

IEEE 802.11 b/g/n WiFi Router

MODEL: WP0DR1110

Custom Approval Section		
Custom Name		
Department		
Approval		Date:

DESIGN	CHECK	APPROVAL

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Document revision history

1. General Description

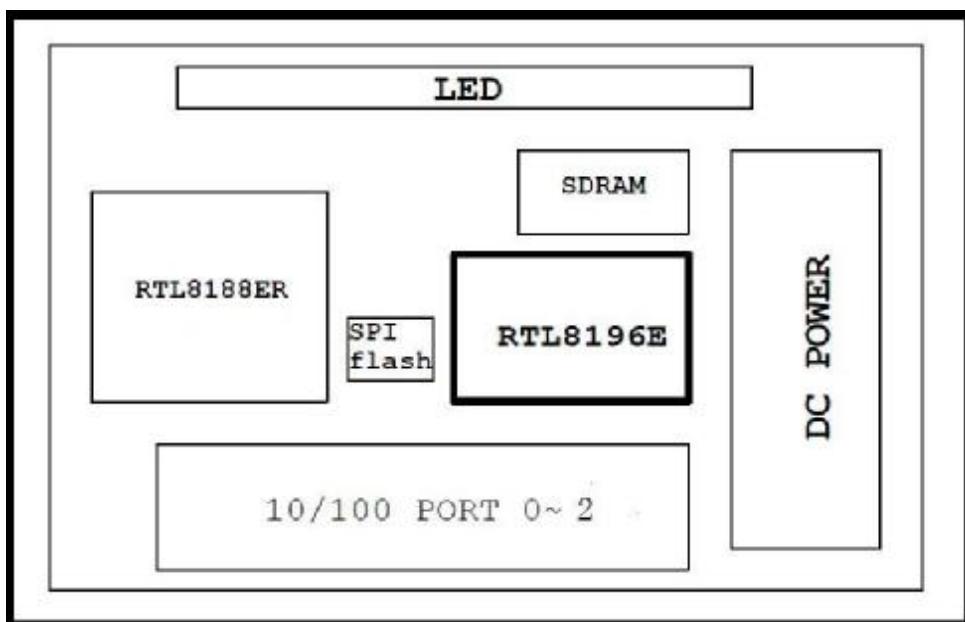
This document is to specify the product requirements for WiFi Router Module. This Module is based on Realtek RTL8196E chipset that complied with IEEE 802.11g, IEEE 802.11b, IEEE 802.11n standard from 2.4G-2.5GHz, and it can be used to provide up to 54Mbps for 802.11g, 11Mbps for 802.11b and 150Mbps for 802.11n.

I Features

- I Application Modes: Wireless Client & Access Point
- I Port: 1x WAN, 2x LAN
- I Compatible with IEEE 802.11b standard to provide wireless 11Mbps data rate.
- I Compatible with IEEE 802.11g standard to provide wireless 54Mbps data rate.
- I Compatible with IEEE 802.11n standard to provide wireless 150Mbps data rate.
- I Operation at 2.4G-2.5GHz frequency band to meet worldwide regulations
- I Dynamic data rate scaling at 6,9,12,18,24,36,48,54 for IEEE802.11g
- I Dynamic data rate scaling at 1,2,5.5, and 11Mbps for IEEE802.11b
- I Maximum reliability, throughput and connectivity with automatic data rate switching
- I Support wireless data encryption with 64/128-bit WEP for security
- I RoHS compliant.

3. Application Diagrams

3.1 Functional Block Diagram



3.2 General Requirements

3.2.1 IEEE 802.11b Section

	Feature	Detailed Description
3.2.1.1	Standard	<ul style="list-style-type: none">IEEE 802.11b
3.2.1.2	Radio and Modulation Schemes	<ul style="list-style-type: none">DQPSK , DBPSK , DSSS , and CCK
3.2.1.3	Operating Frequency	<ul style="list-style-type: none">2412 ~ 2462MHz ISM band
3.2.1.4	Channel Numbers	<ul style="list-style-type: none">11 channels for United States13 channels for Europe Countries14 channels for Japan
3.2.1.5	Data Rate	<ul style="list-style-type: none">11, 5.5, 2, and 1Mbps
3.2.1.6	Media Access Protocol	<ul style="list-style-type: none">CSMA/CA with ACK
3.2.1.7	Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none">Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25degree C16dBm(±2dB) at 1,2,5.5,11Mbps
3.2.1.8	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none">Typical Sensitivity at Which Frame(1000-byte PDUs)Error Rate=8%-88dBm at 1Mbps-88dBm at 2Mbps-88dBm at 5.5Mbps-86dBm for 11Mbps

3.2.2 IEEE 802.11g Section

	Feature	Detailed Description
3.2.2.1	Standard	<ul style="list-style-type: none">IEEE 802.11g
3.2.2.2	Radio and Modulation Type	<ul style="list-style-type: none">QPSK , BPSK , 16QAM ,64QAM with OFDM
3.2.2.3	Operating Frequency	<ul style="list-style-type: none">2412 ~ 2462MHz ISM band
3.2.2.4	Channel Numbers	<ul style="list-style-type: none">11 channels for United States13 channels for Europe Countries13 channels for Japan
3.2.2.5	Data Rate	<ul style="list-style-type: none">6,9,12,18,24,36,48,54Mbps
3.2.2.6	Media Access Protocol	<ul style="list-style-type: none">CSMA/CA with ACK
3.2.2.7	Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none">Typical RF Output Power(tolerance±2dB) at each RF chain, Data Rate and at room Temp. 25degree C16±2dBm at 6~18Mbps15±2dBm at 36 and 24Mbps13±2dBm at 54 and 48Mbps
3.2.2.8	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none">Typical Sensitivity at Which Frame(1000-byte PDUs)Error rate=10%-87dBm at 6Mbps-86dBm at 9Mbps-84dBm at 12Mbps-82dBm for 18Mbps-79dBm at 24Mbps

		<ul style="list-style-type: none"> • -75dBm at 36Mbps • -71dBm at 48Mbps • -70dBm for 54Mbps
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3.2.3 IEEE 802.11n draft 2.0 Section

	Feature	Detailed Description																																																				
3.2.3.1	Standard	<ul style="list-style-type: none"> • IEEE 802.11n 																																																				
3.2.3.2	Radio and Modulation Type	<ul style="list-style-type: none"> • BPSK , QPSK , 16QAM ,64QAM with OFDM 																																																				
3.2.3.3	Operating Frequency	<ul style="list-style-type: none"> • 2412 ~ 2462MHz ISM band • Channel Frequency for HT20: 2412~2462MHz • Channel Frequency for HT40: 2422~2452MHz 																																																				
3.2.3.4	Data Rate(Mbps)	<ul style="list-style-type: none"> • TX/RX: MCS0 ~MCS7 <table border="1"> <thead> <tr> <th rowspan="2">MCS</th> <th colspan="2">GI=800ns</th> <th colspan="2">GI=800ns</th> </tr> <tr> <th>20MHz</th> <th>40MHz</th> <th>20MHz</th> <th>40MHz</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>6.5</td> <td>13.5</td> <td>7.2</td> <td>15</td> </tr> <tr> <td>1</td> <td>13</td> <td>27</td> <td>14.4</td> <td>30</td> </tr> <tr> <td>2</td> <td>19.5</td> <td>40.5</td> <td>21.7</td> <td>45</td> </tr> <tr> <td>3</td> <td>26</td> <td>54</td> <td>28.9</td> <td>60</td> </tr> <tr> <td>4</td> <td>39</td> <td>81</td> <td>43.3</td> <td>90</td> </tr> <tr> <td>5</td> <td>52</td> <td>108</td> <td>57.8</td> <td>120</td> </tr> <tr> <td>6</td> <td>58.5</td> <td>121.5</td> <td>65.0</td> <td>135</td> </tr> <tr> <td>7</td> <td>65</td> <td>135</td> <td>72.2</td> <td>150</td> </tr> </tbody> </table>				MCS	GI=800ns		GI=800ns		20MHz	40MHz	20MHz	40MHz	0	6.5	13.5	7.2	15	1	13	27	14.4	30	2	19.5	40.5	21.7	45	3	26	54	28.9	60	4	39	81	43.3	90	5	52	108	57.8	120	6	58.5	121.5	65.0	135	7	65	135	72.2	150
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3.2.3.5	Media Access Protocol	<ul style="list-style-type: none"> • CSMA/CA with ACK 																																																				
3.2.3.6	Transmitter Output Power at Antenna Connector	<ul style="list-style-type: none"> • Typical RF Output Power(tolerance±2dB) at each RF chain,Data Rate and at room Temp. 25degree C • 16±2dBm at MCS 0,1 • 16±2dBm at MCS 2,3 • 15±2dBm at MCS 4,5 • 13±2dBm at MCS 6,7 <p>HT 40</p> <ul style="list-style-type: none"> • 15±2dBm at MCS 0,1 • 15±2dBm at MCS 2,3 • 14±2dBm at MCS 4,5 • 12±2dBm at MCS 6,7 																																																				
3.2.3.7	Receiver Sensitivity at Antenna Connector	<ul style="list-style-type: none"> • Typical Sensitivity at Which Frame(1000-byte PDUs)Error Rate=10% <p>HT20</p> <ul style="list-style-type: none"> • -85dBm at MCS0 • -82dBm at MCS1 • -80dBm at MCS2 • -77dBm at MCS3 • -74dBm at MCS4 • -70dBm at MCS5 • -68dBm at MCS6 • -66dBm at MCS7 <p>HT40</p> <ul style="list-style-type: none"> • -82dBm at MCS0 • -79dBm at MCS1 																																																				

		<ul style="list-style-type: none"> • -77dBm at MCS2 • -74dBm at MCS3 • -71dBm at MCS4 • -67dBm at MCS5 • -65dBm at MCS6 • -63dBm at MCS7
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4. Electrical and Thermal Characteristics

4.1 Temperature Limit Ratings

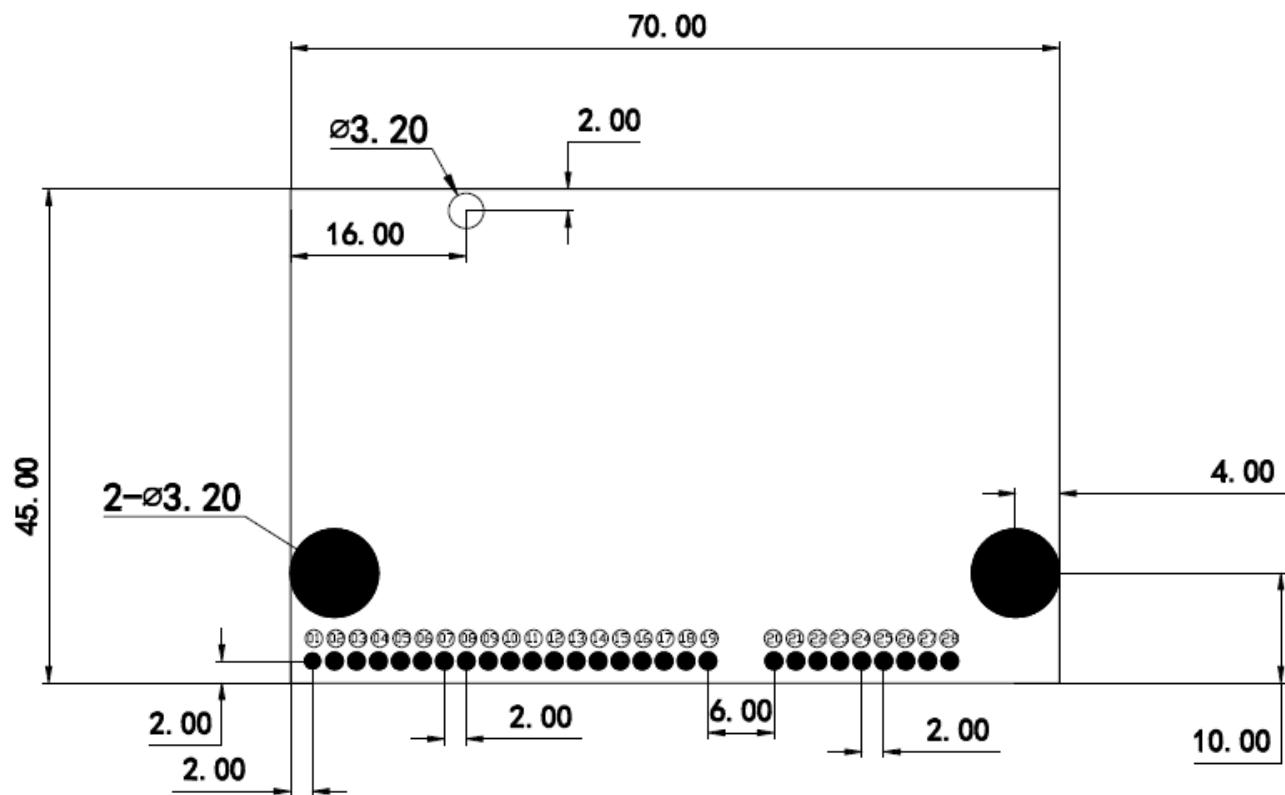
Parameter	Minimum	Maximum	Units
Storage Temperature	-55	+125	°C
Ambient Operating Temperature	0	70	°C
Junction Temperature	0	125	°C

4.2 General Section

	Feature	Detailed Description
4.2.1	Antenna Type	<ul style="list-style-type: none"> • Integrated antenna
4.2.2	Operating power	<ul style="list-style-type: none"> • DC 3.3V/500mA

4.3 Mechanical Dimensions

J1	Pin	1	2	3	4	5	6
	Definition	Uart_TX	Uart_RX	GND	WPS	RST-PCB	LED0
	Pin	7	8	9	10	11	12
	Definition	LED_Wlan	LED2	GND	TX0P	TX0N	RX0P
	Pin	13	14	15	16	17	18
	Definition	RX0N	GND	TX2P	TX2N	GND	RX2P
	Pin	19	20	21	22	23	24
	Definition	RX2N	TX4P	TX4N	GND	RX4P	RX4N
	Pin	25	26	27	28		
	Definition	GND	GND	3.3V	3.3V		



FCC STATEMENT

1. This device complies with Part 15 of the FCC Rules and Industry Canada licence-exempt RSS standard(s). 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.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, Human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

This equipment complies with FCC radiation limits set forth for an uncontrolled environment. This equipment must not be co-located or operating with any other antenna or transmitter. This module is designed to comply with FCC statement FCC ID is: 2ADID-WP0DR1110. The host system using this module should have label in a visible area indicated the following texts "Contains FCC ID : 2ADID-WP0DR1110".