



PRODUCT SPECIFICATION

Version 1.0

IEEE 802.11 b/g/n WiFi Router MODEL: WP25M1200

Custom Approval Section		
Custom Name		
Department		
Approval		Date:

DESIGN	CHECK	APPROVAL

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Document revision history

Revision	Date	Approved by	Remarks
Version 1.0	2017-05-26		Draft

1. General Description

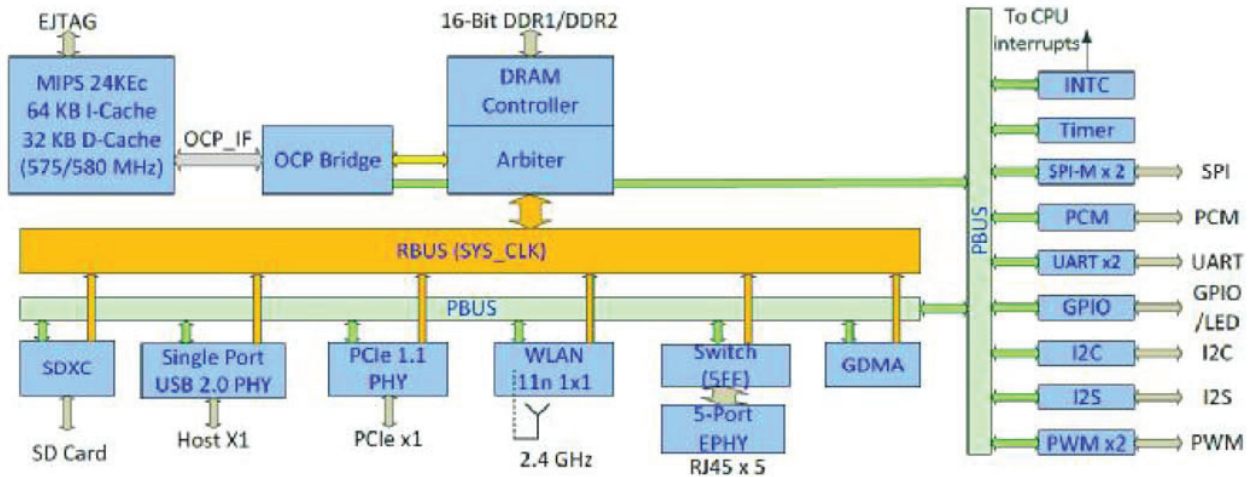
This document is to specify the product requirements for WiFi Router Module. This Module is based on MTK MT7688AN chipset that complied with IEEE 802.11g, IEEE 802.11b, IEEE 802.11n standard from 2.4G-2.5GHz, and it can be used to provide up to 54Mbps for 802.11g, 11Mbps for 802.11b and 150Mbps for 802.11n.

2. Features

- Application Modes: IoT gateway mode and IoT device mode
- Port: 1x WAN, 1x LAN
- Support Linux platform, OpenWRT
- USB2.0 host, PCIe, SD-XC, I2C, I2S/PCM and GPIOs
- Compatible with IEEE 802.11b standard to provide wireless 11Mbps data rate.
- Compatible with IEEE 802.11g standard to provide wireless 54Mbps data rate.
- Compatible with IEEE 802.11n standard to provide wireless 150Mbps data rate.
- Operation at 2.4G-2.5GHz frequency band to meet worldwide regulations
- Maximum reliability, throughput and connectivity with automatic data rate switching
- Support wireless data encryption with 64/128-bit WEP for security
- 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">• 2412-2462 MHz ISM band
3.2.1.4	Channel Numbers	<ul style="list-style-type: none">• 11 channels
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 C
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



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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">• 2412-2462 MHz ISM band
3.2.2.4	Channel Numbers	<ul style="list-style-type: none">• 11 channels
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\pm2dB) at each RF chain,Data Rate and at room Temp. 25degree C
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• -75dBm at 36Mbps• -71dBm at 48Mbps• -70dBm for 54Mbps



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3.2.3 IEEE 802.11n 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"> 2400 ~ 2483.5MHz ISM band Channel Frequency for HT20: 2412-2462 MHZ Channel Frequency for HT40: 2422-2452 MHZ 																																																	
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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3.2.3.7	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 -77dBm at MCS2 -74dBm at MCS3 -71dBm at MCS4 -67dBm at MCS5 -65dBm at MCS6 -63dBm at MCS7 																																																	



4. Electrical and Thermal Characteristics

4.1 Temperature Limit Ratings

Parameter	Minimum	Maximum	Units
Storage Temperature	-40	+80	°C
Ambient Operating Temperature	0	60	°C
Junction Temperature	0	125	°C

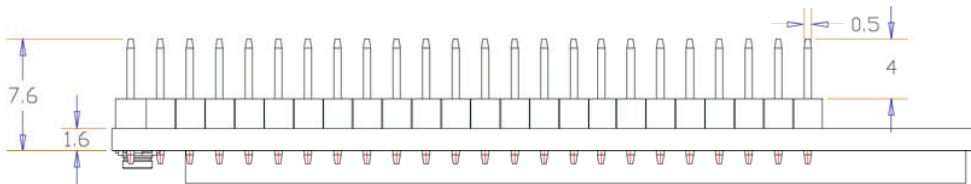
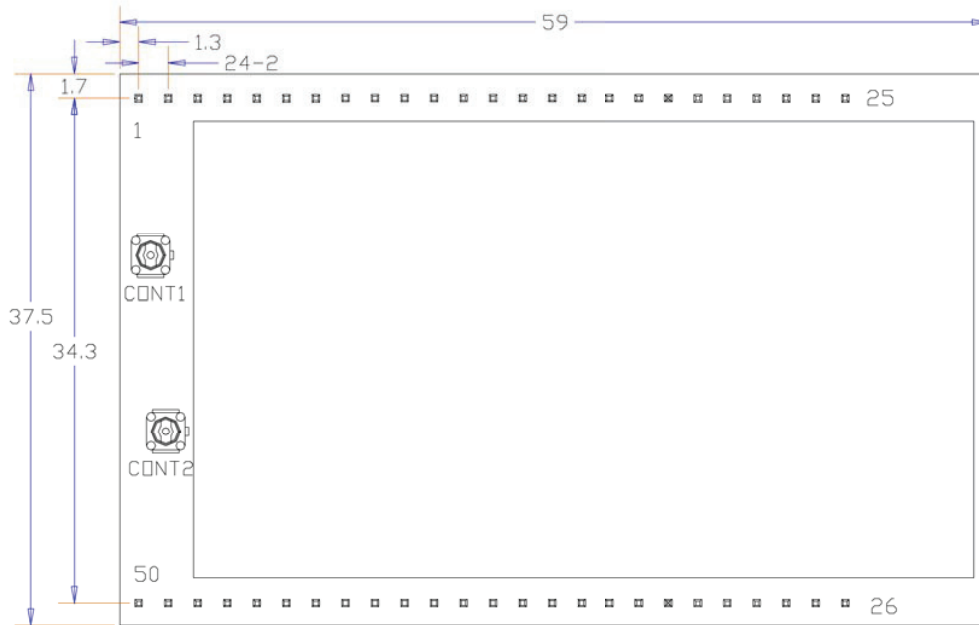
4.2 General Section

	Feature	Detailed Description
4.2.1	Antenna Type	<ul style="list-style-type: none">External antenna, IPEX connector
4.2.2	Operating power	<ul style="list-style-type: none">DC 3.3V/1.2A(max)

4.2.3

Antenna	Manufacturer	Model	Gain
Antenna 1	SHEN ZHEN WACOSUN TECHNOLOGY CO, LTD	HCX001-003	2.86dBi
Antenna 2	Jinchang Electron Global Service	JCW402	3 dBi

4.3 Mechanical Dimensions



* TOLERANCES ARE $\pm 0.5\text{mm}$ UNLESS OTHERWISE SPECIFIED

* UNITE :mm



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Pin Description

Pin	Symbol	Description	Pin	Symbol	Description
1	UART_RXD0	UART0 RX Data	26	GND	Ground
2	UART_TXD0	UART0 TX Data	27	USB_DM	USB D- signal
3	GPIO11	General purpose input/output.	28	USB_DP	USB D+ signal
4	SPI_MOSI	SPI Data Out	29	GND	Ground
5	SPI_MISO	SPI Data In	30	SD_D2	General purpose IO SD-XC
6	SPI_CLK	SPI Clock	31	SD_D3	General purpose IO SD-XC
7	SPI_CS1	SPI Selection	32	SD_CMD	General purpose IO SD-XC
8	I2C_SD	I2C data	33	SD_CLK	General purpose IO (SD-XC
9	I2C_SCLK	I2C Clock	34	SD_D0	General purpose IO SD-XC
10	I2S_CLK	I2S Clock	35	SD_D1	General purpose IO SD-XC
11	I2S_WS	I2S Channel Selection	36	SD_CD	General purpose IO SD-XC
12	I2S_DO	I2S Data output	37	SD_WP	General purpose IO SD-XC
13	I2S_DI	I2S Data input	38	SD_D4	General purpose IO SD-XC
14	UART_RXD1	UART1 RX Data	39	SD_D5	General purpose IO SD-XC
15	UART_TXD1	UART1 TX Data	40	SD_D6	General purpose IO SD-XC
16	GPIO42	General purpose input/output.	41	SD_D7	General purpose IO SD-XC
17	GPIO41	General purpose input/output.	42	RXIN1	10/100 PHY Port #1 RXN
18	GPIO40	General purpose input/output.	43	RXIP1	10/100 PHY Port #1 RXP
19	HW-reset	CPU reset	44	TXON1	10/100 PHY Port #1 TXN
20	WD_RTS_N	Watchdog timeout reset	45	TXOP1	10/100 PHY Port #1 TXP
21	REF_CLKO	Reference Clock Output	46	GND	Ground
22	GND	Ground	47	TXON0	10/100 PHY Port #0 TXN
23	GND	Ground	48	TXOP0	10/100 PHY Port #0 TXP
24	VCC	3.3 V power supply	49	RXIN0	10/100 PHY Port #0 RXN
25	VCC	3.3 V power supply	50	RXIP0	10/100 PHY Port #0 RXP



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.

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.

FCC Radiation Exposure Statement

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device, for example, USB dongle like transmitters is forbidden.

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: 2AD4X-WP25M1200Or Contains FCC ID: 2AD4X-WP25M1200"

when the module is installed inside another device, the user manual of this device must contain below warning statements;

1. 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.
 - (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.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product

IC

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

- (1) This device may not cause interference; and
 - (2) This device must accept any interference, including interference that may cause undesired operation of the device.
- Cet appareil est conforme aux CNR exemptes de licence d'Industrie Canada . Son fonctionnement est soumis aux deux conditions suivantes :
- (1) Ce dispositif ne peut causer d'interférences ; et
 - (2) Ce dispositif doit accepter toute interférence , y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

IC Radiation Exposure Statement

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device, for example, USB dongle like transmitters is forbidden.

This modular complies with IC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body. Cette modulaire doit être installé et utilisé à une distance minimum de 20 cm entre le radiateur et le corps de l'utilisateur.

If the IC number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains IC: 12714A-WP25M1200"when the module is installed inside another device, the user manual of this device must contain below warning statements;

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