Pittasoft Co., Ltd.

Operation description

The SAV837GW includes a 64-bit dual-core RISC processor, advanced Image Signal Processor(ISP), high performance video codec, Intelligence Processing Unit(IPU) as well as high speed I/O interfaces like USB, Ethernet, and SATA.
These features in combination make the SAV837GW an ideal solution that facilities design and development of high-performance, high-picture-quality, and low-cost products.
X-tal(24.000MHz) is a reference clock for AP.
This product has many kinds of LDOs, DC-DC converters and Load Switch ICs.
Main DC-DC makes 5.0V output with DC12~24V input and supplies it to EDLC(Super-Capacitor, 5F/5.4~6.0V) for voltage back-up and other power ICs for make various level voltage.
It use three Load Switch ICs for supply voltage to each external camera unit.
It controls WCT0VR1001S (Wi-Fi & Bluetooth module), Real-time Clock with X-tal(32.768kHz), SerDes IC, LEDs, Buzzer, and micro-SD Card.
Wi-Fi & Bluetooth combo module meets IEEE802.11a/b/g/n/ac and Bluetooth 2.1/4.2.

PRODUCT SPECIFICATION

Version 1.1

IEEE 802.11a/b/g/n/ac Wi-Fi 1T1R / Bluetooth V2.1+EDR/4.2 Combo Chip over USB v2.0 interface

Model Number: WCT0VR1001S

(REALTEK:RTL8821CU-CG)

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

拟制 DESIGN	审核 CHECK	批准 APPROVAL
李奕辉	唐红君	陈宇科
2019-07-19	2019-07-19	2019-07-19

惠 州 高 盛 达 科 技 有 限 公 司

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Document revision history

Revision	Date	Approved by	Remarks
Version 1.0	2019-06-14		Draft
Version 1.1	2019-07-19		Update packaging information

目录

1. General Description

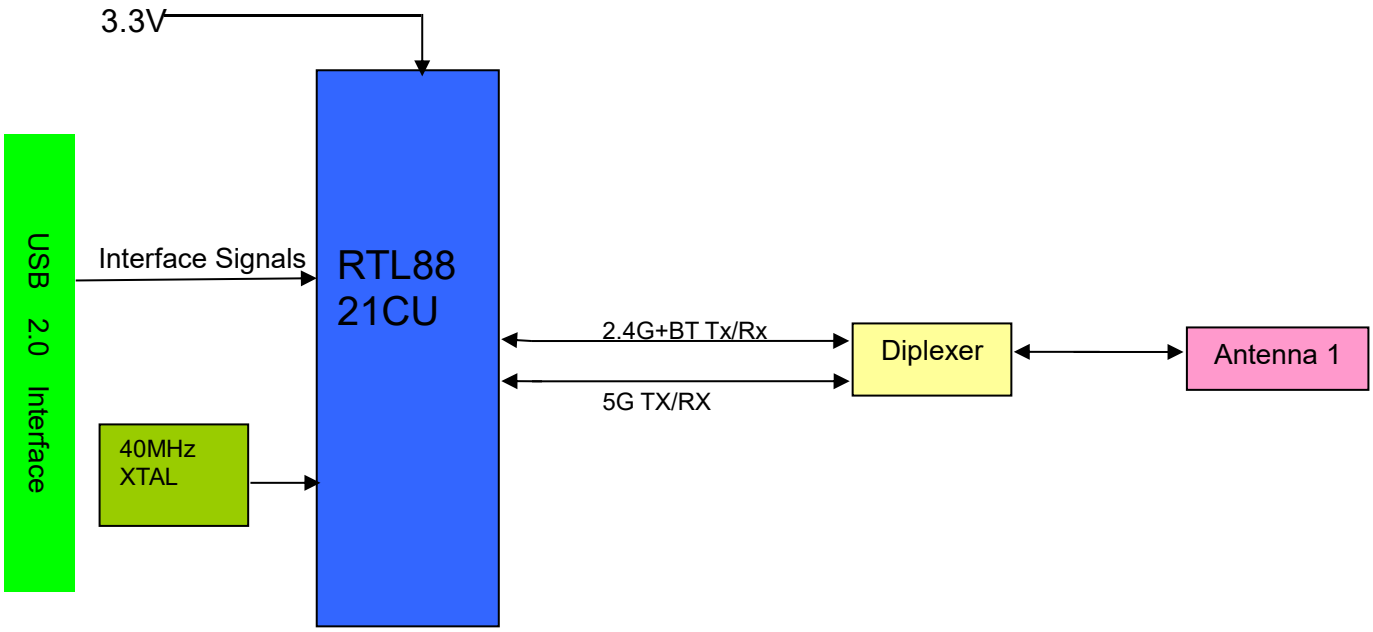
This document is to specify the product requirements for 802.11 **a/b/g/n/ac** USB Module. This Card is based on REALTEK RTL8821CU chipset that complied with IEEE 802.11ac standard from 5.15~5.825GHz,and it is also backward complied with IEEE 802.11a/n standard from 5.15~5.825GHz and IEEE 802.11b/g/n standard from 2.4~2.5GHz. It can be used to provide up to 54Mbps for IEEE 802.11a and IEEE 802.11g, 11Mbps for IEEE 802.11b and 150Mbps for IEEE 802.11n and 433.3Mbps for IEEE 802.11ac to connect your wireless LAN. The Bluetooth part supports 4.2

2. Features

- Compatible with IEEE 802.11a standard to provide wireless 54Mbps data rate.
- 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.
- Compatible with IEEE 802.11ac standard to provide wireless 433.3Mbps data rate.
- Support 20MHz, 40MHz bandwidth in 2.4GHz band
- Support 20MHz, 40MHz, 80MHz bandwidth in 5GHz band
- Support STBC, LDPC
- Security support for WPA/WPA2
- QoS support of WMM
- Operation at 2.4~2.5GHz and 5.15~5.825GHz frequency band to meet worldwide regulations
- Supports Bluetooth V4.2+HS, BLE and be backwards compatible with Bluetooth 1.2, 2.X+ enhance data rate.
- High speed USB 2.0 interface
- ROHS compliant

3. Application Diagrams

3.1 Functional Block Diagram



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 and CCK with DSSS
3.2.1.3	Operating Frequency	• 2400 ～ 2483.5MHz ISM band
3.2.1.4	Channel Numbers	• 13 channels for Worldwide
3.2.1.5	Data Rate	• at most 11Mbps
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,and at room Temp. 25℃ • 16±2 dBm at 11Mbps
3.2.1.8	Receiver Sensitivity at Antenna Connector	• Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) Error Rate<8% at room Temp 25℃ • -83 dBm 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	● 13 channels for Worldwide
3.2.2.5	Data Rate	● at most 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 at each RF chain, at room Temp. 25℃ ● 14±2 dBm at 54Mbps
3.2.2.8	Receiver Sensitivity at Antenna Connector	● Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) Error Rate<10% at room Temp 25℃ ● -71 dBm for 54Mbps

3.2.3 IEEE 802.11a Section

	Feature	Detailed Description
3.2.3.1	Standard	● IEEE 802.11a
3.2.3.2	Radio and Modulation Type	● QPSK , BPSK , 16QAM ,64QAM with OFDM
3.2.3.3	Operating Frequency	● 5.15~5.25GHz ● 5.25~5.35GHz ● 5.47~5.725GHz ● 5.725~5.825GHz
3.2.3.4	Data Rate	● at most 54Mbps
3.2.3.5	Media Access Protocol	● CSMA/CA with ACK
3.2.3.6	Transmitter Output Power at Antenna Connector	● Typical RF Output Power at each RF chain, at room Temp. 25℃ ● 13±2 dBm at 54Mbps
3.2.3.7	Receiver Sensitivity at Antenna Connector	● Typical Sensitivity at each RF chain. @Frame (1000-byte PDUs) Error Rate<10% at room Temp 25℃ ● -71 dBm for 54Mbps

3.2.4 IEEE 802.11n Section

	Feature	Detailed Description	
3.2.4.1	Standard	● IEEE 802.11n	
3.2.4.2	Radio and Modulation Type	● BPSK , QPSK , 16QAM ,64QAM with OFDM	
3.2.4.3	Operating Frequency	● 2.4GHz :2400 ~ 2483.5MHz for ISM band 5GHz : 5.15~5.25GHz；5.25~5.35GHz； 5.47~5.725GHz；5.725~5.825GHz；	
3.2.4.4	Data Rate	at most 150 Mbps	
3.2.4.5	Media Access Protocol	● CSMA/CA with ACK	
3.2.4.6	Transmitter Output Power at Antenna Connector	● Typical RF Output Power at each RF chain,and at roomTemp. 25℃	
		● 2.4GHz Band/HT20 13±2dBm at MCS7	● 2.4GHz Band/HT40 13±2dBm at MCS7
		● 5GHz Band/HT20 12±2dBm at MCS7	● 5GHz Band/HT40 12±2dBm at MCS7
3.2.4.7	Receiver Sensitivity at Antenna Connector	Typical Sensitivity at each RF chain. @Frame(1000-byte PDUs)Error Rate=10% and at room Temp. 25℃	
		2.4GHz Band/HT20 ●-68dBm at MCS7	2.4GHz Band/HT40 ● -66dBm at MCS7
		5GHz Band/HT20 ● -68dBmat MCS7	5GHz Band/HT40 ● -66dBm at MCS7

3.2.5 IEEE 802.11ac Section

	Feature	Detailed Description
3.2.5.1	Standard	● IEEE 802.11ac
3.2.5.2	Radio and Modulation Type	● QPSK , BPSK , 16QAM ,64QAM,256QAM with OFDM
3.2.5.3	Operating Frequency	● 5GHz : 5.15~5.25GHz； 5.25~5.35GHz； 5.47~5.725GHz； 5.725~5.825GHz；
3.2.5.4	Data Rate	● at most 433.3 Mbps
3.2.5.5	Media Access Protocol	● CSMA/CA with ACK
3.2.5.6	Transmitter Output Power at Antenna Connector	● Typical RF Output Power at each RF chain, at room Temp. 25℃ ● 9±2dBm HT80
3.2.5.7	Receiver Sensitivity at Antenna Connector	Typical Sensitivity at each RF chain. @Frame(1000-byte PDUs)Error Rate<10% at room Temp 25℃

5GHz Band / HT20	5GHz Band / HT40
● -64dBm at MCS8	● -58dBm at MCS9
5GHz Band / HT80 ● -55dBm at MCS9	

3.2.6Bluetooth Section

Feather	Description		
General specification			
Bluetooth standard	Bluetooth V2.1/4.2		
Frequency band	2402MHz-2480MHz		
Channel Numbers	79 channels for BDR+EDR 40 channels for BLE		
Modulation	GFSK, π/4-DQPSK and 8DPSK		
RF specification			
	Min（dBm）	Type（dBm）	Max（dBm）
BDR Output Power		4	
BLE Output Power		4	
Sensitive @BER=0.1% FOR GFSK(1Mbps)		-86	
Sensitive @BER=0.01% FOR π/4-DQPSK(2Mbps)		-86	
Sensitive @BER=0.01% FOR 8DPSK(3Mbps)		-80	
Maximum input level	GFSK(1Mbps) -20dBm		
	π/4-DQPSK(2Mbps) -20dBm		
	8DQPSK(3Mbps) -20dBm		
Sensitive @PER=30.8% FOR BLE		-90	

4. Electrical and Thermal Characteristics

4.1 Temperature Limit Ratings

Parameter	Minimum	Maximum	Units
Storage Temperature	-40	+80	C
Ambient Operating Temperature	0	70	C
Junction Temperature	0	125	C

4.2 General Section

	Feature	Detailed Description
4.2.1	Antenna Type	● PAD(WIFI and BT)
4.2.2	Operating Voltage	● 3.3V±10%
4.2.3	Current Consumption	● ＜120mA@RX ● ＜500mA@TX
4.2.4	Form Factor and Interface	● High Speed USB2.0 Interface

4.3 Software

Driver	Windows, Linux,Android
Security	WPA, WPA2

4.4 EEPROM Information

BT

Vendor ID	default
Product ID	default

WiFi

Reg Domain	Worldwide 2.4G/5G Read from registry；Control by driver
	——
Vendor ID	default
Product ID	default

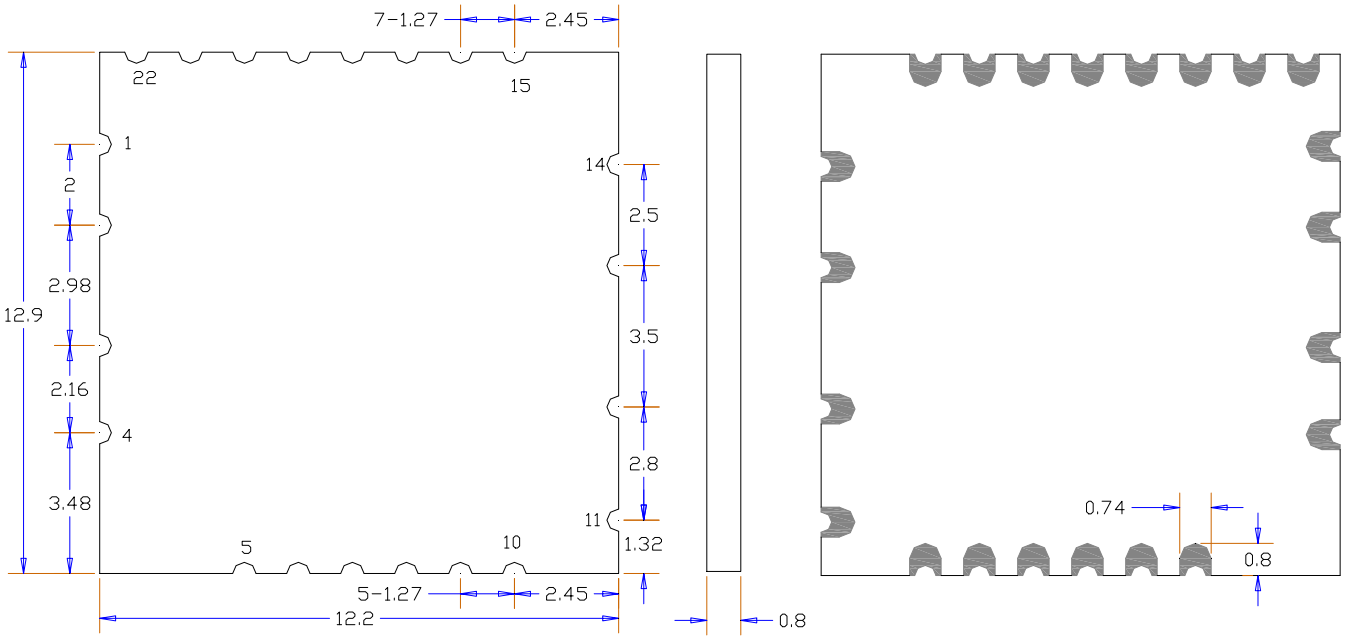
4.5 GPIO Characteristics

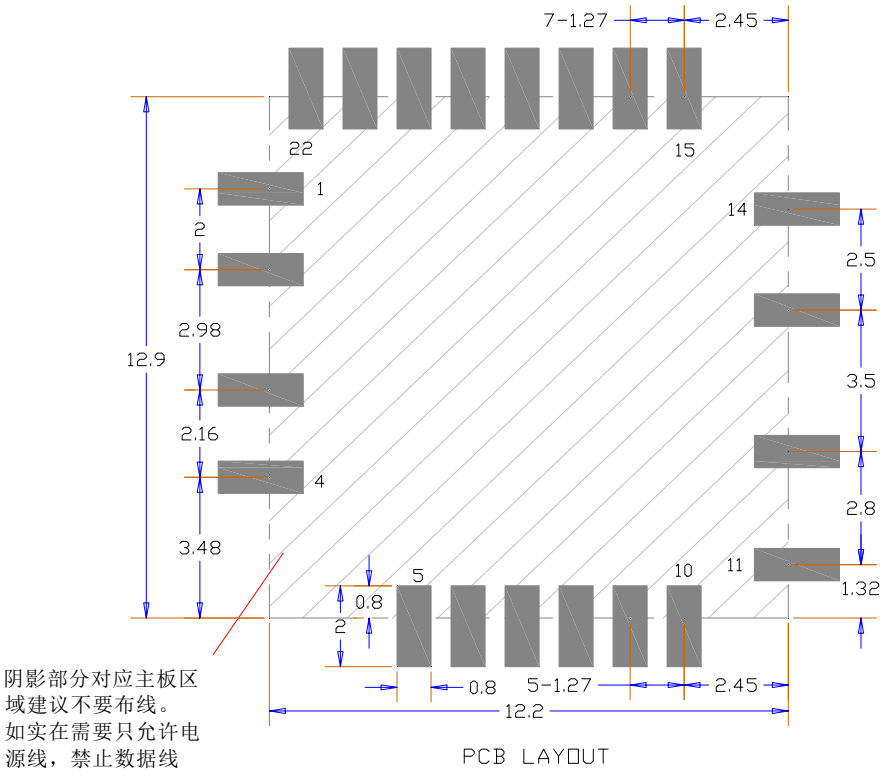
Symbol	Parameter	Min	TYPE	Max	Unit
V_{IL}	Input Low Voltage	-	0	0.9	V
V_{IH}	Input High Voltage	2.0	3.3	3.6	V
V_{OL}	Output Low Voltage	0	-	0.33	V
V_{OH}	Output High Voltage	2.97	-	3.3	V

4.6 Mechanical Dimensions

	Feature	Detailed Description
4.6.1	Length	● 12.2mm
4.6.2	Width	● 12.9mm
4.6.3	Height	● MAX 4.0mm(PCB 0.8mm)
4.6.4	Weight	● 0.5g

5. Mechanical Dimensions





尺寸误差范围：

长度(mm)	误差(mm)
0-5	±0.15
5-10	±0.20
10-50	±0.30

6. PIN Description

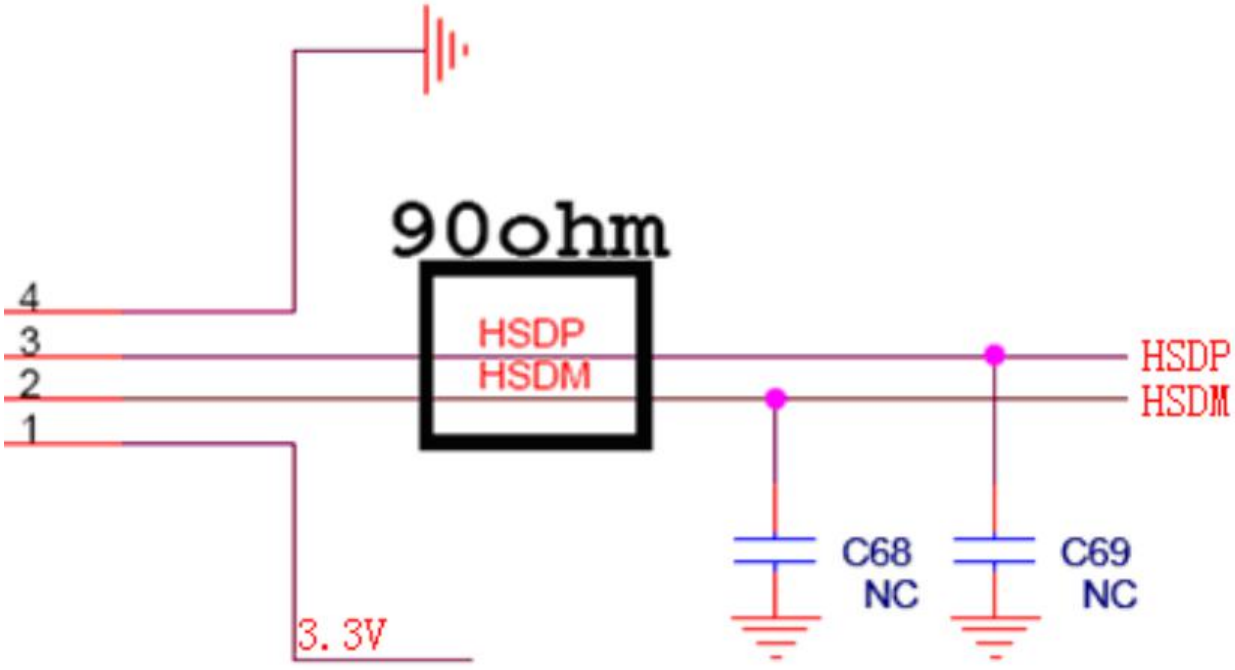
PIN	SYMBOL	DESCRIPTION	TYPE	PIN	SYMBOL	DESCRIPTION	TYPE
1	GND	GND	/	12	WL_USB_DN	USB D-	I/O
2	RF0	TX/RX(5GWIFI&2.4GWIFI&BT)	/	13	WL_USB_DP	USB D+	I/O
3	NC	Not Connect	/	14	GND	GND	/
4	GND	GND	/	15	GPIO1	3DD_SYNC	O
5	NC	Not Connect	/	16	WL_DIS	WLAN DISABLE active low level	I
6	NC	Not Connect	/	17	BT_DIS	BT DISABLE active low level	I
7	NC	Not Connect	/	18	CHIP_EN	Shutdown CHIP [Internal 10K Ω pull up to 3.3V, keeping low level duration(≥100ms) active]	I
8	NC	Not Connect	/	19	HOST_WAKE_WLAN	HOST WAKES UP WLAN CHIP	I
9	BT_WAKE_HOST	BT CHIP WAKES UP HOST	O	20	WLAN_WAKE_HOST	WLAN CHIP WAKES UP HOST	O
10	HOST_WAKE_BT	HOST WAKES UP BT CHIP	I	21	GPIO2	WPS	/
11	VCC	3.3V	I	22	GPIO8	LED	/

Pin 09 BT_WAKE_HOST，模组内部未上拉或下拉，软件可选，配置是高电平有效选择下拉，配置是低电平有效选择上拉。
Pin 10 HOST_WAKE_BT，模组内部未上拉或下拉，软件可选，配置是高电平有效选择下拉，配置是低电平有效选择上拉。
Pin 16 WL_DIS 模组内部未上拉，Host端需要上拉。
Pin 17 BT_DIS 模组内部未上拉，Host端需要上拉。
Pin 19 HOST_WAKE_WLAN，模组内部未上拉或下拉，软件可选，配置是高电平有效选择下拉，配置是低电平有效选择上拉。
Pin 20 WLAN_WAKE_HOST，模组内部未上拉或下拉，软件可选，配置是高电平有效选择下拉，配置是低电平有效选择上拉。
备注： WIFI 和 BT 共用一个地址段，但不会发生共用一个地址的情况。

7. Component LIST

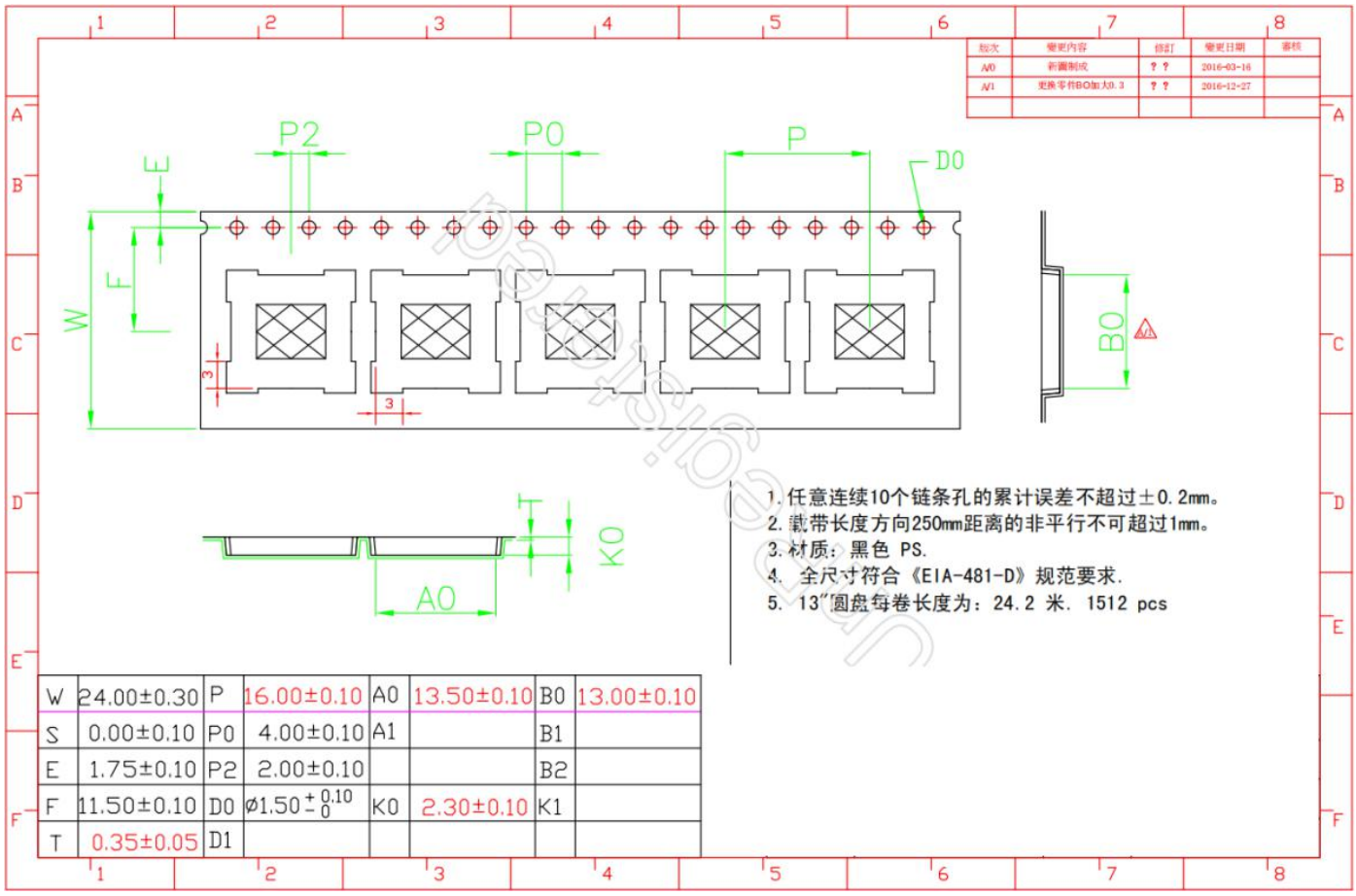
序号	名称	商标/制造商	使用状态
1	集成电路	Realtek	在用
2	贴片双工器	TDK、Walsin	在用
3	印制板	富智祥、科翔、柏承	在用
4	贴片电容	日系、台系	在用
5	贴片电感	日系、台系	在用
6	功率电感	台系	在用
7	贴片电阻	国巨、华新科、大毅、旺诠	在用
8	晶振	加高、TXC、晶宝时频 、富晶宝	在用

8. USB interface electrical characteristics （Recommend Schematic diagram）

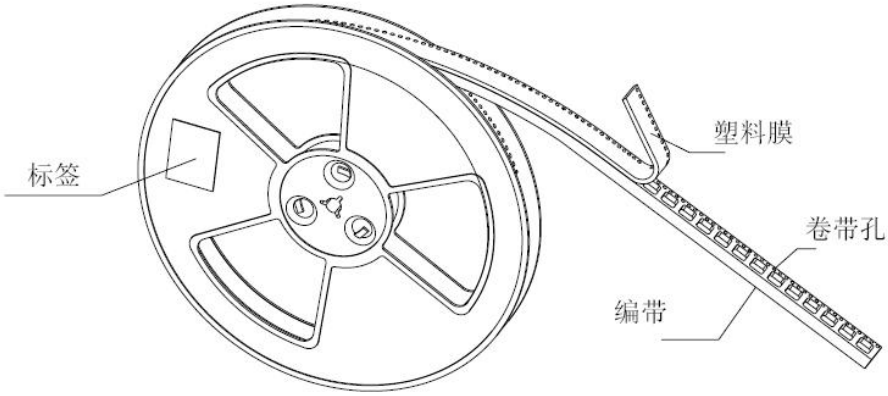


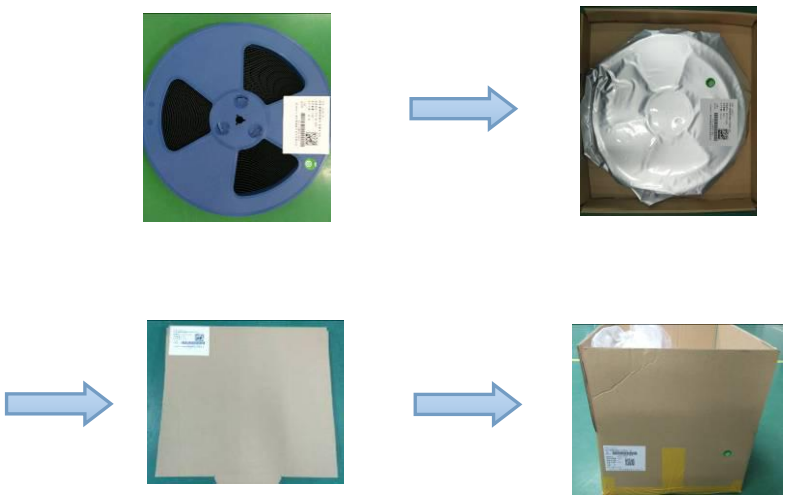
Two root go line do difference, but also required to make 90 O
the impedance test

9. Package



W	24.00±0.30	P	16.00±0.10	A0	13.50±0.10	B0	13.00±0.10
S	0.00±0.10	P0	4.00±0.10	A1		B1	
E	1.75±0.10	P2	2.00±0.10			B2	
F	11.50±0.10	D0	ø1.50 $^{+0.10}_{0}$	K0	2.30±0.10	K1	
T	0.35±0.05	D1					





外箱：426*378*220mm

内盒：414*365*38mm

防静电真空袋：360X430mm

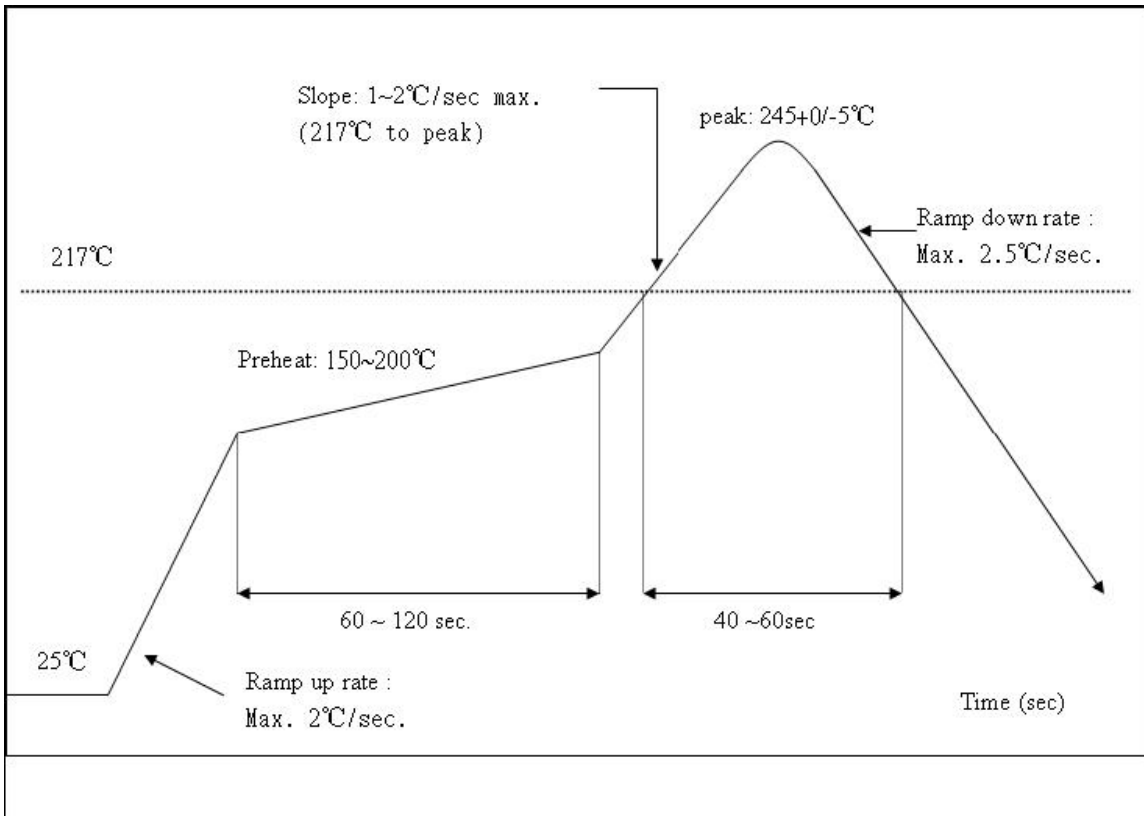
包装数量：每箱7500PCS（5盒，每盒1500PCS）

10. 产品的MSL水平：Moisture Sensitivity Level（MSL）：JEDEC L3

			Soak Requirements (濕度環境要求)			
	Floor Life (車間時間)		Standard (標準)		Accelerated (加速)	
Level	Time	Cond ℃／%RH	Time (hrs)	Cond ℃／%RH	Time (hrs)	Cond ℃／%RH
1	unlimited	≦30/85%	168+5/-0	85/85	n/a	n/a
2	1 year	≦30/60%	168+5/-0	85/60	n/a	n/a
2a	4 weeks	≦30/60%	696+5/-0	30/60	120+1/-0	60/60
3	**168 hours**	**≦30/60%**	**192+5/-0**	**30/60**	**40+1/-0**	**60/60**
4	72 hours	≦30/60%	96+2/-0	30/60	20+0.5/-0	60/60
5	48 hours	≦30/60%	72+2/-0	30/60	15+0.5/-0	60/60
5a	24 hours	≦30/60%	48+2/-0	30/60	10+0.5/-0	60/60
6	TOL	≦30/60%	TOL	30/60	n/a	60/60

11. Recommended Reflow Profile

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



12 Wireless module before the SMT note:

1.When customers Open stencil advice 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

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, vacuum packing of picture<1>
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 modulehygroscopic, 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, Reel packing of picture<2>
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.

13 Wifi 模块贴片装机前注意事项：

1.客户在开钢网时建议要将 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°

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：≦30%℃，≦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. 模块真空包装数量以客户要求的实际包装数量为准，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：125℃，8小时。
2-3. 模块卷盘包装以客户要求的实际包装数量为准,卷盘包装图片<2>

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，模块托盘包装以客户要求的实际包装数量为准.

注：以上包装方式根据客户要求而定，包装以实际出货为准。