AW-NB110H

IEEE 802.11a/b/g/n WIFI with Bluetooth 4.0 class II Combo Single Chip Half Size Mini Module

(NO WoW)

Datasheet

Version 1.0

0B

Revision History

Document release	Date	Modification	initials	Approved
Version 0.1	2011/10/03	Initial version	Carla Chen	Ray Lee
Version 0.2	2011/10/06	Initial version	Kaku Kuo	Roger Chou
Version 0.3	2011/10/07	Mechanical Drawing	Kevin Lin	Ray Lee
Version 0.4	2011/10/12	Standard Version Spec (w/o WoW)	Kaku Kuo	Roger Chou
Version 0.5	2011/11/8	Update Shielding & RF CONN drawing	Kevin Lin	Ray Lee
Version 0.6	2012/1/3	Update BT/WIFI Disable status and drawing.	Kaku kuo	Roger Chiu
Version 0.7	2012/3/23	Update TX/ RX data	Amos Fu	Antonio Chu
Version 0.8	2012/05/10	1. Update General Specifications 2. Add Module Photo	Amos Fu Emily Wang	Antonio Chu Kavin Chang
Version 0.9	2012/10/12	Modify Regulatory Information	Emily Wang	Ray Lee
Version 1.0	2013/01/07	Update OS Support	Emily Wang	Ray Lee

1. Introduction

AzureWave Technologies, Inc. introduces the pioneer of the **IEEE 802.11a/b/g/n WIFI with Bluetooth 4.0/3.0 HS class II Single Chip Half Size Mini Combo Module--- AW-NB110H.**

The AW-NB110H IEEE 802.11 a/b/g/n PCI-E WIFI and USB Bluetooth 3.0HS & 4.0 class II combo single chip combo module is a highly integrated wireless local area network (WLAN) solution to let users enjoy the digital content through the latest wireless technology without using the extra cables and cords. Compliant with the IEEE 802.11a/b/g/n standard, AW-NB110H uses Direct Sequence Spread Spectrum (DSSS), Orthogonal Frequency Division Multiplexing (OFDM), DBPSK, DQPSK, CCK and QAM base band modulation technologies. And it takes Bluetooth 4.0 class II and provides a complete 2.4GHz Bluetooth system and is fully compliant to Bluetooth 4.0 / 3.0HS and v2.1 that support EDR of 2Mbps and 3Mbps for data and audio communications.

A high level of integration and full implementation of power management functions specified in the IEEE 802.11 standard minimize system power requirements by using AW-NB110H.

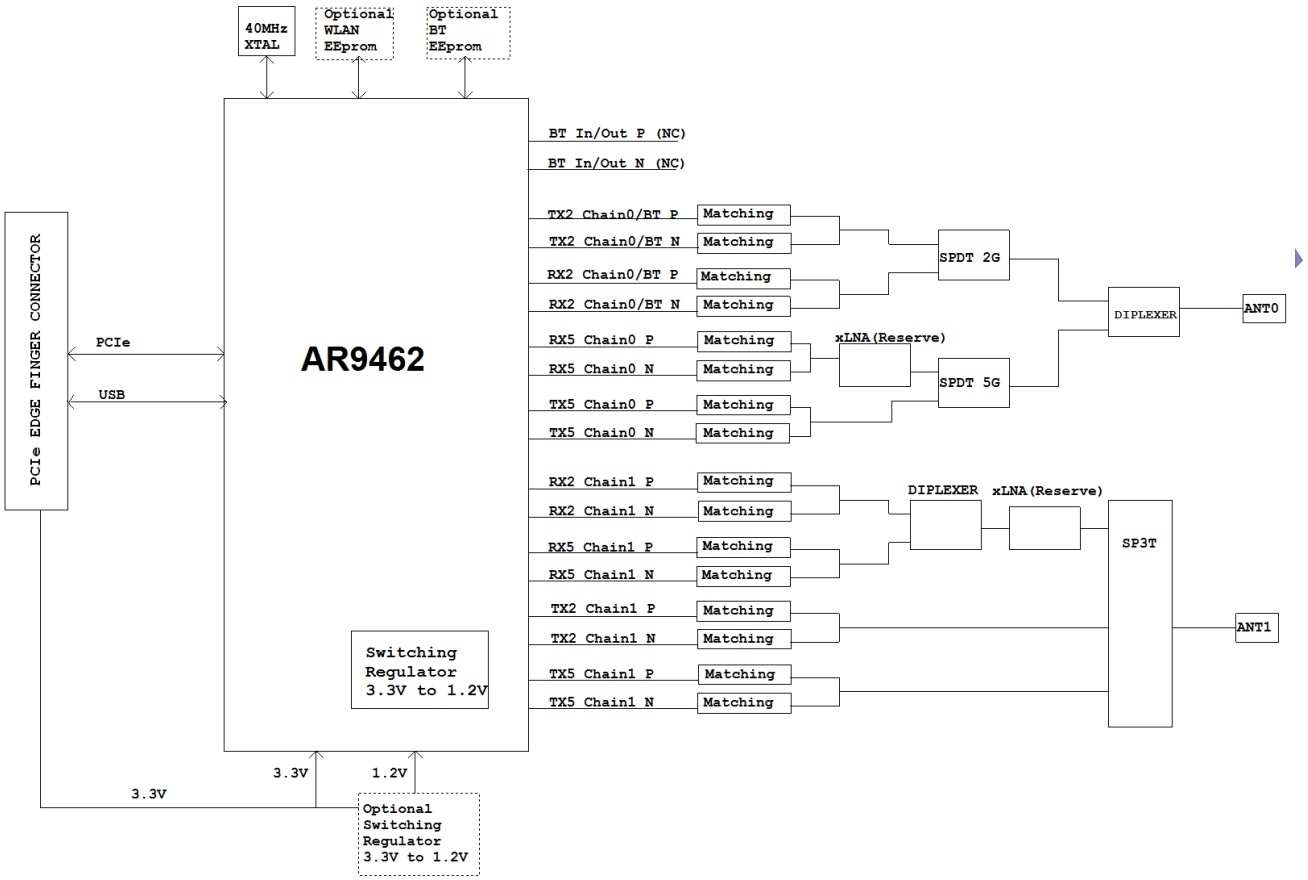
Longer Range: Increases wireless range by up to 3 times and reduces dead spots in coverage area. The device adopts Multiple In, Multiple Out" (MIMO) technology with which effectively doubles the data rate. Unlike ordinary wireless networking technologies that are confused by signal reflections, MIMO actually uses these reflections to increase the range and reduce "dead spots" in the wireless coverage area. The robust signal travels farther, maintaining wireless connections up to 3 times farther than standard 802.11g.

Faster Speed: WLAN up to 300Mbps data rate.

2. Features

- **Single Combo Chip Half Size Mini PCIe/ USB Module**
- **High speed wireless connection up to 300Mbps**
- **2 antennas to support 2(Transmit) × 2(Receive) MIMO technology**
- **Low power consumption and high performance**
- **Enhanced wireless security**
- **Supports PCI-E 1.1 standards specification**
- **Support to BT 4.0 solution**

3. Block Diagram



4. General Specifications

Model Name	AW-NB110H
Product Description	**Single Combo Chip Half Size Mini PCI/ USB Module**
WLAN / BT Standard	IEEE 802.11 a/b/g/n, Wi-Fi compliant / Bluetooth v4.0 Standard
Host Interface	PCIE / USB
Major Chipset	Atheros combo single chip AR9462
WIFI PID	2110
WIFI VID	1A3B
BT PID	3393
BT VID	13D3
Dimension	29.85mm x 26.65mm x 3.15mm (with shielding)
Weight	3.1 g
Antenna Interface connector	Standard *U.FL SMD Ant 0: WIFI / BT Ant 1: WIFI
Operating Conditions	
Voltage	3.3V +/- 10%
Temperature	0 ~ 80 °C
Storage	-40 ~ 85°C
Electrical Specifications	
Frequency Range	Wi-Fi: 2.4 GHz ISM Bands 2.412-2.472 GHz, 2.484 GHz 5.15-5.25 GHz (FCC UNII-low band) for US/Canada, Japan and Europe 5.25-5.35 GHz (FCC UNII-middle band) for US/Canada and Europe 5.47-5.725 GHz for Europe 5.725-5.825 GHz (FCC UNII-high band) for US/Canada BT: 2402MHz~2483MHz
Modulation	WIFI 802.11a/g/n: OFDM 802.11b: CCK(11, 5.5Mbps), DQPSK(2Mbps), BPSK(1Mbps) BT: Header GFSK Payload 2M: 4-DQPSK Payload 3M: 8DPSK
Output Power	802.11a: Typical 11 dBm at 54M / 15dBm at 6M +- 2dBm 802.11b: Typical 17dBm +/- 2 dBm 802.11g: Typical 15 dBm at 54M / 17dBm at 6M +- 2dBm 802.11n 5G HT20 : Typical 9 dBm at MCS7 / 14dBm at MCS0 +/- 2 dBm

	802.11n 5G HT40 : Typical 9 dBm at MCS7 / 14dBm at MCS0 +/- 2 dBm 802.11n 2.4G HT20 : Typical 14 dBm at MCS7 / 17dBm at MCS0 +/- 2 dBm 802.11n 2.4G HT40 : Typical 14 dBm at MCS7 / 16dBm at MCS0 +/- 2 dBm BT: -6 ≤ Output Power ≤ +7 dBm (Conductive)
Receive Sensitivity	802.11a: 54M less then 68 dBm 802.11b: 11M less then 78dBm 802.11g: 54M less then 68 dBm 802.11n 2.4G: HT20 MCS7 less then 64 dBm HT40 MCS7 less then 61 dBm 802.11n 5G: HT20 MCS7 less then 64 dBm HT40 MCS7 less then 61 dBm BT: BER < 0.1% (Anritsu 8852B Tx -70Bm)
Operating Range	Open Space: ~300 m; Indoor: :~100 m (The transmission speed may vary according to the environment)
Security	◆ WEP 64-bit and 128-bit encryption ◆ WPA (Wi-Fi Protected Access) ◆ WPA2 (Wi-Fi Protected Access)
Operating System Compatibility	Windows XP / Win 7/ Win8
Regulatory	Follow Atheros AR5B22 worldwide certifications.

4-1. Absolute Maximum Ratings

Symbol	Parameter	Max. Rating	Unit
V_{dd33}	Maximum I/O supply voltage	**3.63**	V
RF_{in}	Maximum RF input (reference to 50 Ω)	**+10**	dBm
T_{store}	Storage temperature	**-40~90**	°C

4-2. Recommended Operating Conditions

Symbol	Parameter	Rating	Unit
V_{dd33}	I/O voltage	**2.97~3.63**	V

4-3. GPIO Interface Characteristics

Signal Name(To chip GPIO PIN)	Mini PCI-E PIN	Type	Driver	PU/DP Resistance
WLAN_LED	44	O	**24 mA (Max)**	None-PU
WLAN_DISABLE	20	I	_	100 KΩ PU

PU: Pull Up

4-4. Logic Level Characteristics

Vcc=+3.3V +/- 10%

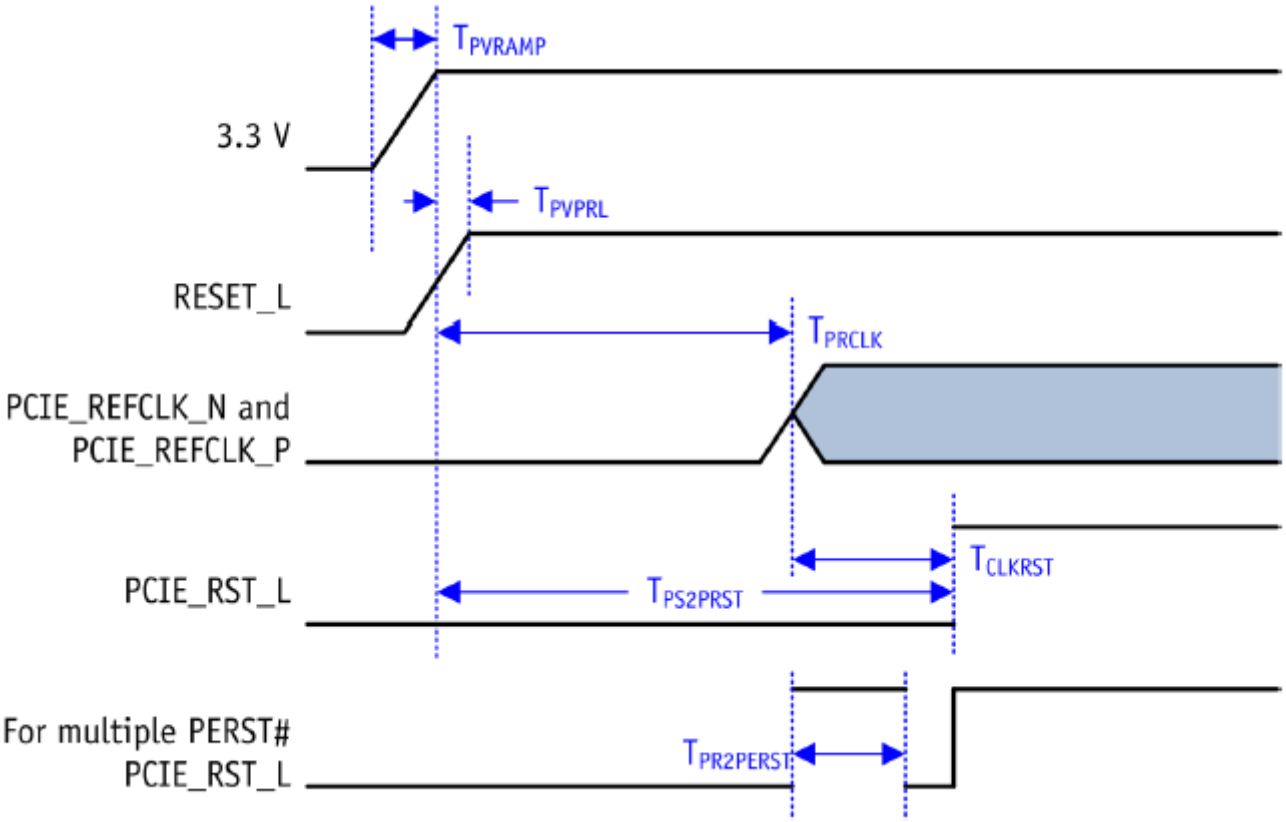
VIH (min)= 0.7*Vcc (v)

VIL (max)= 0.3*Vcc (v)

VIH = Voltage input high

VIL= Voltage input low

4-5. Power UP Sequencing



Signal Name	Description	Min	Max
T_{PVRAMP}	Power Supply Ramp on 3.3V	—	1 ms
T_{PVPRL}	Power Valid to RST_L Asserted	0 µs[1]	—
T_{PRCLK}	RST_L De-asserted to PCIE_REFCLK_N and PCIE_REFCLK_P Stable	100 µs	—
T_{CLKRST}	PCIE_REFCLK_N and PCIE_REFCLK_P Stable to PCIE_RST_L De-asserted	100 µs[2]	—
$T_{PS2PRST}$	Power Supply Stable to PCIE_RST_L De-assert	10 ms	—
$T_{PR2PERST}$	Interval for Multiple PCIE_RST_L	40 ms	—

[1]It is recommended to leave the RST_L pin floating. At power up, internal power-on reset signal derived from 1.2 V and 3.3 V supply will ensure correct functionality.
[2]This timing depends on hardware interface designs, such as Express Card, PCIE Mini Card, or PCIE desktop applications. The system must follow PCI Express specification, as well as T_{CLKRST}.

4-6.Power Consumption:

WLAN

Test Bed	Dell Vostro 3450	
Test OS	Windows 7 Ultimate x64 sp1	
Test AP	D-LINK 855	
Driver Version	AZ_AR9462_Win7_10.0.0.12_20111215_BETA	
Test Voltage	3.3V	
Item	L0 Mode	NOTE
Transmit Packet Test HT 40*	269.11 mA	
Receiver Packet Test HT 40*	149.94 mA	

Note. 1. Bluetooth function is disable.

2. The power consumption data were measured when NB operated in DC (battery) mode.

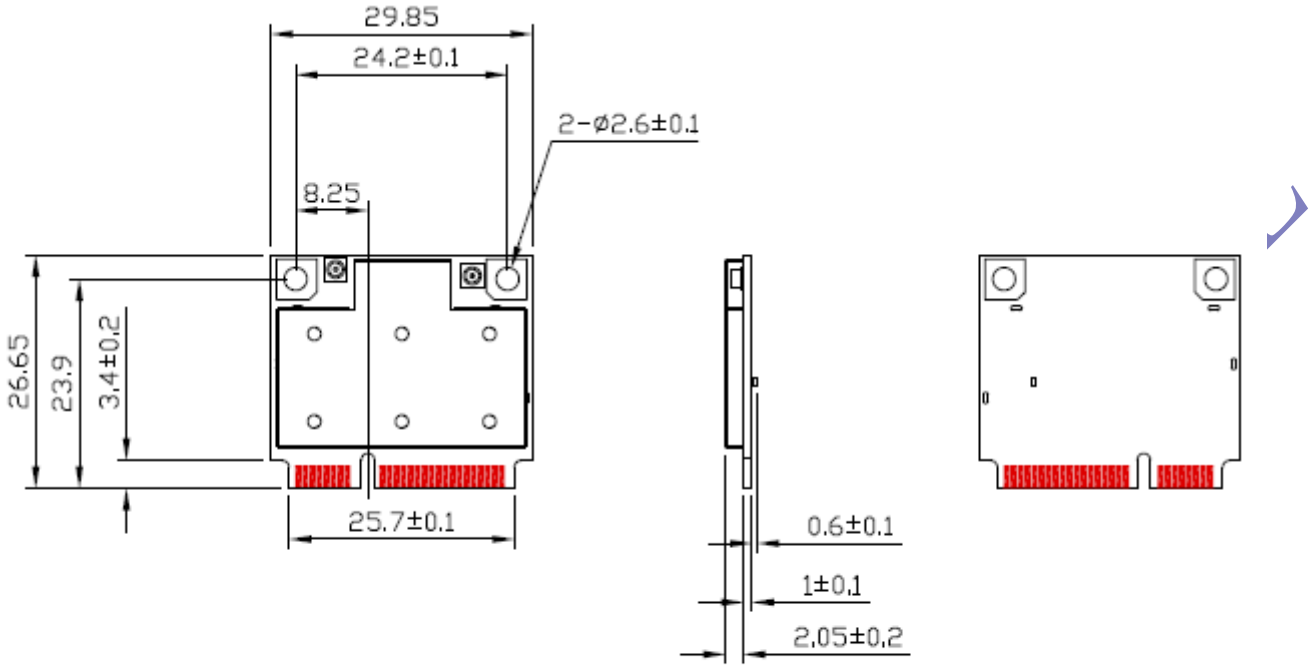
Bluetooth

Test Bed	Dell Vostro 3450	
Test OS	Windows 7 Ultimate SP1 x64	
Driver Version	AZ_AR9485_AR3012_Win7_9.2.0.402_BT_7.3.0.95_20110427	
Test Voltage	3.3V	
Item	UNIT	Note
Transmit Packet	41.5 mA	
Receiver Packet	30.0 mA	

Note. 1.Wifi function is disable.

2.The power consumption data were measured when NB operated in DC (battery) mode.

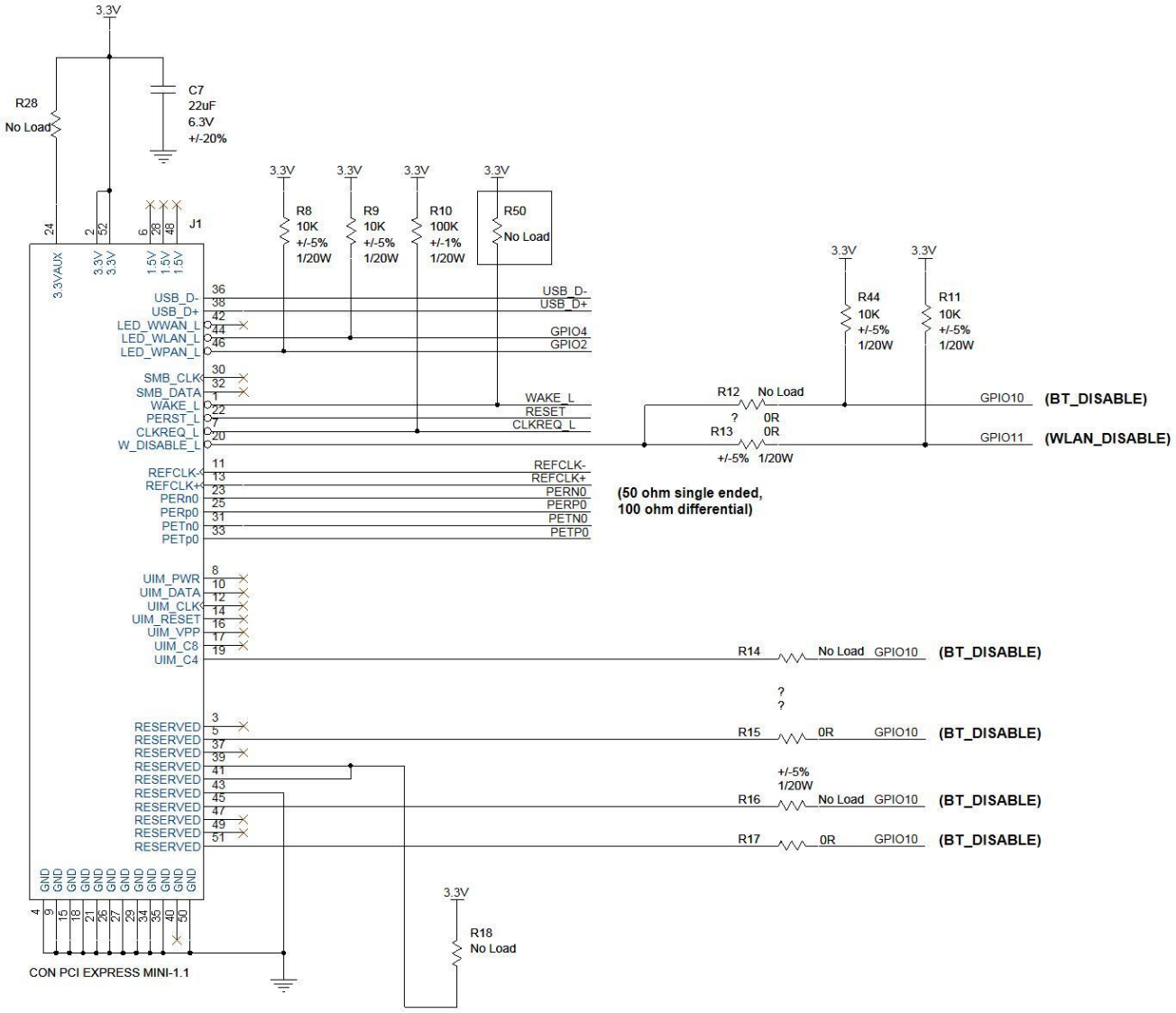
5. Mechanical Dimensions



Tolerances unless otherwise specified : ±0.15mm

6. Connector Pin-out Definitions

Pin No.	Definition	Basic Description	Type
1	WAKE_L	No connect. Should be left open.	NC
2	3.3V	3.3V power supply	Power
3	NC	No connect. Should be left open.	NC
4	GND	Ground	GND
5	BT_ DISABLE	BT disable control. Low disable BT. Module P.U	Input
6	NC	No connect. Should be left open.	NC
7	CLKREQ_L	Reference clock request.	Output
8	NC	No connect. Should be left open.	NC
9	GND	Ground	GND
10	NC	No connect. Should be left open.	NC
11	REFCLK-	Differential reference clock	Input
12	NC	No connect. Should be left open.	NC
13	REFCLK+	Differential reference clock	Input
14	NC	No connect. Should be left open.	NC
15	GND	Ground	GND
16	NC	No connect. Should be left open.	NC
17	NC	No connect. Should be left open.	NC
18	GND	Ground	GND
19	NC	No connect. Should be left open.	NC
20	W_DISABLE_L	WLAN disable control. Low disable WIFI. Module P.U	Input
21	GND	Ground	GND
22	PERST_L	PCI express fundamental reset	Input
23	PERn0	Differential transmit	Output
24	NC	No connect. Should be left open.	NC
25	PERp0	Differential transmit	Output
26	GND	Ground	GND
27	GND	Ground	GND
28	NC	No connect. Should be left open.	NC
29	GND	Ground	GND
30	NC	No connect. Should be left open.	NC
31	PETn0	Differential receive	Input
32	NC	No connect. Should be left open.	NC
33	PETp0	Differential receive	Input
34	GND	Ground	GND
35	GND	Ground	GND
36	USB_D-	USB Differential signal	I/O
37	NC	No connect. Should be left open.	NC
38	USB_D+	USB Differential signal	I/O
39	NC	No connect. Should be left open.	NC
40	NC	No connect. Should be left open.	NC
41	NC	No connect. Should be left open.	NC
42	NC	No connect. Should be left open.	NC
43	GND	Ground	GND
44	LED_WLAN_L	Active low signal. The signal is used to provide WIFI status indicators via LED.	Output
45	NC	No connect. Should be left open.	NC
46	LED_WLAN_L	Active low signal. The signal is used to provide BT status indicators via LED.	Output
47	NC	No connect. Should be left open.	NC
48	NC	No connect. Should be left open.	NC
49	NC	No connect. Should be left open.	NC
50	GND	Ground	GND
51	BT_ DISABLE	BT disable control. Low disable BT. Module P.U	Input
52	3.3V	3.3V power supply	Power



7. Module Photo