



WLAN 802.11bgn 1T1R and BT2.1 EDR combo slim module

Application Note

Combo slim Module

Rev 1.0

APPLICATION NOTE

MS-3822

WLAN 802.11b/g/n 1T1R Slim Module



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Revision History

Revision	Date	Description	Author/Revised by
1.0	2009/11/30	First version	Benson

1. WLAN Module Block Diagram

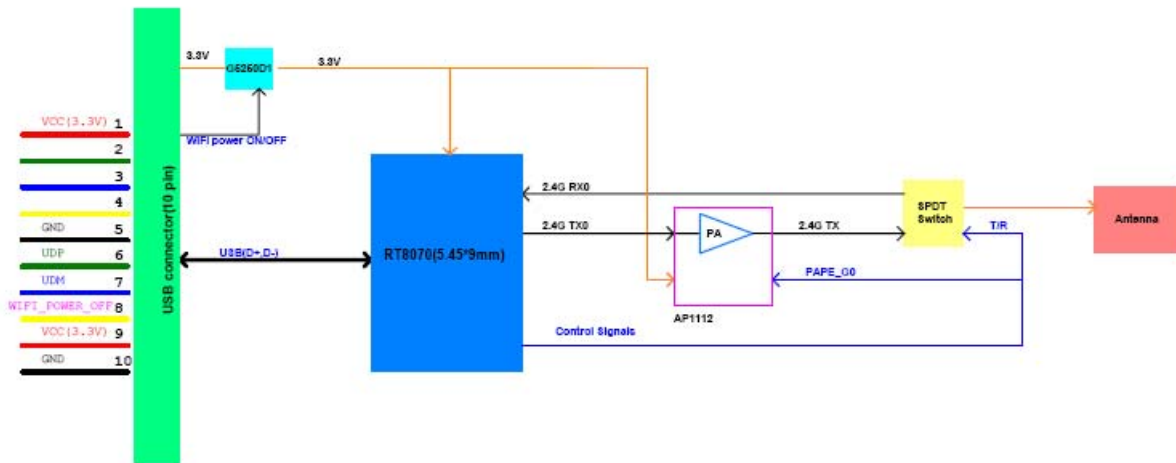


Figure1: WLAN Module Block Diagram

2. Product Specification

Wi-Fi product specification		
Chip information	Ralink RT8070 SoC	
Network Standard	IEEE 802.11n IEEE 802.11b IEEE 802.11g	
Frequency Band	2.400-2.4835 GHz	
Interface	USB 2.0	
Data Rate	<i>IEEE 802.11g</i> (auto-fallback): - OFDM: 54, 48, 36, 24, 18, 12, 9 and 6 Mbps <i>IEEE 802.11b</i> (auto-fallback): - CCK: 11, 5.5 Mbps - DQPSK: 2 Mbps - DBPSK: 1 Mbps <i>IEEE 802.11n</i> (auto-fallback): - OFDM: 6.5 to 150 Mbps (Follow MCS 0~7 standard)	
Media Access Control	CSMA/CA with ACK	
Channel	<i>IEEE 802.11g/n</i> Ch. 1-11 – N. America Ch. 1-13 – Japan Ch. 1-13– Europe ETSI Ch. 10-11 – Spain Ch. 10-13 – France	<i>IEEE 802.11b</i> Ch. 1-11 – N. America Ch. 1-14 – Japan Ch. 1-13– Europe ETSI Ch. 10-11 – Spain Ch. 10-13 – France
Transmission	IEEE 802.11b (DSSS) · IEEE 802.11g/n (OFDM)	
Modulation	<i>IEEE 802.11b</i> (DSSS): CCK @ 11, 5.5 Mbps DQPSK @ 2 Mbps DBPSK @ 1 Mbps <i>IEEE 802.11n</i> (OFDM): OFDM @ 6.5 to 150 Mbps (Follow MCS 0~7 standard)	<i>IEEE 802.11g</i> (OFDM): BPSK @ 6, 9 Mbps QPSK @ 12, 18 Mbps 16-QAM @ 24, 36 Mbps 64-QAM @ 48, 54 Mbps



Application Note

Combo slim Module

Network Architecture	Ad-Hoc Mode (Peer-to-Peer) Infrastructure Mode	
Antenna Type	PCB printed antenna	
Temperature	Operating Temperature	0° to 55°C
	Storage Temperature	-20° to 100°C
Humidity	10%-90% (non-condensing)	
Power Consumption (TBD)	802.11b (11Mbps): mA@3.3V in continuous Tx / mA@3.3V in Rx	
	802.11g (54Mbps): mA@3.3V in continuous Tx / mA@3.3V in Rx	
	802.11n: HT20MHz: mA@3.3V in continuous Tx / mA@3.3V in Rx (MCS7)	
	HT40MHz: mA@3.3V in continuous Tx / mA@3.3V in Rx (MCS7)	
	233mA@3.3V in standby mode	
Dimensions	62*6*3mm	
Weight	3g	
Operating Voltage	3.3V+/-10%	
Output Power	802.11g (54Mbps): 14.0+/-1 dBm 802.11b (11Mbps): 17.0+/-1 dBm 802.11n: 12.0+/-1 dBm	
Receiver Sensitivity (Typical Value)	802.11b (11Mbps): CCK @ 8% PER = <u>-76</u> dBm 802.11g (54Mbps): OFDM @ 10% PER = <u>-65</u> dBm 802.11n: HT20 @ 10% PER = <u>-64</u> dBm / HT40 @ 10% PER = <u>-61</u> dBm	
Range	Up to 300m (outdoor operating range)	
Security	64/128-bit WEP, WPA, WPA2, TKIP, AES, 802.1X, CCX	
Operating System	Windows XP 32/64-bit, Vista 32/64-bit, Win7 32/64-bit	

3. Module Pin Description

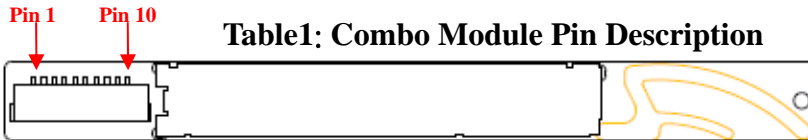


Table1: Combo Module Pin Description

Pin	Name	Type	Description	Note
1	3.3V	P	3.3V DC Power Supply Input for Module Circuits	<ul style="list-style-type: none"> ● Bypassing Capacitor Free ● Ferrite Bead Free
2	NC		NC	
3	NC		NC	
4	LED	O	Active High to enable LED	
5	GND	P	Ground	
6	D+	I/O	D+ Line of USB2.0	WIFI D+
7	D-	I/O	D- Line of USB2.0	WIFI D-
8	WIFI_POWER_OFF	I/O	WIFI_POWER_OFF	Support System Module Turn ON/OFF WIFI Function (Never floating, Threshold 1.4V) WiFi on: High, off: Low
9	3.3V	P	3.3V DC Power Supply Input for Module Circuits	<ul style="list-style-type: none"> ● Bypassing Capacitor Free ● Ferrite Bead Free
10	GND	P	Ground	

***Note:**

- (1) I: Input
- (2) O: Output
- (3) I/O: Bi-Direction
- (4) P: Power

4. Mechanical Specifications

3.1 PCB Mechanical Drawing

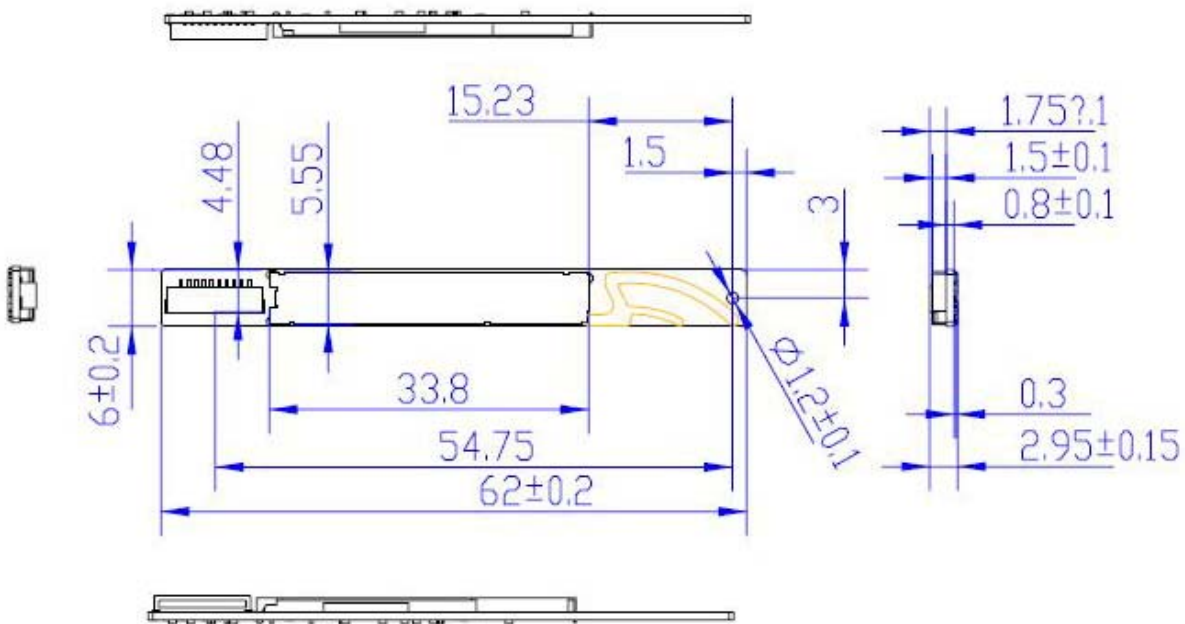
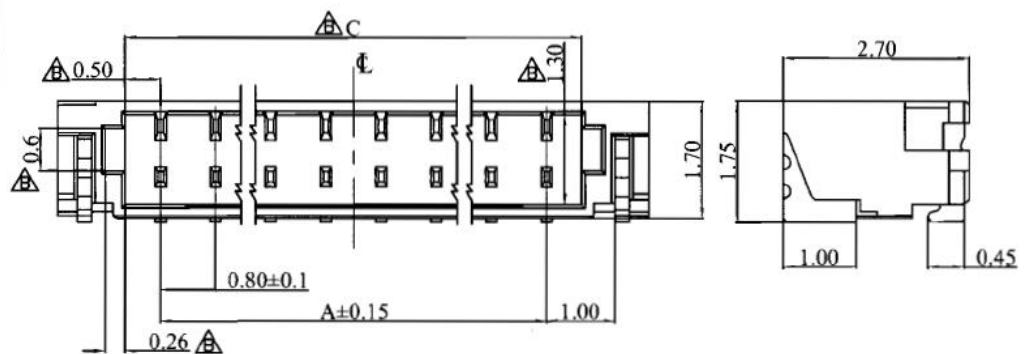


Figure2: WLAN Module Dimension

3.2 Connector Mechanical Drawing

Poles	Dimension mm		
	A	B	C
10	7.2	10.2	8.25



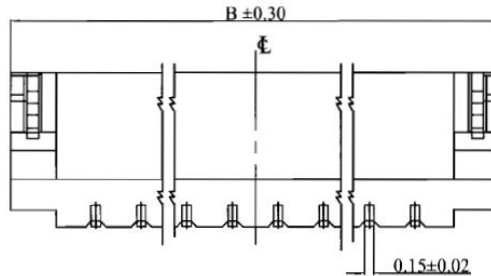


Figure3: Combo Module connector Dimension

4.3 Recommended Cable Length and Gauge

UL1571 32AWG HOOK UP WIRE OD=0.38mm, LENGTH=650mm (MAX.)

PS: This is the very minimum cable selection requirement. Performance could be more optimized if cable length is shorter or premium cable is adopted.

5. Recommended Assembly for WLAN Module



Application Note

Combo slim Module

Rev 1.0

Applying insulating tape or other insulator and adhere it onto the module or LCD panel. This is to prevent the module touching on the panel ground.



1~2mm gap

Giving at least 1-2mm gap or applying insulators (insulating tap) in between module & panel for better isolation. (please note: This gap or isolation is only necessary when there is noise inducing from the LCD panel)

6. Solution for Thermal Reduction and Improving Antenna Gain



Adopting copper /aluminum foil or heat sink and then adhere it onto the top of combo module shielding case. The bigger the foil/heat sink, the better the thermal conduction. Please note that

Application Note

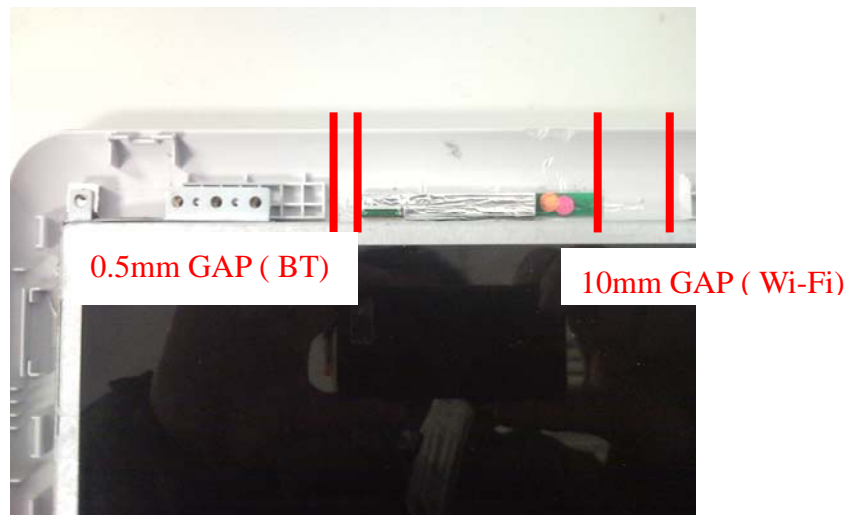
Combo slim Module

Rev 1.0

the size of foil/heat sink should just fit properly onto the shielding case. Foil/ heat sink size larger than shielding area will impact the antenna performance. See below picture as a reference for correct cutting size. Copper foil is highly recommended as it will enhance antenna performance.



7. Recommended Placement for Combo Module's Antennas.



Leaving a gap between the combo module and NB housing (the screw hole) for better antenna performance.

For Wi-Fi side, 10mm gap is recommended.

For Bluetooth side, 0.5mm gap is recommended.

Note: please avoid any metal parts to cover, touch or surround with antenna.

8. Recommended The Size Of Copper /Aluminum Foil



9. Recommended The EMI Coating Area

We suggest the area of EMI Coating must be within the length of Green line :100mm and the width between blue line A and B (from the end of panel to end of A side). Don't Coating exceed this area.

Application Note

Combo slim Module

Rev 1.0

