

BL-8188EU1 (ETV)

Product Specification

WLAN 11b/g/n USB MODULE

承认书

Approval Sheet

客户			
CUSTOMER			
日期			
Date			
产品型号	8188EU1		
Product Type			
料号			
Part No			
必联电子承认栏			
工程 ENGINEER	品保 QC	业务 SALES	
客户承认栏			
工程 ENGINEER	品保 QC	生产 MANUFACTORY	采购 PURCHASING

Version: 2.6



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B-LINK ELECTRONIC CO., LTD in shenzhen

Contents

Contents.....	1
1:General Description.....	2
2: The range of applying.....	2
3:Features.....	2
4: DCCharacteristics.....	4
5: The main performance of product..	4
6: Electrical Specification.....	5
7: The block diagram of product principle.....	9
8: The supported platform.....	9
9: The definition of product Pin.....	10
10: The Structure and Size of product.....	11
11: The ANT Pin connect to antenna, please refer to design demand.....	12
12: Tpical Solder Reflow Profil.....	13
13: Package Diagram.....	14
14: SGS report data analysis table.....	14

1 General Description

BL-8188EU1 product Accord with FCC CE and is 150M wireless USB adapter which has lower power consumption, high linearity output power, accords with IEEE802.11B/G/N, and supports IEEE802.11i safety protocol, along with IEEE 802.11e standard service quality. It connects with other wireless device which accorded with these standards together, supports the new data encryption on 64/128 bit WEP and safety mechanism on WPA-PSK/WPA2-PSK, WPA/WPA2. Its wireless transmitting rate rises 150M, equivalent to 10 times of common 11b product. The inner AI high gain ceramics antenna adapts different kinds of work environment. It's easy and convenient to link to wireless network for the users using desktop, laptop and other device that needs connect to wireless network.

2 The range of applying

MID, networking camera, STB GPS, E-book, Hard disk player, Network Radios, PSP, etc, the device which need be supported by wireless networking.

3 Features

Feature	Implementation
Power supply	VCC3.3V +-0.2V 220MA
Clock source	40MHz
Temperature range	Work temperature:-0°C---40°C Storage temperature -55°C ~ +125°C
Package	SMT 6 pins
WLAN features	
General features	<ul style="list-style-type: none"> ■ CMOS MAC, Baseband PHY, and RF in a single chip for IEEE 802.11b/g/n compatible WLAN ■ Complete 802.11n solution for 2.4GHz band ■ 72.2Mbps receive PHY rate and 72.2Mbps transmit PHY rate using 20MHz bandwidth ■ 150Mbps receive PHY rate and 150Mbps transmit PHY rate using 40MHz bandwidth

	<ul style="list-style-type: none"> ■ Compatible with 802.11n specification ■ Backward compatible with 802.11b/g devices while operating in 802.11n mode
Host Interface	Complies with USB Specification Revision 2.0
Standards Supported	<ul style="list-style-type: none"> ■ IEEE 802.11b/g/n compatible WLAN ■ IEEE 802.11e QoS Enhancement (WMM) ■ IEEE 802.11h TPC, Spectrum Measurement ■ 802.11i (WPA, WPA2). Open, shared key, and pair-wise key authentication services
WLAN MAC Features	<ul style="list-style-type: none"> ■ Frame aggregation for increased MAC efficiency (A-MSDU, A-MPDU) ■ Low latency immediate High-Throughput Block Acknowledgement (HT-BA) ■ PHY-level spoofing to enhance legacy compatibility ■ Power saving mechanism ■ Channel management and co-existence ■ Transmit Opportunity (TXOP) Short Inter-Frame Space (SIFS) bursting for higher multimedia bandwidth
WLAN PHY Features	<ul style="list-style-type: none"> ■ IEEE 802.11n OFDM ■ One Transmit and one Receive path (1T1R) ■ 20MHz and 40MHz bandwidth transmission ■ 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 ■ Maximum data rate 54Mbps in 802.11g and 150Mbps in 802.11n ■ Switch diversity for DSSS/CCK ■ Hardware antenna diversity ■ Selectable 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

4 DC Characteristics

Symbol	Parameter	Minimum	Typical	Maximum	Units
VD33A, VD33D	3.3V I/O Supply Voltage	3.0	3.3	3.6	v
VD12A, VD12D	1.2V Core Supply Voltage	1.10	1.2	1.32	v
VD15A, VD15D	1.5V Supply Voltage	1.425	1.5	1.575	v
IDD33	3.3V Rating Current	-	-	600	mA

5 The main performance of product

Item	Description
The supported protocol and standard	IEEE 802.11n, IEEE 802.11g, IEEE 802.11b
Interface type	USB2.0
The range of frequency	2.4-2.484GHZ
The amount of working Channel	1-11 (America, Canada) ;1-13 (China, Europe) ;1-14 (Japan)
Data Modulation	OFDM/DBPSK/DQPSK/CCK
Working Mode	Infrastructure, Ad-Hoc
The transmitting rate	135/54/48/36/24/18/12/9/6 /1M (self-adapting)
Spread spectrum	DSSS
Throughput	80Mbps(external 2dbi antenna ,damping 30dbm in Shielding box)
The connect type of Antenna	Connect to the external antenna through the half hole
The transmit distance	Indoor 100M, Outdoor 300M, according the local environment
Working Power consumption	149MA
MENS(L*W*H)	12.2MM*12.9MM*0.6MM
The chipset model	RTL8188ETV

6. Electrical Specification

This Specification is based-on conductive DVT testing result. The extreme condition include overall temperature (0°C, +25°C, +60°C) and overall voltage (4.5V, 5V, 5.5V).

6.1 802.11b Mode

Items	Contents				
Specification	IEEE802.11b				
Mode	DSSS / CCK				
Channel	CH1 to CH13				
Data rate	1, 2, 5.5, 11Mbps				
DC Characteristics	Min.	Typ.	Max.	Unit	Remark
1. DC current (Average) @5V input					
1) TX only @17dBm (continue Tx SISO)	\	263	273	mA	
2) TX throughput mode	\	143	148	mA	
3) RX throughput mode	\	138	140	mA	
TX Characteristics	Min.	Typ.	Max.	Unit	
2. Power Levels(Calibrated)					
1) 17dBm Target (For Each antenna port)	15	17.5	18	dBm	
3. Spectrum Mask @ target power					
1) fc +/-11MHz to +/-22MHz	-37	-	-30	dBr	
2) fc > +/-22MHz	-56	-	-50	dBr	
4. Frequency Error	-10	0	10	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity(each chain)					
1) 1Mbps (FER \leq 8%)		-96	-93	dBm	
2) 2Mbps (FER \leq 8%)		-94	-91	dBm	
3) 5.5Mbps (FER \leq 8%)		-90	-87	dBm	
4) 11Mbps (FER \leq 8%)		-86	-85	dBm	
6 Maximum Input Level (FER \leq 8%)	-8	/		dBm	

6.2 802.11g Mode

Items	Contents				
Specification	IEEE802.11g				
Mode	OFDM				
Channel	CH1 to CH13				
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps				
DC Characteristics	Min.	Typ.	Max.	Unit	Remark
1. DC current (Average) @5V input					

1) TX only @15dBm (continue Tx SISO)	\	245	245	mA	
2) TX throughput mode	\	150	150	mA	
3) RX throughput mode	\	148	148	mA	
TX Characteristics	Min.	Typ.	Max.	Unit	
2. Power Levels					
1) 15dBm Target (For Each antenna port)	14	15	16	dBm	
3. Spectrum Mask @ target power					
1) at fc +/-11MHz	-35	/	-20	dBr	
2) at fc +/-20MHz	-59	/	-28	dBr	
3) at fc > +/-30MHz	-60	/	-40	dBr	
4 Constellation Error(EVM)@ target power					
1) 6Mbps	/	-28	-5	dB	
2) 9Mbps	/	-28	-8	dB	
3) 12Mbps	/	-28	-10	dB	
4) 18Mbps	/	-28	-13	dB	
5) 24Mbps	/	-28	-16	dB	
6) 36Mbps	/	-28	-19	dB	
7) 48Mbps	/	-30	-22	dB	
8) 54Mbps	/	-30	-25	dB	
5 Frequency Error	-10	0	10	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
6 Minimum Input Level Sensitivity(each chain)					
1) 6Mbps (PER \leq 10%)	/	-90	-87	dBm	
2) 9Mbps (PER \leq 10%)	/	-89	-86	dBm	
3) 12Mbps (PER \leq 10%)	/	-88	-84	dBm	
4) 18Mbps (PER \leq 10%)	/	-86	-82	dBm	
5) 24Mbps (PER \leq 10%)	/	-83	-79	dBm	
6) 36Mbps (PER \leq 10%)	/	-80	-75	dBm	
7) 48Mbps (PER \leq 10%)	/	-74	-71	dBm	
8) 54Mbps (PER \leq 10%)	/	-73	-70	dBm	
7 Maximum Input Level (PER \leq 10%)	-20	/	/	dBm	

6.3 802.11n HT20 Mode

Items	Contents				
Specification	IEEE802.11n HT20 @ 2.4GHz				
Mode	OFDM				
Channel	CH1 to CH13				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15				
DC Characteristics	Min.	Typ.	Max.	Unit	Remark
1. DC current (Average) @5V input					
1) TX only @ 14dBm Target(each port), (continue Tx MIMO MCS15)	\	207	214	mA	

2) TX throughput mode	\	165	180	mA	
3) RX throughput mode	\	93	94	mA	
TX Characteristics	Min.	Typ.	Max.	Unit	
2. Power Levels					
1) 14dBm Target (For Each antenna port)	13	13.5	15	dBm	
2) 14dBm Target (Combined two antenna port)	/	/	/	dBm	
3. Spectrum Mask @14.5dBm					
1) at fc +/-11MHz	-33	/	-20	dBr	
2) at fc +/-20MHz	-55	/	-28	dBr	
3) at fc > +/-30MHz	-57	/	-45	dBr	
4. Constellation Error(EVM)@ target power					
1) MCS0	/	-24	-5	dB	
2) MCS1	/	-24	-10	dB	
3) MCS2	/	-24	-13	dB	
4) MCS3	/	-26	-16	dB	
5) MCS4	/	-26	-19	dB	
6) MCS5	/	-26	-22	dB	
7) MCS6	/	-28	-25	dB	
8) MCS7	/	-31	-28	dB	
5. Frequency Error	-10	0	10	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
6. Minimum Input Level Sensitivity(each chain)					
1) MCS0 (PER \leq 10%)	/	-90	-87	dBm	
2) MCS1 (PER \leq 10%)	/	-87	-84	dBm	
3) MCS2 (PER \leq 10%)	/	-85	-82	dBm	
4) MCS3 (PER \leq 10%)	/	-82	-79	dBm	
5) MCS4 (PER \leq 10%)	/	-79	-75	dBm	
6) MCS5 (PER \leq 10%)	/	-74	-71	dBm	
7) MCS6 (PER \leq 10%)	/	-71	-70	dBm	
8) MCS7 (PER \leq 10%)	/	-70	-69	dBm	
7. Maximum Input Level (PER \leq 10%)	-20	/	/	dBm	

6.4 802.11n HT40 Mode

Items	Contents				
Specification	IEEE802.11n HT40 @ 2.4GHz				
Mode	OFDM				
Channel	CH3 to CH11				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15				
DC Characteristics	Min.	Typ.	Max.	Unit	Remark
1. DC current (Average) @5V input					
1) TX only @ 14dBm Target(each port), (continue Tx MIMO MCS15)	\	200	210	mA	

2) TX throughput mode	\	192	200	mA	
3) RX throughput mode	\	170	170	mA	
TX Characteristics	Min.	Typ.	Max.	Unit	
2. Power Levels (Calibrated)					
1) 14dBm Target (For Each antenna port)	12	14	16	dBm	
2) 14dBm Target (Combined two antenna port)	/	/	/	dBm	
3. Spectrum Mask @13dBm					
1) at fc +/-22MHz	-45	/	-20	dBr	
2) at fc +/-40MHz	-55	/	-28	dBr	
4. Constellation Error(EVM)@target power					
1) MCS0	/	-28	-5	dB	
2) MCS1	/	-28	-10	dB	
3) MCS2	/	-28	-13	dB	
4) MCS3	/	-28	-16	dB	
5) MCS4	/	-28	-19	dB	
6) MCS5	/	-28	-22	dB	
7) MCS6	/	-30	-25	dB	
8) MCS7	/	-30	-28	dB	
5. Frequency Error	-10	0	10	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
6. Minimum Input Level Sensitivity(each chain)					
1) MCS0 (PER \leq 10%)	/	-88	-84	dBm	
2) MCS1 (PER \leq 10%)	/	-84	-81	dBm	
3) MCS2 (PER \leq 10%)	/	-82	-79	dBm	
4) MCS3 (PER \leq 10%)	/	-79	-76	dBm	
5) MCS4 (PER \leq 10%)	/	-74	-72	dBm	
6) MCS5 (PER \leq 10%)	/	-71	-68	dBm	
7) MCS6 (PER \leq 10%)	/	-70	-67	dBm	
8) MCS7 (PER \leq 10%)	/	-68	-66	dBm	
7. Maximum Input Level(PER \leq 10%)	-20	/	/	dBm	

7 The block diagram of product principle

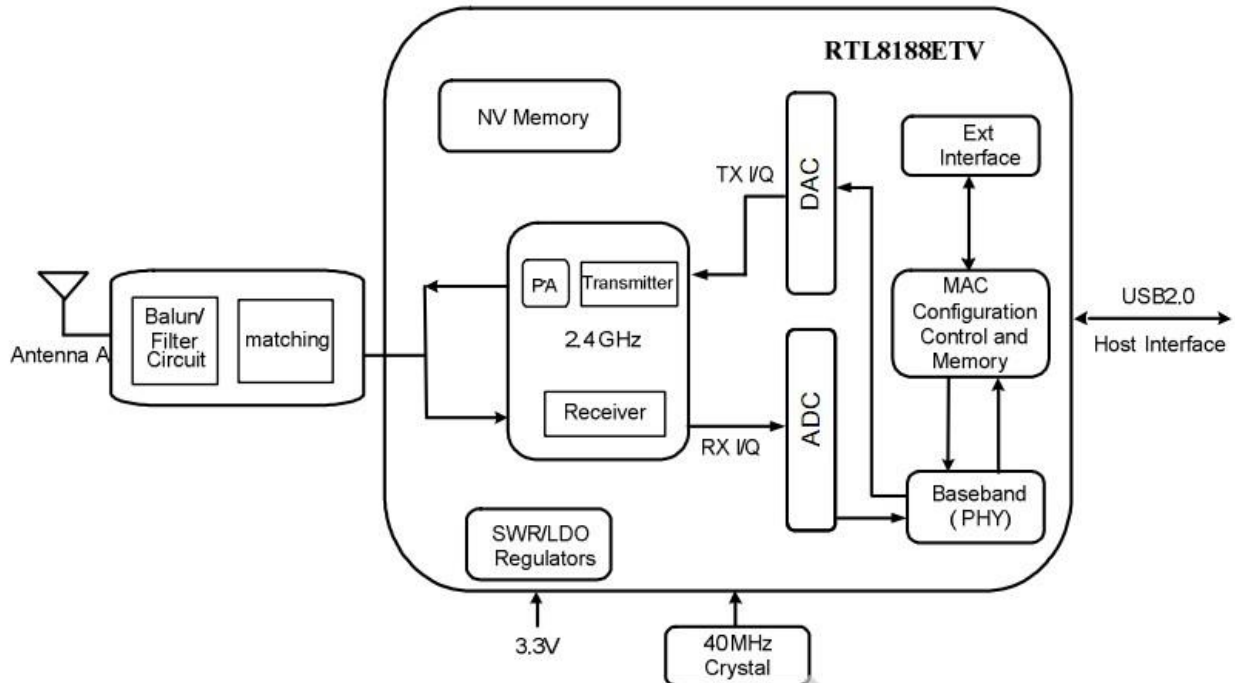
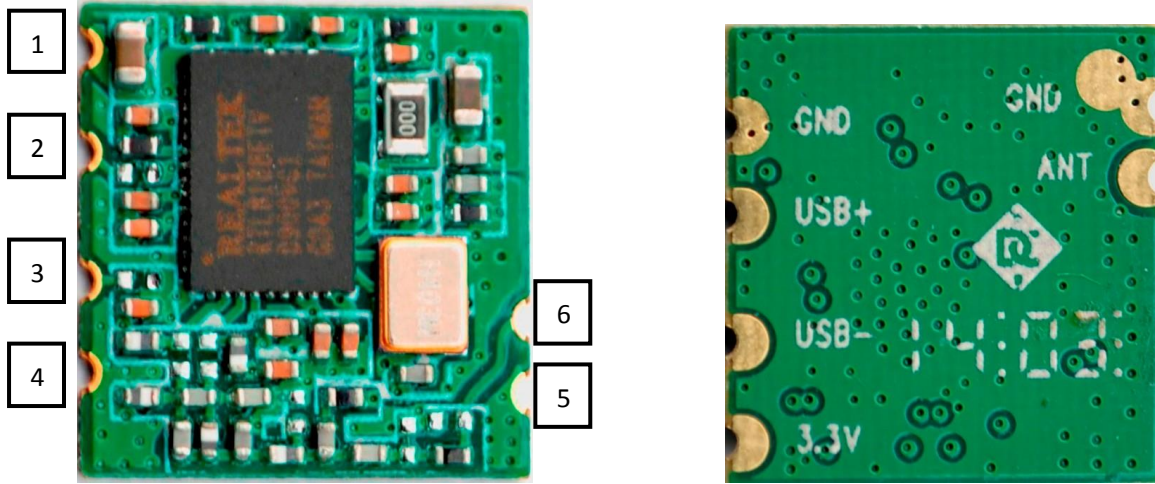


Figure 1. Single-Band 11n (1x1) Solution

8 The supported platform

Operating System	CPU Framework	Driver
WIN2000/XP/VISTA/WIN7	X86 Platform	Enable
LINUX2.4/2.6	ARM, MIPSII	Enable
WINCE5.0/6.0	ARM ,MIPSII	Enable

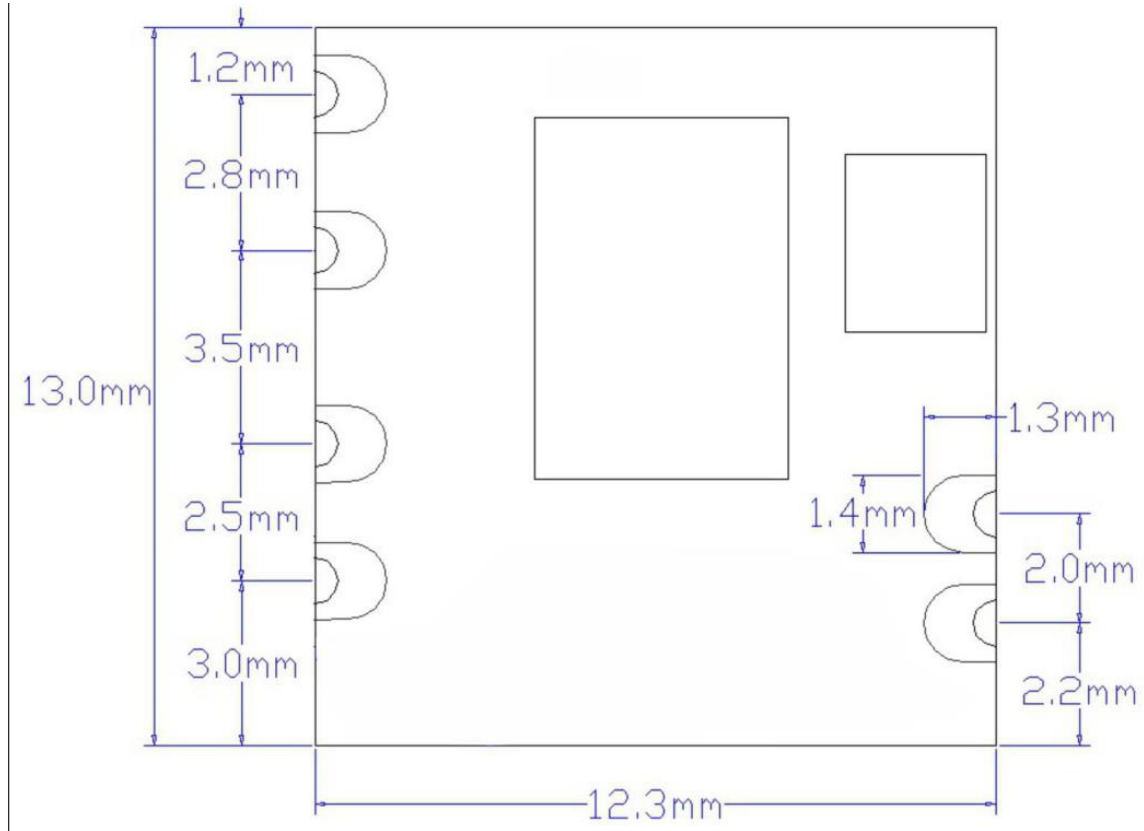
9 The definition of product Pin



Top and bottom view of BL-8188-EU1

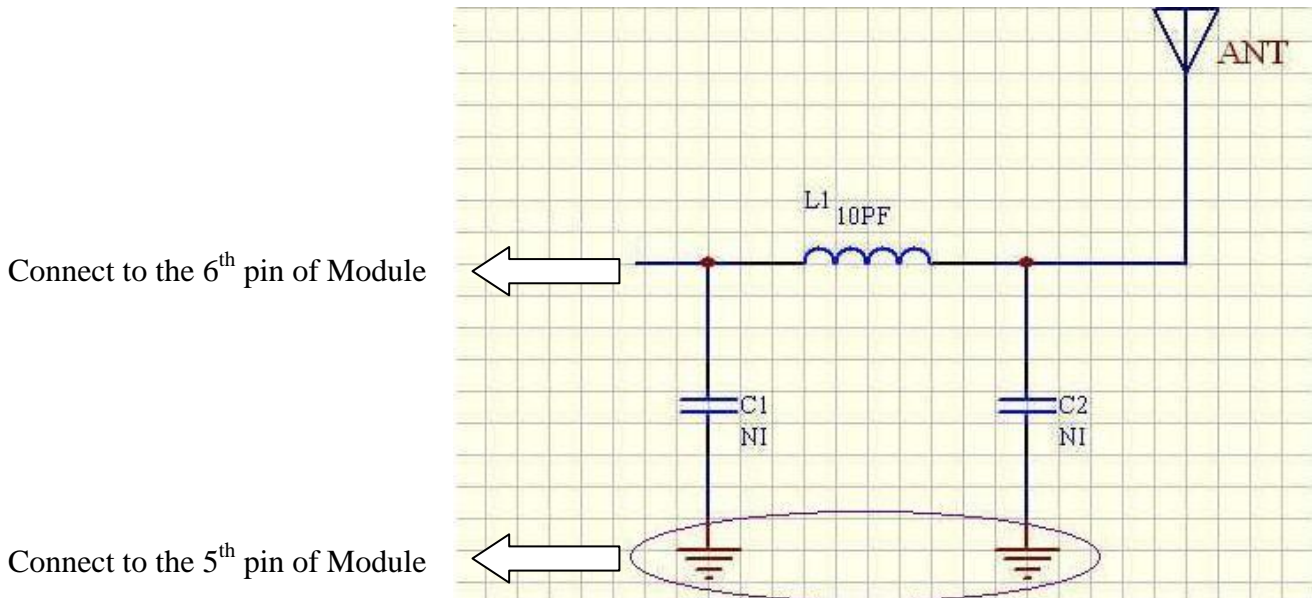
Pin No:	TYPE	Description
1	P	DC :3.3V
2	I/O	UDM-
3	I/O	UDP+
4	P	GND
5	P	GND
6	O	ANT

10 The Structure and Size of product



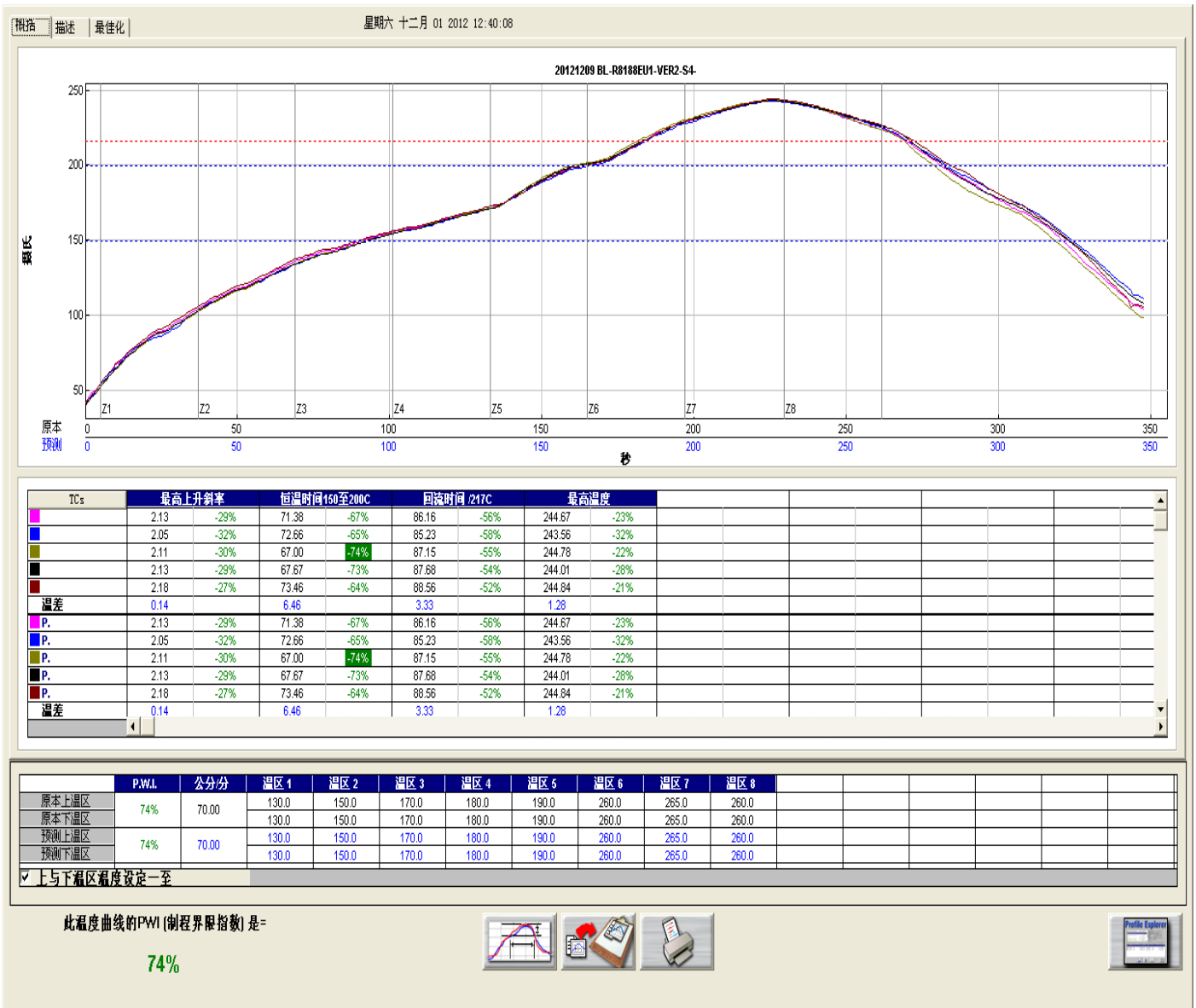
BL-R8188-EU1

11: The 6th Pin connect to antenna, please refer to design demand



- The current of 3.3V power supply must be >300mA, its ripple wave must be <30mV. The GND pins of module and external antenna need to be an incorporated part. The ground plane should be larger, module and antenna should keep far away from interference source.
- The sixth pin is 2.4G high frequency output, coplanar impedance of layout line between this pin to antenna interface should be 50Ω, we suggest use arc line or straight line, and beside the line there will be ground plane that its length as shout as possible, the longest length is no more than 50mm.
- L1, C1, C2 constitute a π -type network that we preset, please make it close to antenna interface, this π -type network is used to match the antenna parameters and control the radiation. It should be adjusted according to the real condition when being used. Normally you can only mount L1 that its parameters are: 10pF, NP0 material. No need C1 and C2

12: Typical Solder Reflow Profile



13:Packing



14. SGS report data analysis table

BL-8188EU1 (EUS)/BL-8188EU1 (ETV) SGS报告数据分析表

公司名称：深圳必联电子有限公司

填写日期：2013年12月23日

序号	产品名称	部件名称	构成物料	材质	原材料供方	加工流程	分析结果 (ppm = mg/kg)							测试机构	报告编号	报告日期	备注
							Cd (< 5PPM)	Pb (< 50PPM)	Hg (< 2PPM)	Cr+6 (ND)	PBBs (ND)	PBDEs (ND)	卤素/halogen				
							Br (< 900PPM)	Cl (< 900PPM)	Br+Cl (< 1500PPM)								
1	晶振	BASE-CERAMIC	A443	KYOCERA	-	ND	ND	ND	ND	ND	ND	ND	ND	SGS	SHAEC1308214611	2013-5-17	
2		BASE-W	W	KYOCERA	-	ND	ND	ND	Negative	ND	ND	ND	ND	SGS	SHAEC1308214607	2013-5-17	
3		BASE-Ni PLATING	Ni	KYOCERA	-	ND	ND	ND	Negative	ND	ND	ND	ND	SGS	SHAEC1308214603	2013-5-17	
4		BASE-Au PLATING	Au	KYOCERA	-	ND	ND	ND	Negative	ND	ND	ND	ND	SGS	SHAEC1308214605	2013-5-17	
5		BASE-SEAL RING	Fe	KYOCERA	-	ND	ND	ND	Negative	ND	ND	ND	ND	SGS	SHAEC1308214601	2013-5-17	
6		LID-KOVAR	Fe	WANOTEC	-	ND	ND	ND	ND	ND	ND	ND	ND	PONY	HD3152011604D-011704D-1	2013-3-20	
7		LID-Ni PLATING	Ni	WANOTEC	-	ND	ND	ND	ND	ND	ND	ND	ND	PONY	HD3152011404D-011504D-1	2013-3-20	
8		ADHESIVE	Silver (Ag)	加高电子	-	ND	ND	ND	ND	ND	ND	ND	ND	SGS	KA/2013/70605	2013-7-16	
9	陶瓷电感	介电陶瓷	钛酸钡	村田	SMT	N.D	N.D	N.D	N.D	N.D	N.D	N.D	N.D	SGS	JP/2013/030670	2013-3-27	
10		内电极	铜	村田	SMT	N.D	N.D	N.D	N.D	N.D	N.D	/	/	SGS	JP/2013/040380	2013-4-24	
11		外电极	镍	村田	SMT	N.D	N.D	N.D	N.D	N.D	N.D	/	/	SGS	CE/2013/44001	2013-4-26	
12		镍镀层	镍	村田	SMT	N.D	N.D	N.D	N.D	N.D	N.D	/	/	SGS	CE/2013/73190	2013-7-24	
13		锡镀层	锡	村田	SMT	N.D	N.D	N.D	N.D	N.D	N.D	/	/	SGS	CE/2013/73186	2013-7-24	
14	电阻	Silver		SUMITOMO	Topside layer	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	SGS	CE/2013/44339	2013-4-29	
15		Glass		INVI CORPORATION	Primary coating	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	SGS	CE/2013/37676A	2013-4-6	
16		Nickel/Chromium		UMAT	Sputtering End	N.D.	N.D.	N.D.	Negative	/	/	/	/	SGS	CE/2013/71822	2013-7-15	
17		Ni		Vale Canada	Plating Ni	N.D.	N.D.	N.D.	Negative	N.D.	N.D.	N.D.	N.D.	SGS	CE/2013/B3493	2013-11-27	
18		Sn		Shenmao	Plating Sn	N.D.	11	N.D.	Negative	N.D.	N.D.	N.D.	N.D.	SGS	CE/2013/B5196	2013-12-4	
19		Dielectric		TDK	Dielectric ceramic body	N.D.	N.D.	N.D.	N.D.	N.D.	/	/	SGS	JP/2013/041002	2013-5-10		

20	电容	Inner Electrode		TDK	Inner Electrode	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	/	/	/	SGS	JP/2013/041004	2013-5-10	
21		Terminal Electrode		TDK	Terminal electrode	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	/	/	/	SGS	JP/2013/041005	2013-5-10	
22		Ni		TDK	Under plating	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	/	/	/	SGS	JP/2013/041008	2013-5-10	
23		Matte Sn		TDK	Surface plating	N. D.	17	N. D.	N. D.	N. D.	N. D.	/	/	/	SGS	JP/2013/041009	2013-5-10	
24	PCB板	铜	铜	金昌	压合	N. D.	N. D.	N. D.	N. D.	/	/	/	/	/	SGS	CANEC1309198801	2013-6-21	
25		有机物、填料	油墨	容大	混合	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	/	/	/	SGS	RHS01F013843003C	2013-9-13	
26		玻纤纱、玻纤布	板材	建滔	混合	N. D.	13	N. D.	N. D.	N. D.	N. D.	/	/	/	SGS	CANEC1311142512 A01	2013-8-6	
27		金	金	睿晨	沉积	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	/	/	/	SGS	CANEC1304786302	2013-4-12	
28	吸塑盘	片材	PVC	振荣	吸塑	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	/	/	/	SGS	CANML1317289201	2013-11-13	
29	纸箱	纸板/油墨	K5K	银利	-	N. D.	16	N. D.	N. D.	N. D.	N. D.	/	/	/	SGS	CANEC1305827401	2013-4-25	
30	主芯片			REALTEK	外购	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	SGS	CE/2013/51677	2013-5-17	BL-8188
31	主芯片			REALTEK	外购	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	N. D.	SGS	CE/2013/51677	2013-5-17	BL-8188

填写说明：1、需提供产品或物料测试报告复印件
 2、对于构成产品的材料及过程使用材料均应详细填写
 3、原材料供方必须填写全称
 4、分析结果要求填写为具体检测结果。当检测结果为“N. D.”时，填写为检测极限。
 要求：本数据分析表需要加盖公司公章并原件送达长虹器件科技有限公司

本章规定了电子设备中使用的金属材料中铅 (Pb) 和镉 (Cd) 的测定程序。描述了三种方法，即 ICP-OES, ICP-MS 和 AAS。用盐酸或硝酸消化样品。所得溶液中的 Pb 和 Cd 可用 ICP-OES, ICP-MS 或 AAS 测定。也描述了详细的程序由基体和存在的特殊元素决定。程序适用于未知试样及筛选法已显示定性组成的试样。

本章描述的测试程序旨在提供高等级的管制物质浓度的准确度和精密度，对 ICP-OES 和 AAS, Pb 和 Cd 从 10 mg/kg 起，对于 ICP-MS, Pb 和 Cd 从 0.1 mg/kg 起。测试程序不受更高浓度限制。

Selo ANATEL modelo BL-8188EU1



“Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário.”