



**Specifications  
For Wi-Fi Module**

**IEEE 802.11ac and b/g/n  
2Tx2R**

**Model Number: WMC-AC15**

**Revision: 1.00**



## Revision History

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Rev.	Date	Author	Reason for Changes
1.00	2017/04/17	Shelley Hsieh	<ul style="list-style-type: none"><li>• Initial draft</li></ul>



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## **1.0 Scope**

### **1.1 Document**

This document is to specify the product requirements for 802.11a/b/g/n 2x2 DB module. This module is based on RTL chipset that complied with IEEE 802.11n from 2.4/5GHz. In addition to bridging 802.11ac and 802.11b/g/n wireless networks, this model can bridge to wired networks with its integrated 10/100/1000M Ethernet port.

### **1.2 Product Features**

- Compatible with IEEE 802.11b high rate standard to provide wireless 11Mbps data rate
- Compatible with IEEE 802.11g higher speed standard to provide wireless 54Mbps data rate
- Compatible with IEEE 802.11a higher speed standard to provide wireless 54Mbps data rate
- Compatible with IEEE 802.11n higher speed standard to provide wireless 300Mbps data rate
- Compatible with draft 802.11ac higher speed standard to provide wireless 867Mbps data rate
- Operation at 2.4~2.5GHz and 5.15~5.85GHz frequency band to meet worldwide regulations
- 2x2 MIMO Spatial steaming simultaneously to improve highest throughput performance and extended coverage
- Web-based configuration and management
- Support one 10/100/1000M Ethernet port

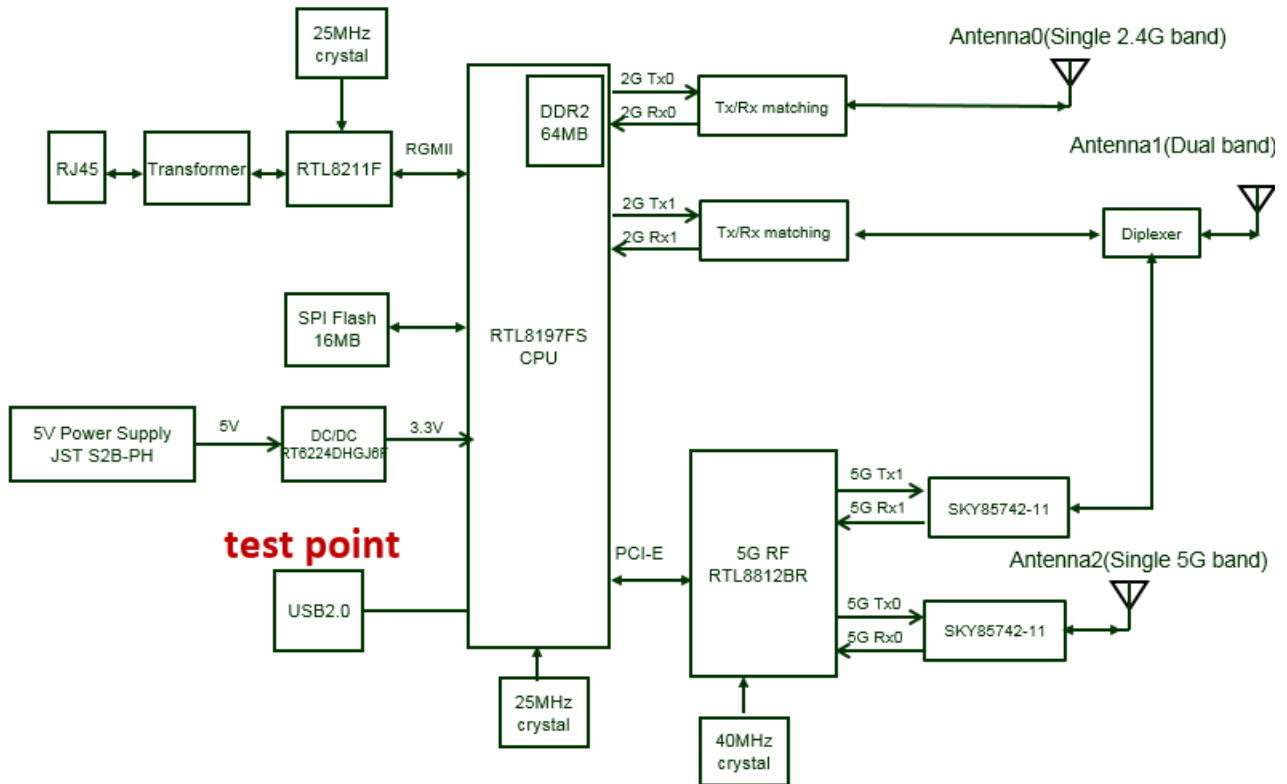


• 2.0 Requirements

The following sections identify the detailed requirements of the **802.11 ac and b/g/n Module**

**2.1 Hardware Specification**

**2.1.1 Functional Block Diagram**



**2.1.2 Hardware Interface and Key Components**

	Feature	Detailed Description
2.1.2.1	LAN Interface	<ul style="list-style-type: none"> <li>One 10/100/1000 Mbps Gigabit Ethernet port</li> </ul>
2.1.2.2	WLAN Interface (2.4 GHz)	<ul style="list-style-type: none"> <li>Compatible with IEEE 802.11n specification</li> <li>Compatible with IEEE 802.11g specification</li> <li>Compatible with IEEE 802.11b specification</li> </ul>
2.1.2.3	WLAN Interface (5GHz)	<ul style="list-style-type: none"> <li>Compatible with draft IEEE 802.11ac specification</li> <li>Compatible with IEEE 802.11a specification</li> <li>Compatible with IEEE 802.11n specification</li> </ul>
2.1.2.4	Power Connector	<ul style="list-style-type: none"> <li>JST S2B-PH-KL or JST S2B-PH-K-S</li> </ul>
2.1.2.5	CPU + WLAN 11b/g/n	<ul style="list-style-type: none"> <li>RTL8197FS</li> </ul>
2.1.2.6	Giga PHY	<ul style="list-style-type: none"> <li>RTL8211F</li> </ul>
2.1.2.7	WLAN 11a/n/ac	<ul style="list-style-type: none"> <li>RTL8812BRH</li> </ul>
2.1.2.8	RAM	<ul style="list-style-type: none"> <li>DDR2 64MB embedded in CPU</li> </ul>
2.1.2.9	Flash	<ul style="list-style-type: none"> <li>SPI Flash 16MB</li> </ul>
2.1.2.10	Console	<ul style="list-style-type: none"> <li>None</li> </ul>



## 2.2 General Requirements

### 2.2.1 IEEE 802.11b Section

#	Feature	Detailed Description
2.2.1.1	Standard	<ul style="list-style-type: none"> <li>IEEE 802.11b</li> </ul>
2.2.1.2	Radio and Modulation Schemes	<ul style="list-style-type: none"> <li>DQPSK, DBPSK, DSSS, and CCK</li> </ul>
2.2.1.3	Operating Frequency	<ul style="list-style-type: none"> <li>2412 ~ 2462MHz ISM band</li> </ul>
2.2.1.4	Channel Numbers	<ul style="list-style-type: none"> <li></li> </ul>
2.2.1.5	Data Rate	<ul style="list-style-type: none"> <li>11, 5.5, 2, and 1Mbps</li> </ul>
2.2.1.6	Media Access Protocol	<ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>
2.2.1.7	Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none"> <li>Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25degree C</li> <li>19dBm at 1, 2, 5.5,11 Mbps</li> </ul> <p>Note: The maximum power setting will vary according to individual country regulations.</p>
2.2.1.8	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none"> <li>Typical Sensitivity at Which Frame (1000-byte PDUs) Error Rate = 8%, comply with IEEE802.11b</li> <li>-76 dBm for 1, 2, 5.5, 11 @ 8% PER</li> </ul>

### 2.2.2 IEEE 802.11g Section

#	Feature	Detailed Description
2.2.2.1	Standard	<ul style="list-style-type: none"> <li>IEEE 802.11g</li> </ul>
2.2.2.2	Radio and Modulation Type	<ul style="list-style-type: none"> <li>BPSK, QPSK, 16QAM, 64QAM with OFDM</li> </ul>
2.2.2.3	Operating Frequency	<ul style="list-style-type: none"> <li>2412 ~ 2462MHz ISM band</li> </ul>
2.2.2.4	Channel Numbers	<ul style="list-style-type: none"> <li></li> </ul>
2.2.2.5	Data Rate	<ul style="list-style-type: none"> <li>6,9,12,18,24,36,48,54Mbps</li> </ul>
2.2.2.6	Media Access Protocol	<ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>
2.2.2.7	Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none"> <li>Typical RF Output Power (tolerance +-2dB) at each RF chain, Data Rate and at room Temp. 25degree C</li> <li>19 dBm at 6~9 Mbps</li> <li>18 dBm at 12~18Mbps</li> <li>17 dBm at 24~36 Mbps</li> <li>16 dBm at 48~54 Mbps</li> </ul> <p>Note: The maximum power setting will vary according to individual country regulations.</p>
2.2.2.8	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none"> <li>Typical Sensitivity at Which Frame (1000-byte PDUs) Error Rate = 10%, comply with IEEE802.11g</li> <li>-82 dBm at 6Mbps</li> <li>-81 dBm at 9Mbps</li> <li>-79 dBm at 12Mbps</li> <li>-77 dBm at 18Mbps</li> <li>-74 dBm at 24Mbps</li> <li>-70 dBm at 36Mbps</li> <li>-66 dBm at 48Mbps</li> <li>-65 dBm at 54Mbps</li> </ul>



### 2.2.3 IEEE 802.11a Section

#	Feature	Detailed Description
2.2.3.1	Standard	<ul style="list-style-type: none"> <li>IEEE 802.11a</li> </ul>
2.2.3.2	Radio and Modulation Type	<ul style="list-style-type: none"> <li>BPSK, QPSK, 16QAM, 64QAM with OFDM</li> </ul>
2.2.3.3	Operating Frequency	<ul style="list-style-type: none"> <li>5.15 ~ 5.25GHz</li> <li>5.25 ~ 5.35GHz</li> <li>5.470 ~ 5.725GHz</li> <li>5.725~5.825GHz</li> </ul>
2.2.3.4	Data Rate	<ul style="list-style-type: none"> <li>54, 48, 36, 24, 18, 12, 9 and 6Mbps</li> </ul>
2.2.3.5	Media Access Protocol	<ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>
2.2.3.6	Maximum Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none"> <li>Typical RF Output Power at each Data Rate at room Temp. 25degree C</li> <li>18 dBm at 6Mbps</li> <li>18 dBm at 9Mbps</li> <li>17 dBm at 12Mbps</li> <li>17 dBm at 18Mbps</li> <li>16 dBm at 24Mbps</li> <li>16 dBm at 36Mbps</li> <li>15 dBm at 48Mbps</li> <li>14 dBm at 54Mbps</li> </ul> <p>Note: The maximum power setting will vary according to individual country regulations.</p>
2.2.3.7	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none"> <li>Typical Sensitivity at Which Frame (1000-byte PDUs) Error Rate = 10%, comply with IEEE802.11a</li> <li>-82 dBm at 6Mbps</li> <li>-81 dBm at 9Mbps</li> <li>-79 dBm at 12Mbps</li> <li>-77 dBm at 18Mbps</li> <li>-74 dBm at 24Mbps</li> <li>-70 dBm at 36Mbps</li> <li>-66 dBm at 48Mbps</li> <li>-65 dBm at 54Mbps</li> </ul>

### 2.2.4 IEEE 802.11n Section

#	Feature	Detailed Description
2.2.4.1	Standard	<ul style="list-style-type: none"> <li>Draft IEEE 802.11n</li> </ul>
2.2.4.2	Radio and Modulation Type	<ul style="list-style-type: none"> <li>BPSK, QPSK, 16QAM, 64QAM with OFDM</li> </ul>
2.2.4.3	Operating Frequency	<ul style="list-style-type: none"> <li>2.4GHz Band:               <ul style="list-style-type: none"> <li>- 2.412 ~ 2.462GHz</li> </ul> </li> <li>5GHz Band:               <ul style="list-style-type: none"> <li>- 5.15 ~ 5.25GHz</li> <li>- 5.25 ~ 5.35GHz</li> <li>- 5.470 ~ 5.725GHz</li> <li>- 5.725 ~ 5.8250GHz</li> </ul> </li> </ul>
2.2.4.4	Media Access Protocol	<ul style="list-style-type: none"> <li>CSMA/CA with ACK</li> </ul>
2.2.4.5		<ul style="list-style-type: none"> <li>Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25degree C</li> </ul>



#	Feature	Detailed Description	
	Maximum Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none"> <li>■ 5GHz Band/HT-20               <ul style="list-style-type: none"> <li>• 18 dBm at MCS0</li> <li>• 18 dBm at MCS1</li> <li>• 17 dBm at MCS2</li> <li>• 17 dBm at MCS3</li> <li>• 16 dBm at MCS4</li> <li>• 16 dBm at MCS5</li> <li>• 15 dBm at MCS6</li> <li>• 14 dBm at MCS7</li> </ul> </li> <li>■ 2.4GHz Band/HT-20               <ul style="list-style-type: none"> <li>• 18 dBm at MCS0</li> <li>• 18 dBm at MCS1</li> <li>• 17 dBm at MCS2</li> <li>• 17 dBm at MCS3</li> <li>• 16 dBm at MCS4</li> <li>• 16 dBm at MCS5</li> <li>• 15 dBm at MCS6</li> <li>• 15 dBm at MCS7</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>■ 5GHz Band/HT-40               <ul style="list-style-type: none"> <li>• 18 dBm at MCS0</li> <li>• 18 dBm at MCS1</li> <li>• 17 dBm at MCS2</li> <li>• 17 dBm at MCS3</li> <li>• 16 dBm at MCS4</li> <li>• 16 dBm at MCS5</li> <li>• 15 dBm at MCS6</li> <li>• 14 dBm at MCS7</li> </ul> </li> <li>■ 2.4GHz Band/HT-40               <ul style="list-style-type: none"> <li>• 17 dBm at MCS0</li> <li>• 17 dBm at MCS1</li> <li>• 16 dBm at MCS2</li> <li>• 16 dBm at MCS3</li> <li>• 16 dBm at MCS4</li> <li>• 16 dBm at MCS5</li> <li>• 15 dBm at MCS6</li> <li>• 15 dBm at MCS7</li> </ul> </li> </ul>
		<i>Note: The maximum power setting will vary according to individual country regulations.</i>	
2.2.4.7	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none"> <li>• Typical Sensitivity at Which Frame (1000-byte PDUs) Error Rate = 10%, and at room temperature 25 degree C</li> </ul>	
		<ul style="list-style-type: none"> <li>■ 5GHz Band/HT-20               <ul style="list-style-type: none"> <li>• -82 dBm at MCS0/8</li> <li>• -79 dBm at MCS1/9</li> <li>• -77 dBm at MCS2/10</li> <li>• -74 dBm at MCS3/11</li> <li>• -70 dBm at MCS4/12</li> <li>• -66 dBm at MCS5/13</li> <li>• -65 dBm at MCS6/14</li> <li>• -64 dBm at MCS7/15</li> </ul> </li> <li>■ 2.4GHz Band/HT-20               <ul style="list-style-type: none"> <li>• -82 dBm at MCS0/8</li> <li>• -79 dBm at MCS1/9</li> <li>• -77 dBm at MCS2/10</li> <li>• -74 dBm at MCS3/11</li> <li>• -70 dBm at MCS4/12</li> <li>• -66 dBm at MCS5/13</li> <li>• -65 dBm at MCS6/14</li> <li>• -64 dBm at MCS7/15</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>■ 5GHz Band/HT-40               <ul style="list-style-type: none"> <li>• -79 dBm at MCS0/8</li> <li>• -76 dBm at MCS1/9</li> <li>• -74 dBm at MCS2/10</li> <li>• -71 dBm at MCS3/11</li> <li>• -67 dBm at MCS4/12</li> <li>• -63 dBm at MCS5/13</li> <li>• -62 dBm at MCS6/14</li> <li>• -61 dBm at MCS7/15</li> </ul> </li> <li>■ 2.4GHz Band/HT-40               <ul style="list-style-type: none"> <li>• -79 dBm at MCS0/8</li> <li>• -76 dBm at MCS1/9</li> <li>• -74 dBm at MCS2/10</li> <li>• -71 dBm at MCS3/11</li> <li>• -67 dBm at MCS4/12</li> <li>• -63 dBm at MCS5/13</li> <li>• -62 dBm at MCS6/14</li> <li>• -61 dBm at MCS7/15</li> </ul> </li> </ul>

### 2.2.5 Draft IEEE 802.11ac Section (5 GHz)

#	Feature	Detailed Description
2.2.5.1	Standard	• Draft IEEE 802.11ac
2.2.5.2	Radio and Modulation Schemes	• BPSK, QPSK, 16QAM, 64QAM , up to 256QAM with OFDM
2.2.5.3	Operating Frequency	<ul style="list-style-type: none"> <li>• 5.15 ~ 5.25GHz</li> <li>• 5.25 ~ 5.35GHz</li> <li>• 5.470 ~ 5.725GHz</li> <li>• 5.725~5.825GHz</li> </ul>
2.2.5.4	Data Rate	• 6.5~866.7 Mbps
2.2.5.5	Media Access Protocol	• CSMA/CA with ACK
2.2.5.6	Transmitter Output Power	VHT20 • 18 dBm at MCS0





#	Feature	Detailed Description
		<ul style="list-style-type: none"> <li>• 18 dBm at MCS1</li> <li>• 17 dBm at MCS2</li> <li>• 17 dBm at MCS3</li> <li>• 16 dBm at MCS4</li> <li>• 16 dBm at MCS5</li> <li>• 15 dBm at MCS6</li> <li>• 14 dBm at MCS7</li> <li>• 14 dBm at MCS8</li> </ul> <p>VTH40</p> <ul style="list-style-type: none"> <li>• 18 dBm at MCS0</li> <li>• 18 dBm at MCS1</li> <li>• 17 dBm at MCS2</li> <li>• 17 dBm at MCS3</li> <li>• 16 dBm at MCS4</li> <li>• 16 dBm at MCS5</li> <li>• 15 dBm at MCS6</li> <li>• 14 dBm at MCS7</li> <li>• 14 dBm at MCS8</li> <li>• 13 dBm at MCS9</li> </ul> <p>VTH80</p> <ul style="list-style-type: none"> <li>• 18 dBm at MCS0</li> <li>• 18 dBm at MCS1</li> <li>• 17 dBm at MCS2</li> <li>• 17 dBm at MCS3</li> <li>• 16 dBm at MCS4</li> <li>• 16 dBm at MCS5</li> <li>• 15 dBm at MCS6</li> <li>• 14 dBm at MCS7</li> <li>• 14 dBm at MCS8</li> <li>• 13 dBm at MCS9</li> </ul> <p>Note: The maximum power setting will vary according to individual country regulations.</p>
2.2.5.7	Receiver Sensitivity	<p>comply with IEEE802.11ac.</p> <p>VHT 20</p> <ul style="list-style-type: none"> <li>• -82 dBm at MCS0</li> <li>• -79 dBm at MCS1</li> <li>• -77 dBm at MCS2</li> <li>• -74 dBm at MCS3</li> <li>• -70 dBm at MCS4</li> <li>• -66 dBm at MCS5</li> <li>• -65 dBm at MCS6</li> <li>• -64 dBm at MCS7</li> <li>• -59 dBm at MCS8</li> </ul> <p>VHT 40</p> <ul style="list-style-type: none"> <li>• -79 dBm at MCS0</li> <li>• -76 dBm at MCS1</li> <li>• -74 dBm at MCS2</li> <li>• -71 dBm at MCS3</li> <li>• -67 dBm at MCS4</li> <li>• -63 dBm at MCS5</li> <li>• -62 dBm at MCS6</li> <li>• -61 dBm at MCS7</li> <li>• -56 dBm at MCS8</li> <li>• -54 dBm at MCS9</li> </ul> <p>VHT 80</p>



#	Feature	Detailed Description
		<ul style="list-style-type: none"> <li>-76 dBm at MCS0</li> <li>-73 dBm at MCS1</li> <li>-71 dBm at MCS2</li> <li>-68 dBm at MCS3</li> <li>-64 dBm at MCS4</li> <li>-60 dBm at MCS5</li> <li>-59 dBm at MCS6</li> <li>-58 dBm at MCS7</li> <li>-53 dBm at MCS8</li> <li>-51 dBm at MCS9</li> </ul>

## 2.2.6 General Section

#	Feature	Detailed Description	
2.2.6.1	Interface	• 1 WAN ports (GbE)	
2.2.6.2	Antenna Type	• Only reserve ANT Connector	
2.2.6.3	LEDs	<b>On/Off Power Indicator</b>	<b>Green On:</b> The device is receiving power and working properly. <b>Red On:</b> Reserve <b>Off:</b> The device does not receive power.
		<b>Boot System Indicator</b>	<b>Green On:</b> The device is functioning properly. <b>Off:</b> The device is not ready or malfunctioned.
		<b>WiFi layer connectivity</b>	<b>Green On:</b> The device is ready and connected to the AP, but is not sending or receiving data through the WiFi WAN. <b>Green Blinking:</b> The device is sending or receiving data through the WiFi WAN. <b>Off:</b> The WiFi WAN is not ready or is not connected to the AP or has failed.

## 2.3 Software Requirements

The configuration of Router can be done through the Wireless/Ethernet port by using the Web based application.

### 2.3.1 Function Table

SETUP	ADVANCED	TOOLS	STATUS	SUPPORT
Internet	Advanced Wireless	Admin	Device Info	Menu
Wireless Settings	WI-FI Protected Setup	Time	Logs	
Network Settings	Advanced Network	System	Statistics	
	Firewall Settings	Firmware	Wireless	
	Guest Zone	Dynamic DNS		



	Mac Address Filter			
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This web-based configuration interface includes the following functions:

- **Setup**  
Setup allows you to configure parameters for Internet connection, wire networking and wireless networking by manually configuration.
- **Advanced**  
Advanced Function Configuration allows you to configure advanced features such as firewall setting ....etc.
  - **Tools**  
Maintenance provides administrators to manage the router.
- **Status**  
Status allows you to display the router information and status.
- **Help**  
To provide an online user manual that facilitates the setup.

### 2.3.2 Setup

	Feature	Detailed Description
2.3.2.1	Internet	<ul style="list-style-type: none"> <li>• To set up Internet connection by using <b>Manual Internet Connection Setup.</b></li> <li>• <b>Static IP Address</b> Select this option if your ISP (Internet Service Provider) has provided you with an IP address, Subnet Mask, Default Gateway, and a DNS server address. Enter this information in the appropriate fields.</li> <li>• <b>Dynamic IP Address</b> Select this option if your ISP (Internet Service Provider) provides you an IP address automatically. Cable modem providers typically use dynamic assignment of IP Address.</li> <li>• <b>PPPoE</b> Select this option if your ISP requires you to use a PPPoE (Point to Point Protocol over Ethernet) connection. DSL providers typically use this option. Select Dynamic PPPoE to obtain an IP address automatically for your PPPoE connection (used by majority of PPPoE connections). Select Static PPPoE to use a static IP address for your PPPoE connection.</li> <li>• <b>PPTP</b> Select this option if your ISP uses a PPTP (Point to Point Tunneling Protocol) connection and has assigned you a username and password in order to access the Internet. Select Dynamic PPTP to obtain an IP address automatically for your PPTP connection. Select Static PPTP to use a static IP address for your PPTP connection.</li> </ul>
2.3.2.2	Wireless Settings	<ul style="list-style-type: none"> <li>• The wireless section is used to configure the wireless settings for the router.</li> <li>• <b>Wireless Network Settings</b> This section allows administrator to setup the wireless network settings such as SSID, Wireless Channel, Enable auto channel selection, Transmission Rate, Enable Hidden Wireless</li> </ul>



	Feature	Detailed Description
		<ul style="list-style-type: none"> <li> <b>Wireless Security Mode</b>            To protect your privacy you can configure wireless security features. This device supports those wireless security modes, WPA-PSK, WPA2-PSK , WPA/WPA2. WPA provides a higher level of security. WPA-Personal does not require an authentication server.         </li> </ul>
2.3.2.3	Network Setting	<ul style="list-style-type: none"> <li>To configure the internal network settings of the router and also to configure the built-in DHCP Server to assign IP addresses to the computers on the local area network.</li> <li> <b>Router Setting</b>            The IP address that is configured here is the IP address that you use to access the Web-based management interface.         </li> <li> <b>DHCP Server Setting</b>            Use this section to configure the built-in DHCP server to assign IP address to the computers on your network.         </li> <li> <b>DHCP Client List</b>            Dynamic DHCP client computers connected to the unit will have their information displayed in the Dynamic DHCP Client Table. The table will show the Host Name, IP Address, MAC Address, and Expired Time of the DHCP lease for each client computer.         </li> <li> <b>DHCP Reservation</b>            This section allows users to enter the "Computer Name", "IP Address" and "MAC Address" manually for the PC that you desire to have the router to statically assign the same IP to or choose the PC from the drop down menu which shows current DHCP clients.         </li> </ul>

### 2.3.3 Advanced Function Configuration

	Feature	Detailed Description
2.3.3.1	Advanced Wireless	<ul style="list-style-type: none"> <li>These options are to change the behavior of their 802.11n wireless radio from the standard settings. It allows the administrators to change some advanced wireless settings, such as Transmit Power, WMM enable, and Enable Wireless Partition.</li> </ul> <p><b>Transmit Power</b> User can set Transmit Power of the antenna.</p> <p><b>WLAN Partition</b> WLAN Partition prevents associated wireless clients from communicating with each other.</p> <p><b>WMM</b> WMM is QoS for wireless network.</p> <p><b>HT20/40 Coexistence</b> Enabling coexistence to ensure 802.11b/802.11g devices can work in mixed-mode network.</p>



	Feature	Detailed Description
2.3.3.2	Wi-Fi Protected Setup	<ul style="list-style-type: none"> <li>Wi-Fi Protected Setup is used to easily add devices to a network using a PIN or button press.</li> </ul> <p><b>Wi-Fi Protected Setup</b></p> <p><b>Enable:</b> This section allows admins to enable and disable WPS.</p> <p><b>Lock WPS-PIN Setup</b> Locking the WPS-PIN Setup prevents the settings from being changed by any new external registrar using its PIN. Devices can still be added to the wireless network using Wi-Fi Protected Setup. It is still possible to change wireless network settings with Manual Wireless Network Setup or Wireless Network Setup Wizard.</p> <p><b>PIN Settings</b> A PIN is a unique number that can be used to add the router to an existing network or to create a new network. The default PIN may be printed on the bottom of the router. For extra security, a new PIN can be generated.</p> <p><b>Add Wireless Station</b> This Wizard helps you add wireless devices to the wireless network. It will either display the wireless network settings to guide you through manual configuration, prompt you to enter the PIN for the device, or ask you to press the configuration button on the device. If the device supports Wi-Fi Protected Setup and has a configuration button, you can add it to the network by pressing the configuration button on the device and then the on the router within 120 seconds.</p>
2.3.3.3	Advanced Network	<ul style="list-style-type: none"> <li>Provide advanced network settings such as UPnP, WAN Ping, WAN Speed, and Multicast stream Enablers.</li> </ul> <p><b>UPnP</b> This section allows admins to enable or disable UpnP which helps other UpnP LAN hosts interoperate with the router. Leave the UpnP option enabled as long as the LAN has other UpnP applications.</p> <p><b>WAN Ping</b> If admins enable this feature, the WAN port of your router will respond to ping requests from the Internet that are sent to the WAN IP Address.</p> <p><b>WAN Port Speed</b> The WAN speed is usually detected automatically. However, admins can select the speed manually.</p> <p><b>Multicast Stream</b> The router uses the IGMP protocol to support efficient multicasting – transmission of identical content, such as multimedia, from a source to a number of recipients. This section allows admins to enable or disable multicast stream support. Default setting under IPv4 is disabled and under IPv6 is enabled.</p>



	Feature	Detailed Description
2.3.3.4	Firewall Settings	<ul style="list-style-type: none"> <li>The router provides a tight firewall by virtue of the way NAT works. Unless configuring the router to the contrary, the NAT does not respond to unsolicited incoming requests on any port, thereby making the LAN invisible to Internet cyberattackers.</li> <li><b>Firewall Setting</b> This section allows administrator to enable SPI ("stateful packet inspection" also known as "dynamic packet filtering") which helps to prevent cyberattacks by tracking more state per session. It validates that the traffic passing through that session conforms to the protocol. When the protocol is TCP, SPI checks that packet sequence numbers are within the valid range for the session, discarding those packets that do not have valid sequence numbers.</li> <li><b>DMZ Host</b> DMZ means "Demilitarized Zone." If an application has trouble working from behind the router, administrator can expose one computer to the Internet and run the application on that computer. When a LAN host is configured as a DMZ host, it becomes the destination for all incoming packets that do not match some other incoming session or rule. If any other ingress rule is in place, that will be used instead of sending packets to the DMZ host; so, an active session, virtual server, active port trigger, or port forwarding rule will take priority over sending a packet to the DMZ host.</li> <li><b>Application Level Gateway (ALG) Configuration</b> Here admins can enable or disable ALGs. Some protocols and applications require special handling of the IP payload to make them work with network address translation (NAT). Each ALG provides special handling for a specific protocol or application. A number of ALGs for common applications are enabled by default.</li> </ul>
2.3.3.5	Guest Zone	<ul style="list-style-type: none"> <li>The guest zone provide a separate network zone for guest to access Internet.</li> </ul>
2. 3. 3. 6	Mac Address Filter	<ul style="list-style-type: none"> <li>The MAC (Media Access Controller) Address filter option is used to control network access based on the MAC Address of the network adapter. A MAC address is a unique ID assigned by the manufacturer of the network adapter. This feature can be configured to ALLOW or DENY network/Internet access.</li> </ul>

### 2.3.4 Tools

	Feature	Detailed Description
2.3.4.1	Admin	<ul style="list-style-type: none"> <li>The Admin option is used to set a password for access to the Web-based management and enable Remote Management that allows administrator to manage the router from anywhere on the Internet.</li> </ul>
		<p><b>Admin Password</b> Enter a password for the user "admin", who will have full access to the Web-based management interface.</p> <p><b>System Name</b> The name of the router can be changed here.</p> <p><b>Administration</b> Enabling Remote Management allows you to manage the router from anywhere on the Internet. Disabling Remote Management allows you to manage the router only from computers on your LAN.</p>
2.3.4.2	Time	<p>The Time Configuration option allows admins to configure, update, and maintain the correct time on the router's internal system clock.</p>
		<p><b>Time And Date Configuration</b> From this section admins can set the time zone that users are in and</p>



	Feature	Detailed Description
		<p>daylight saving can also be configured to automatically adjust the time when needed.</p> <p><b>Automatic Time Configuration</b> This section allows admins to setup the time configuration through NTP.</p> <p><b>Set The Date and Time Manually</b> This section allows admins to setup the time configuration manually or copy the setting from PC.</p>
2.3.4.3	System	<ul style="list-style-type: none"> <li>This section allows administrator to save setting to administrator's local hard drive or load settings from administrator's local hard drive, and restore the router to the factory default settings. Restoring the unit to the factory default settings will erase all settings, including any rules that have created.</li> </ul>
2.3.4.4	Firmware Update	<ul style="list-style-type: none"> <li>The Firmware Upgrade section can be used to update to the latest firmware code to improve functionality and performance.</li> </ul> <p><b>Firmware Information</b> Here are displayed the version numbers of the firmware currently installed in your router and the most recent upgrade that is available.</p> <p><b>Firmware Upgrade</b> This section allows admins to upgrade the firmware by uploading it from their local hard drive.</p>
2.3.4.5	DDNS setting	<ul style="list-style-type: none"> <li>Dynamic DNS settings: This section allows clients can enter a host name to register a dedicated DDNS server. (DynDDNS)</li> </ul>

### 2.3.5 Status

	Feature	Detailed Description
2.3.5.1	Device Info	<ul style="list-style-type: none"> <li>All of your Internet and network connection details are displayed on the Device Info page. The firmware version is also displayed here.</li> </ul>
2.3.5.2	Log	<ul style="list-style-type: none"> <li>The router automatically logs (records) events of possible interest in its internal memory. If there is not enough internal memory for all events, logs of older events are deleted, but logs of the latest events are retained.</li> </ul>
2.3.5.3	Statistics	<ul style="list-style-type: none"> <li>The Statistics page displays all of the LAN, WAN, and Wireless packet transmit and receive statistics.</li> </ul>
2.3.5.4	Wireless	<ul style="list-style-type: none"> <li>The wireless section allows you to view the wireless clients that are connected to your wireless router.</li> </ul>

### 2.3.6 Support

	Feature	Detailed Description
2.2.6.1	Support	Manual

### 2.4 Mechanical Requirements

	Feature	Detailed Description
2.3.1	Length	<ul style="list-style-type: none"> <li>88mm</li> </ul>
2.3.2	Width	<ul style="list-style-type: none"> <li>46.75mm</li> </ul>
2.3.3	High	<ul style="list-style-type: none"> <li>1.6mm</li> </ul>



## 2.5 Environment Requirement

	Feature	Detailed Description
2.5.1	Operating Temperature Conditions	<ul style="list-style-type: none"><li>The product is capable of continuous reliable operation when operating in ambient temperature of -10 °C to +50°C.</li></ul>
2.5.2	Non-Operating Temperature Conditions	<ul style="list-style-type: none"><li>Neither subassemblies is damaged nor the operational performance be degraded when restored to the operating temperature after exposing to storage temperature in the range of -20 °C to +60 °C.</li></ul>
2.5.3	Operating Humidity conditions	<ul style="list-style-type: none"><li>The product is capable of continuous reliable operation when subjected to relative humidity in the range of 10% and 90% non-condensing.</li></ul>
2.5.4	Non-Operating Humidity Conditions	<ul style="list-style-type: none"><li>The product is not be damaged nor the performance be degraded after exposure to relative humidity ranging from 5% to 95% non-condensing</li></ul>





## Federal Communication Commission Interference Statement

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 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.

### FCC Caution:

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

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.

### Important Note:

#### Radiation Exposure Statement

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 and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/Canada.

This device is intended only for OEM integrators under the following conditions:

1. The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2. The transmitter module may not be co-located with any other transmitter or antenna,
3. For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as the three conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

### Important Note:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

### End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following:

Contains FCC ID: RRK-WMCAC15.

#### Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

### Antenna Information

This radio transmitter (FCC ID: RRK-WMCAC15) has been approved by FCC to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Model	Type	Connector	Peak gain ( dBi )				
			2412~2462 MHz	5150~5250 MHz	5250~5350 MHz	5470~5725 MHz	5725~5850 MHz
296242441	PCB Dipole	IPEX MHF	0	-2.0	-2.0	-2.0	-2.0



## Industry Canada Statement

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

- This device may not cause interference; and
- This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

- l'appareil ne doit pas produire de brouillage;
- l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This radio transmitter (IC: 4833A-WMCAC15) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (IC: 4833A-WMCAC15) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

### Antenna Information

Model	Type	Connector	Peak gain ( dBi )				
			2412~2462 MHz	5150~5250 MHz	5250~5350 MHz	5470~5725 MHz	5725~5850 MHz
296242441	PCB Dipole	IPEX MHF	0	-2.0	-2.0	-2.0	-2.0

### Caution:

(i) The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

(ii) For devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250- 5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the EIRP limit;

(iii) For devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725- 5850 MHz shall be such that the equipment still complies with the EIRP limits specified for point-to-point and non-point-to-point operation as appropriate; and Operations in the 5.25-5.35GHz band are restricted to indoor usage only.

### Avertissement:

(i) les dispositifs fonctionnant dans la bande de 5150 à 5250MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

(ii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis pour les dispositifs utilisant les bandes de 5250 à 5350MHz et de 5470 à 5725 MHz doit être conforme à la limite de la p.i.r.e.;

(iii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis (pour les dispositifs utilisant la bande de 5725 à 5850 MHz) doit être conforme à la limite de la p.i.r.e. spécifiée pour l'exploitation point à point et l'exploitation non point à point, selon le cas;

Les opérations dans la bande de 5.25-5.35GHz sont limitées à un usage intérieur seulement.

### Radiation Exposure Statement

This equipment complies with Canada 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.

### Déclaration d'exposition aux radiations

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

This device is intended only for OEM integrators under the following condition:

- The transmitter module may not be co-located with any other transmitter or antenna.

As long as the condition above is met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes:

- Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 1 condition ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires.

Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.



#### **Important Note:**

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

#### **Note Importante:**

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

#### **End Product Labeling**

The final end product must be labeled in a visible area with the following: Contains IC: 4833A-WMCAC15.

#### **Plaque signalétique du produit final**

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: Contient des IC: 4833A-WMCAC15.

#### **Manual Information to the End User**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

#### **Manuel d'information à l'utilisateur final**

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.