		dBm
EVM (<-28)		-28		dB

6) RF Characteristics for 5G (Data Rate 54M OFDM))

Items	Contents			
Specification	5G (Data Rate 54M OFDM)			
Data Rate	54 Mbps			
Channel frequency	5180 ~ 5825 MHz			
RX (per≤-65dBm@10%)	-65 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (12±2 dBm)		12		dBm
EVM (<-28)		-28		dB

7) RF Characteristics for 5G (HT20_MCS7))

Items	Contents			
Specification	5G (HT20_MCS7)			
Channel frequency	5180 ~ 5825 MHz			
RX (per≤-65dBm@10%)	-65 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (12±2 dBm)		12		dBm
EVM (<-28)		-28		dB

8) RF Characteristics for 5G (HT40_MCS7))

Items	Contents			
Specification	5G (HT40_MCS7)			
Channel frequency	5180 ~ 5825 MHz			
RX (per≤-65dBm@10%)	-65 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (12±2 dBm)		12		dBm
EVM (<-28)		-28		dB

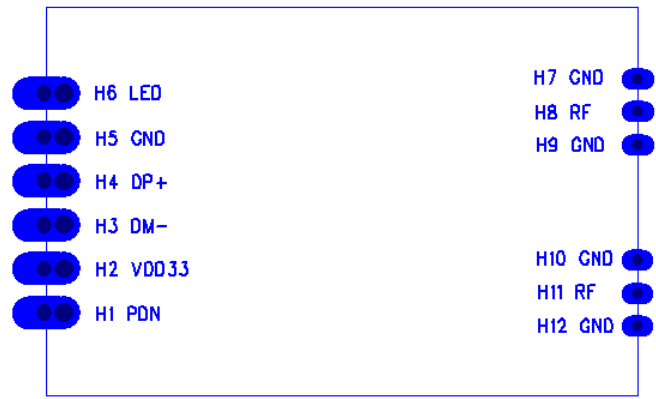
4.Mechanical

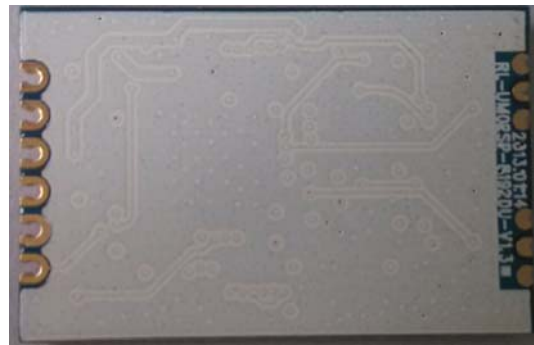
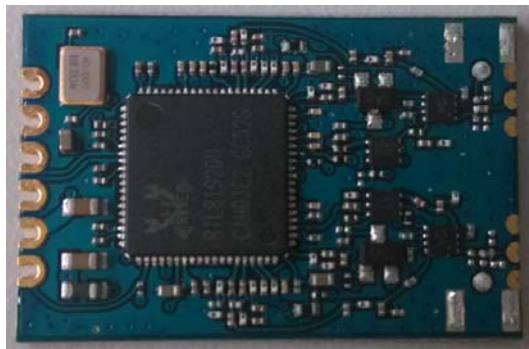
Dimensions (mm)	Length	Width	Height
	27.0 (Tolerance:±0.2mm)	17.8537 (Tolerance:±0.2mm)	1.9 (Tolerance:±0.2mm)



5.MODULE PIN ASSIGNMENT

Pin	Function	Pin	Function
H1	PDN	H7	GND
H2	VDD33	H8	RF
H3	DM-	H9	GND
H4	DP+	H10	GND
H5	GND	H11	RF
H6	LED	H12	GND





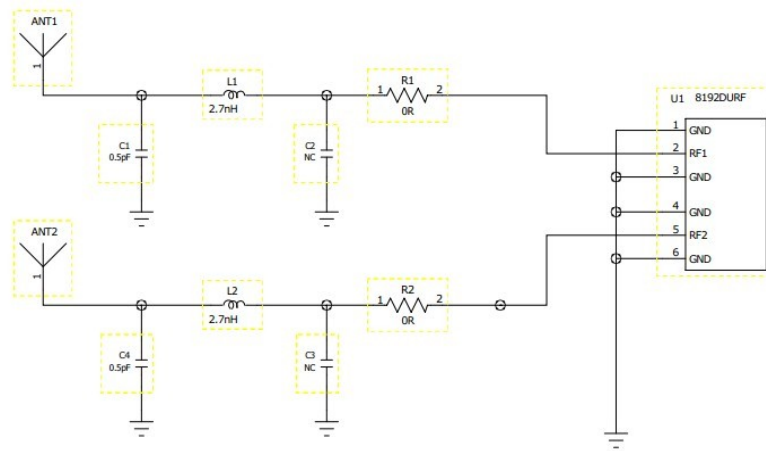
6.DC Characteristics

Symbol	Parameter	Minimum	Typical	Maximum	Units
VD15A, VD15D	1.5V Supply Voltage	1.4	1.5	1.6	V
IDD33	3.3V Rating Current	-	-	500	mA

7.Power Consumption

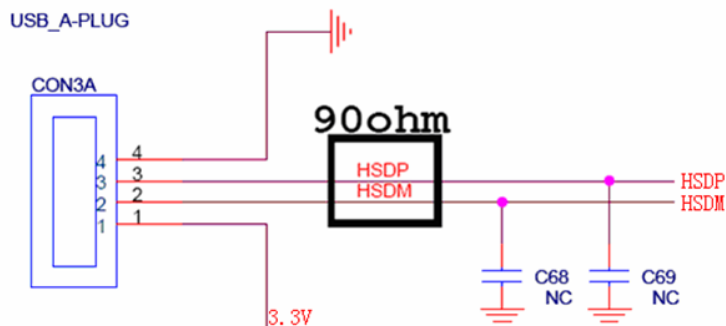
Parameters	Sym	Conditions	Min	Typ	Max	Unit
V Supply Voltage	Vc3.3		3.1	3.3	3.5	V
1.5V Supply Voltage	Vc15		1.4	1.5	1.6	V
Receiving Tests the biggest receive						
3.3V Current Consumption	Icc3.3 rx	H40MCS15		189		MA
3.3V Current Consumption	Icc3.3 rx	OFDM 54M		230		MA
Transmission Biggest transmission test						
3.3V Current Consumption	Icc3.3 tx	H40MCS15		286		MA
3.3V Current Consumption	Icc3.3 tx	OFDM 54M		312		MA
The depth waits for an opportunity	Icc3.3 tx/rx			13		MA
Deep sleep	Ic3.3 tx/rx			13		MA

8.WIFI RF Circuit reference picture



R1 R2:0R L1 L2:2.7nH C1 C4:0.5pF

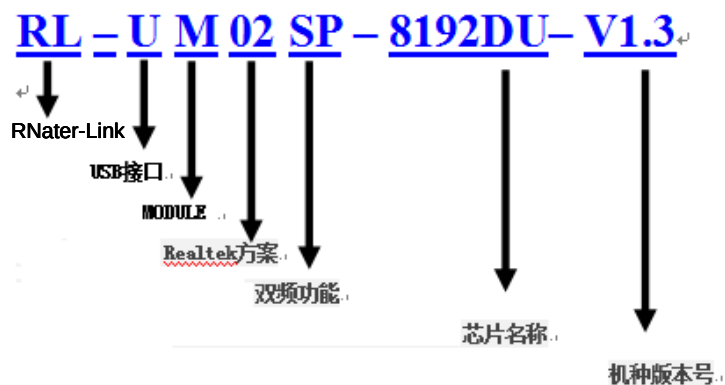
9.USB interface electrical characteristics



Two root go line do difference, but also required to make 90 Ohm the impedance test

建议在电源输入端留一个电源开关，每次开关卡时可以做一个上电断电的作用。可以使WIFI复位。就不会有打开WIFI出错的现象了。

10. Screen printing instructions

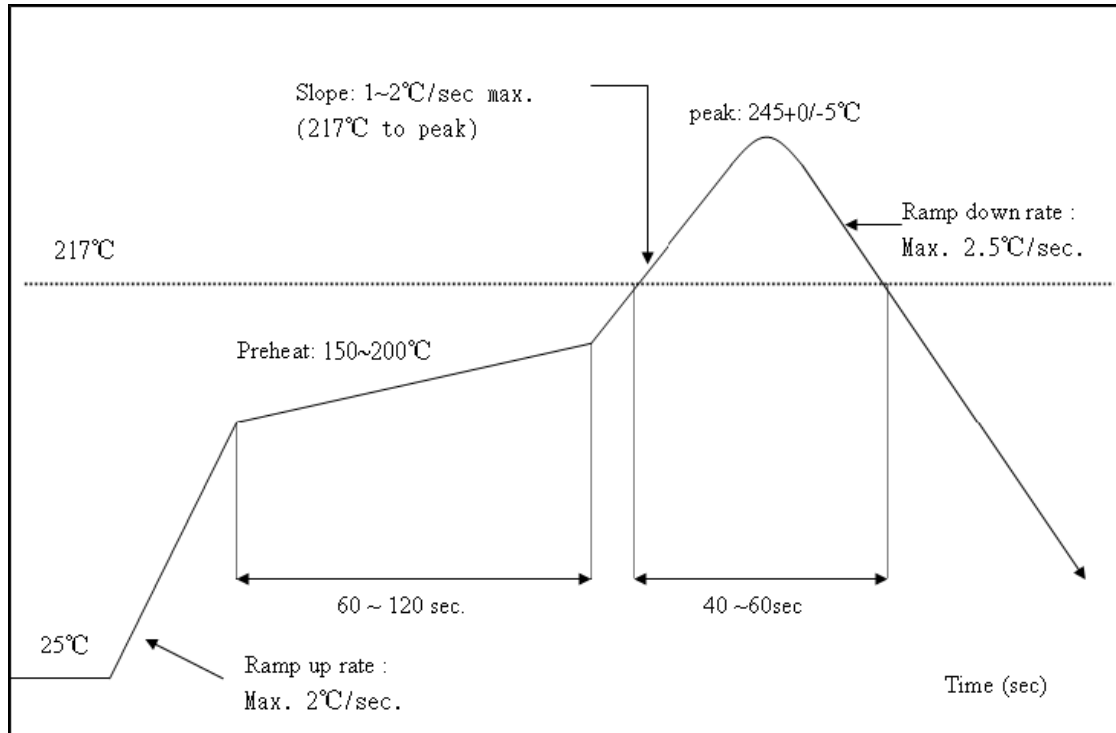


Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : $<250^{\circ}\text{C}$

Number of Times : ≤ 2 times



ENVIRONMENTAL

Operating

Operating Temperature: 0°C to +70 °C
Relative Humidity: 5-90% (non-condensing)

Storage

Temperature: -40°C to +80°C (non-operating)
Relevant Humidity: 5-95% (non-condensing)

MTBF caculation

Over 150,000hours

13.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: 1.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 $\leq 20\%RH$.If :30%~40%(pink)or greater than 40%(red).Labeling module has moisture absorption. ① Mounthed within 168 hours at factory conditions of: $t \leq 30^{\circ}C$, $\leq 60\%R.H$. 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.Module vacuum packing 2000 PCS per disc. 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.Reel packing 2000 PCS or 1000 PCS per disc. 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 to 1000 PCS or 2000 PCS shipment.	13.Wifi 模块贴片装机前注意事项: 1.客户在开钢网时一定要将 wifi 模块焊盘的孔开大, 请按 1 比 1 再向外扩大 0.7mm 比例开钢网, 厚度按 0.12mm. 2.有需要拿 wifi 模块时不可以光手去拿, 一定要戴上手套以及静电环. 3.过炉温度要根据客户主板的大小而定, 一般像平板电脑上的标准温度为250+-5°, 也可以做到260+-5° Wifi 模块储存及使用管制应注意事项如下: 1.模块的真空包装之储存期限: 1-1.保存期限: 12个月, 储存环境条件: 温度在: <40℃, 相对湿度: <90%R.H. 1-2.模块包装被拆后, SMT 组装之时限: 1-3.检查湿度卡: 显示值应小于30% (蓝色), 如: 30%~40%(粉红色) 或者大于40% (红色) 表示模块已吸湿气. ① 工厂环境温度湿度管制: $\leq 30^{\circ}C$, $\leq 60\%R.H$. ② 拆封后, 车间的保存寿命为 168 小时. 1-4.如在拆封后的 168 个小时内未使用完, 需要烘烤, 烘烤条件如下: ① 模块须重新烘烤, 以除去模块吸湿问题. ② 烘烤温度条件: 125℃, 8 小时. ③ 烘烤后, 放入适量的干燥剂再密封包装. 1-5.模块真空包装每盘 2000pcs, 真空包装图片<1> 2.模块卷盘包装事项如下: 2-1.保存期限: 12个月, 储存环境条件: 温度在: <40℃, 相对湿度: <90%R.H. 2-2.模块拆开包装168小时后, 如要上线贴片需要重新烘烤, 以除去模块吸湿问题, 烘烤温度条件25℃, 8小时。 2-3.卷盘包装标准为每盘 2000pcs, 也可以 1000pcs. 3.模块托盘包装事项如下: 3-1.保存期限: 3个月, 储存环境条件: 温度在: <40℃, 相对湿度: <90%R.H. 3-2.模块如在 48 小时内未使用, 在上线之前需要进行烘烤, 烘烤温度条件: 125℃, 8 小时。 3-3.托盘包装每盘为 100pcs, 以 1000pcs 或 2000pcs 出货.
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