# BL-8188EU1（EUS）

## Product Specification

### WLAN 11b/g/n USB MODULE Version: 2.6

## FCC Statement

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.
Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-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.

The 150Mbps Wireless N SDIO
Module is designed to comply with the FCC statement. FCC ID is S8J-R8188EU1. The host system using 150 Mbps Wireless N SDIO Module, should have label indicated it contain modular's
FCC ID：S8J-R8188EU1.
This radio module must not installed to colocate and operating simultaneously with other radios in host system additional testing and equipment authorization
may be required to operating simultaneously with other radio.

RF warning for Mobile device:
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.

# Contents

# 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:-20ºC---70ºC<br>Storage temperature -55°C ~ +125°C |
| Package | SMT 6 pins |
| WLAN features | |
| General features | ■CMOS MAC, Baseband PHY, and RF in a single chip for IEEE 802.11b/g/n compatible WLAN<br>■Complete 802.11n solution for 2.4GHz band<br>■72.2Mbps receive PHY rate and 72.2Mbps transmit PHY rate using 20MHz bandwidth<br>■150Mbps receive PHY rate and 150Mbps transmit PHY rate using 40MHz bandwidth |

| | |
|---|---|
| | ■Compatible with 802.11n specification<br>■Backward compatible with 802.11b/g devices while operating in 802.11n mode |
| Host Interface | Complies with USB Specification Revision 2.0 |
| Standards Supported | ■IEEE 802.11b/g/n compatible WLAN<br>■IEEE 802.11e QoS Enhancement (WMM)<br>■IEEE 802.11h TPC, Spectrum Measurement<br>■802.11i (WPA, WPA2). Open, shared key, and pair-wise key authentication services |
| WLAN MAC Features | ■Frame aggregation for increased MAC efficiency (A-MSDU, A-MPDU)<br>■Low latency immediate High-Throughput Block Acknowledgement (HT-BA)<br>■PHY-level spoofing to enhance legacy compatibility<br>■Power saving mechanism<br>■Channel management and co-existence<br>■Transmit Opportunity (TXOP) Short Inter-Frame Space (SIFS) bursting for higher multimedia bandwidth |
| WLAN PHY Features | ■IEEE 802.11n OFDM<br>■One Transmit and one Receive path (1T1R)<br>■20MHz and 40MHz bandwidth transmission<br>■Short Guard Interval (400ns)<br>■DSSS with DBPSK and DQPSK, CCK modulation with long and short preamble<br>■OFDM with BPSK, QPSK, 16QAM, and 64QAM modulation. Convolutional Coding Rate: 1/2, 2/3, 3/4, and 5/6<br>■Maximum data rate 54Mbps in 802.11g and 150Mbps in 802.11n<br>■Switch diversity for DSSS/CCK<br>■Hardware antenna diversity<br>■Selectable receiver FIR filters<br>■Programmable scaling in transmitter and receiver to trade quantization noise against increased probability of clipping Fast<br>■receiver Automatic Gain Control (AGC)<br>■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,EE 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 |
| Sensitivity @PER | 54/135M:-74dBm@10%PER,<br>11M:-85dBm@8%PER<br>6M: -88dBm@10%PER ,<br>1M: -90dBm@8%PER |
| RF Power | 135M:15dBM,<br>54M:15dBM,<br>11M:19dBM |
| Throughput | 80Mbps(external 2dbi antenna ,damping 50dbm in Shielding box ) |
| The connect type of Antenna | Connect to the external antenna through the half hole, Connect to the external antenna through the half hole, The antenna and other interface get connected to the external devices by the edge half a circle welding plate |

| | |
|---|---|
| LED indicator | status indicator |
| The transmit distance | Indoor 100M, Outdoor 300M, according the local environment |
| Working Power consumption | 68MA |
| MENS(L*W*H) | 12.3MM*12.9MM*0.6MM |
| The chipset model | RTL8188EUS |

# 6 DC/RF characteristics

| **Terms** | **Contents** | | | |
|---|---|---|---|---|
| Specification : IEEE802.11b | | | | |
| Mode | DSSS / CCK | | | |
| Frequency | 2412 – 2484MHz | | | |
| Data rate | 1, 2, 5.5, 11Mbps | | | |
| DC Characteristics | min | Typ. | max. | unit |
| TX mode | 257 | 263 | 271 | mA |
| Rx mode | 80 | 82 | 84 | mA |
| Standby mode | 140 | 145 | 146 | uA |
| Specification : IEEE802.11g | | | | |
| Mode | OFDM | | | |
| Frequency | 2412 - 2484MHz | | | |
| Data rate | 6, 9, 12, 18, 24, 36, 48, 54Mbps | | | |
| DC Characteristics | min | Typ. | max. | unit |
| TX mode | 244 | 245 | 245 | mA |
| Rx mode | 88 | 89 | 89 | mA |
| Standby mode | 143 | 145 | 146 | uA |
| Specification : IEEE802.11n | | | | |
| Mode | OFDM | | | |
| Frequency | 2412 - 2484MHz | | | |
| Data rate | 6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps | | | |
| DC Characteristics | min | Typ. | max. | unit |
| TX mode | 201 | 207 | 214 | mA |
| Rx mode | 90 | 93 | 94 | mA |
| Standby mode | 144 | 145 | 146 | uA |

# 7 The block diagram of product principle

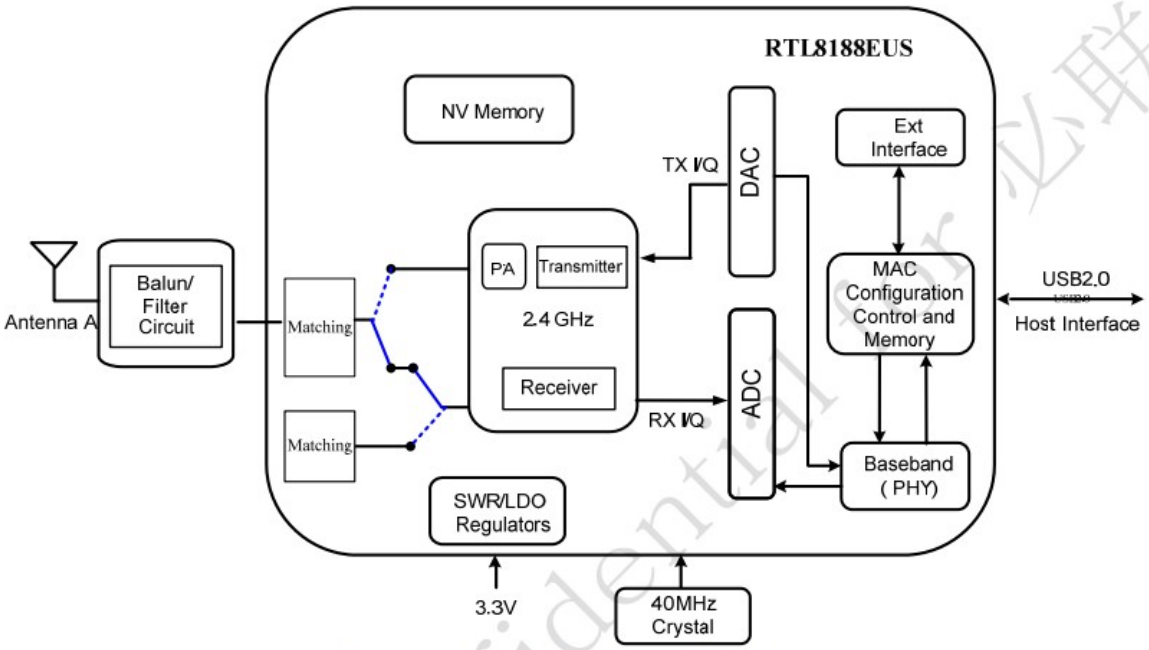
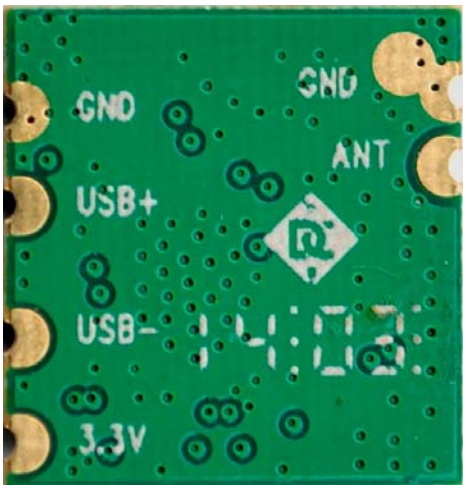



**Figure 1. Single-Band 11n (1x1) Solution**

# 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 |

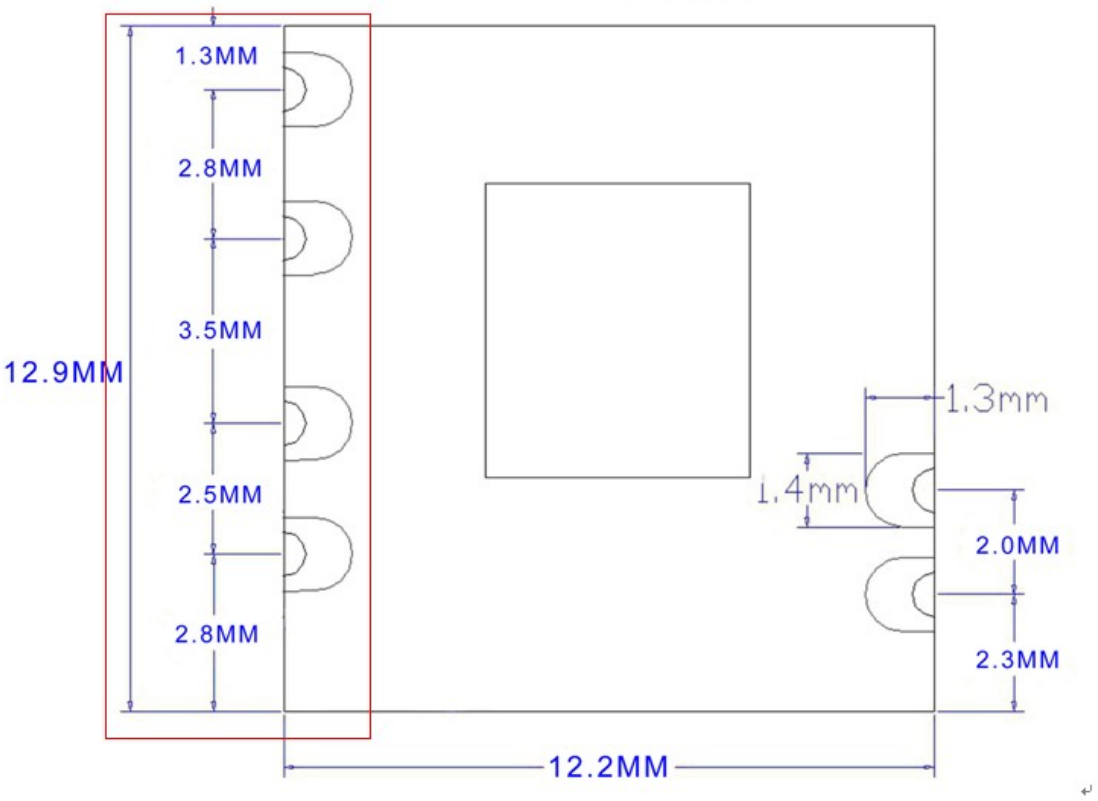
# 9 The definition of product Pin


**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



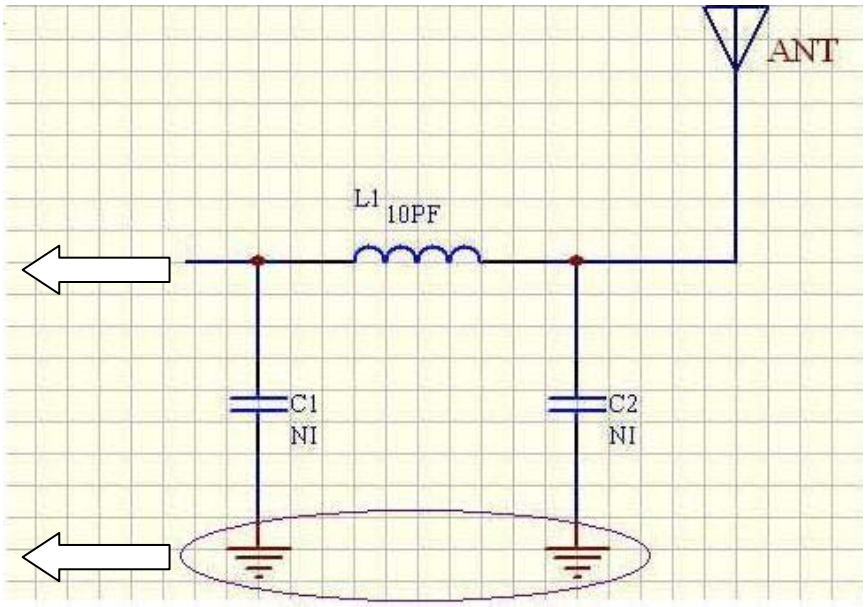

**BL-R8188-EU1**

## 11:Packing


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

Connect to the 6th pin of Module

Connect to the 5th pin of Module




a) 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.

b) 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.

c) 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

# 13:Tipcial Solder Reflow Profile