Product External Specifications

For

802.11b/g/n 2x2 USB Module

(MTK RT5372)

Customer : TPV

Model P/N

TPV : 317GAAWF506ALP

Alpha : TPWUSN24V2A1G

Model Number: WUS-N24V2

Version : 1.3

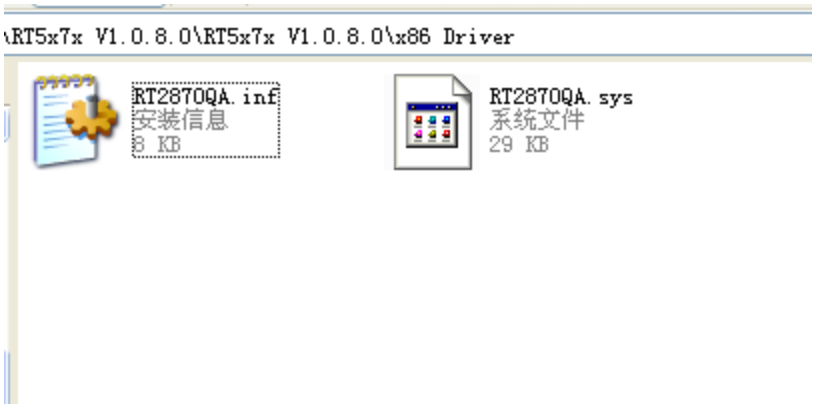
Revision History

Rev.	Date	Author	Reason for Changes
1.0	2013/07/01	Yu-Chun Yu	• Draft Release
1.1	2013/08/06	Doreen Chang	• Add packing and the photo of module
1.2	2013/8/19	Doreen Chang	• Add model number in cover page
1.3	2014/08/01	Doreen Chang	• Add FCC ID information

Contents

i. Install Driver

1. install the test driver

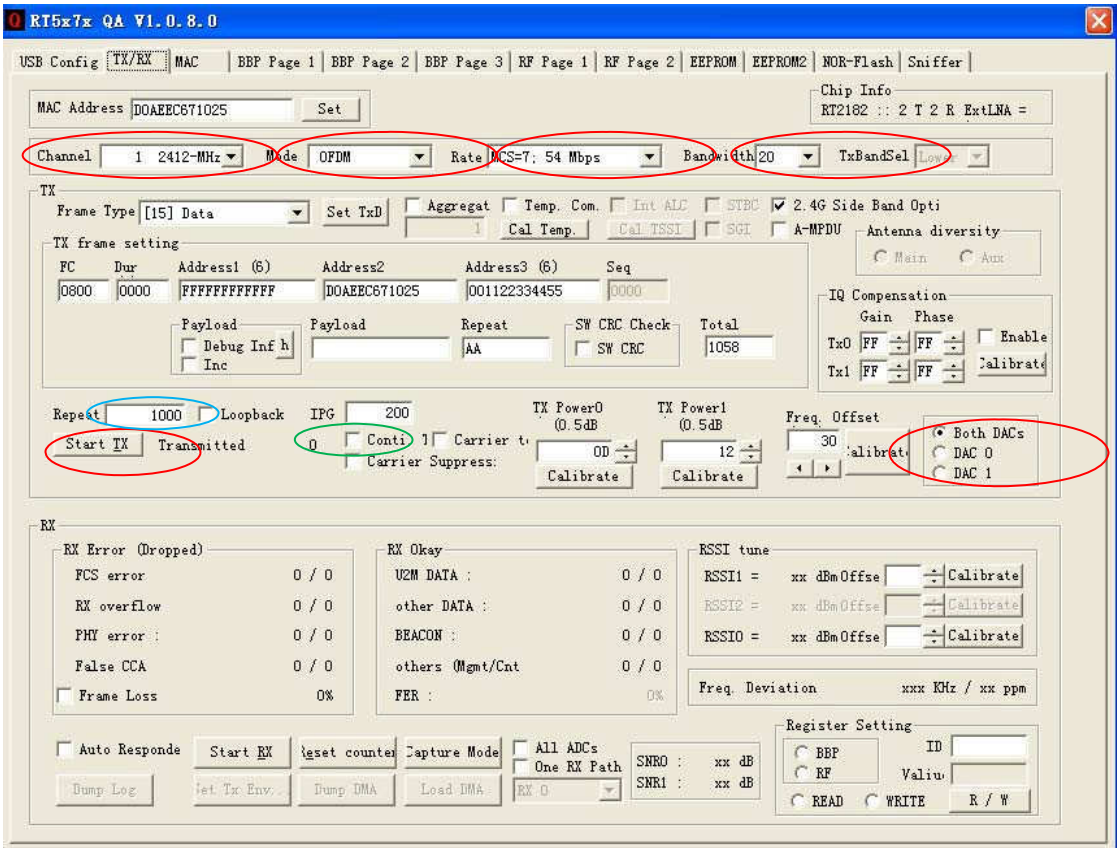


2. TX signal command

（1） select TX/RX site

（2） select channel,datarate,bandwidth and chain0/1

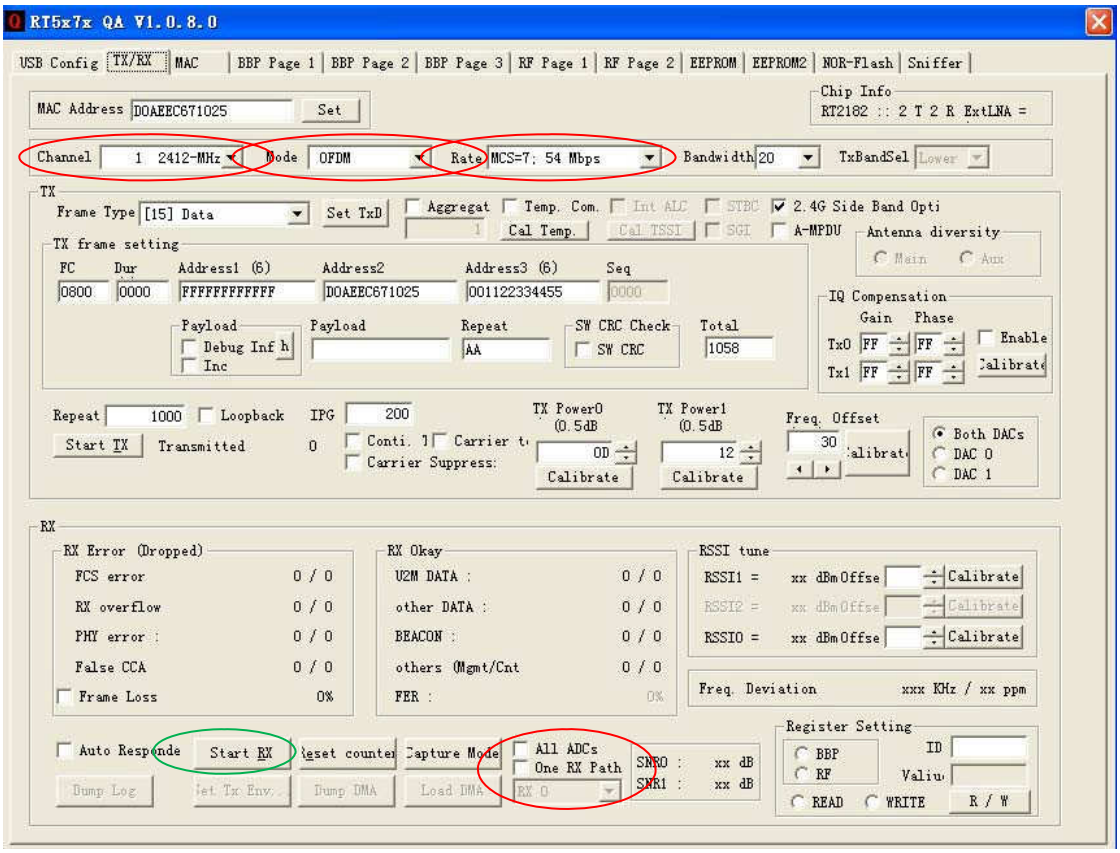
（3） for continue TX select conti,press start tx;for continue packets tx,set repeat to 0,press start tx



3. RX signal command

(1) select TX/RX site

(2) select channel,datarate and chain 0/1



1.1 Scope

1.2 Document

This document is to specify the product requirements for **802.11n USB Module with onboard metal antenna** . This USB module is based on MTK Ralink single chip that complied with 802.11n standard from 2.4~2.5GHz, and it can be used to provide up to 11Mbps for IEEE 802.11b, 54Mbps for IEEE 802.11g and 300Mbps for 802.11n to connect your wireless LAN.

With seamless roaming, fully interoperability and advanced security with WEP standard, **802.11n USB Module** offers absolute interoperability with different vendors' 802.11b, 802.11g, and 802.11n Access Points through the wireless LAN.

1.3 Product Features

- Compatible with IEEE 802.11g standard to provide wireless 54Mbps data rate
- Compatible with IEEE 802.11b standard to provide wireless 11Mbps data rate
- Compatible with IEEE 802.11n standard to provide wireless 300Mbps data rate

- Supports infrastructure networks via Access Point and ad-hoc network via peer-to-peer communication
- Supports WEP, 802.1x, WPA and WPA2 enhanced security
- Friendly user configuration and diagnostic utilities
- Drivers support Windows XP , Vista, Win7.
- 6-pin pitch connector USB interface
- RoHS compliant
- Antenna type : Two onboard metal Antenna

2.0 Requirements

The following sections identify the detailed requirements of **802.11b/g/n embedded USB Module**

2.1 Functional Block Diagram

2.2 General Requirements

2.2.1 IEEE 802.11b Section

#	Feature	Detailed Description
2.2.1.1	Standard	• IEEE 802.11b
2.2.1.2	Radio and Modulation Schemes	• DQPSK, DBPSK, DSSS, and CCK
2.2.1.3	Operating Frequency	• 2400 ~ 2483.5MHz ISM band
2.2.1.4	Channel Numbers	• 11 channels for United States 13 channels for Europe Countries and other regions
2.2.1.5	Data Rate	• 11, 5.5, 2, and 1Mbps
2.2.1.6	Media Access Protocol	• CSMA/CA with ACK
2.2.1.7	Transmitter Output Power	• Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25degree C • 16 dBm(±2dB) at 1,2,5.5,11Mbps
2.2.1.8	Receiver Sensitivity	• Typical Sensitivity at each RF chain. Frame (1000-byte PDUs) Error Rate = 8% • -76 dBm at 1Mbps • -76 dBm at 2Mbps • -76 dBm at 5.5Mbps • -76 dBm at 11Mbps
2.2.1.9	Receiver Maximum Input Level	The Receiver shall provide a maximum PER of 8 % at a PSDU length of 1000 bytes for a maximum input level of -10 dBm measured at each antenna for any baseband modulation

2.2.2 IEEE 802.11g Section

#	Feature	Detailed Description
2.2.2.1	Standard	• IEEE 802.11g
2.2.2.2	Radio and Modulation Schemes	• BPSK, QPSK, 16QAM, 64QAM, and OFDM
2.2.2.3	Operating Frequency	• 2400 ~ 2483.5MHz ISM band
2.2.2.4	Channel Numbers	• 11 channels for United States 13 channels for Europe Countries and other regions
2.2.2.5	Data Rate	• 6,9,12,18,24,36,48,54Mbps
2.2.2.6	Media Access Protocol	• CSMA/CA with ACK
2.2.2.7	Transmitter Output Power	• Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25degree C • 16± 2dBm at 6,9 Mbps • 15± 2dBm at 12,18 Mbps • 15± 2dBm at 24,36 Mbps • 14± 2dBm at 48,54 Mbps
2.2.2.8	Receiver Sensitivity	• Typical Sensitivity at each RF chain. Frame (1000-byte PDUs) Error Rate = 8% • -82 dBm at 6Mbps • -81 dBm at 9Mbps • -79 dBm at 12Mbps • -77 dBm at 18Mbps • -74 dBm at 24Mbps • -70dBm at 36Mbps • -66dBm at 48Mbps • -65 dBm at 54Mbps
2.2.2.9	Receiver Maximum Input Level	The Receiver shall provide a maximum PER of 10 % at a PSDU length of 1000 bytes for a maximum input level of -20 dBm measured at each antenna for any baseband modulation

2.2.3 IEEE 802.11n Section

#	Feature	Detailed Description			
2.2.3.1	Standard	• IEEE 802.11n			
2.2.3.2	Radio and Modulation Type	• BPSK, QPSK, 16QAM, 64QAM with OFDM			
2.2.3.3	Operating Frequency	• 2400 ~ 2483.5MHz ISM band			
2.2.3.4	Data Rate				
		MCS	GI=800ns		GI=400ns	
			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

#	Feature	Detailed Description				
		8	13	27	14.444	30
		9	26	54	28.889	60
		10	39	81	43.333	90
		11	52	108	57.778	120
		12	78	162	86.667	180
		13	104	216	115.556	240
		14	117	243	130.000	170
		15	130	270	144.444	300
2.2.3.5	Media Access Protocol	• CSMA/CA with ACK				
2.2.3.6	Transmitter Output Power at Antenna Connector	• Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25degree C • 2.4GHz Band/HT-20 • 13± 2dBm at MCS0/1 • 13± 2dBm at MCS2/3 • 13± 2dBm at MCS4/5 • 13± 2dBm at MCS6/7 • 2.4GHz Band/HT-40 • 13± 2dBm at MCS0/1 • 13± 2dBm at MCS2/3 • 13± 2dBm at MCS4/5 • 13± 2dBm at MCS6/7				
2.2.3.7	Receiver Sensitivity at Antenna Connector	• Typical Sensitivity at each RF chain. Frame (4096 octets PSDUs). Error Rate <10% and at room Temp. 25degree C • HT-20 • -80 dBm at MCS 0/8 • -77 dBm at MCS 1/9 • -75 dBm at MCS 2/10 • -72 dBm at MCS 3/11 • -68 dBm at MCS 4/12 • -64 dBm at MCS 5/13 • -63 dBm at MCS 6/14 • -62 dBm at MCS 7/15 • HT-40 • -77 dBm at MCS 0/8 • -74 dBm at MCS 1/9 • -72 dBm at MCS 2/10 • -69 dBm at MCS 3/11 • -65 dBm at MCS 4/12 • -61 dBm at MCS 5/13 • -60 dBm at MCS 6/14 • -59 dBm at MCS 7/15				
2.2.3.8	Receiver Maximum Input Level	The Receiver shall provide a maximum PER of 10 % at a PSDU length of 1000 bytes for a maximum input level of -30 dBm measured at each antenna for any baseband modulation				

2.2.4 eneral Section

#	Feature	Detailed Description
2.2.4.1	Antenna Type	• Onboard metal Antenna

2.2.4.2	Operating Voltage	• 3.3VDC +/- 10%
2.2.4.3	Current Consumption	• 450mA at continuous transmit mode @HT40 MCS0 315mA at receive mode w/o receiving packet @HT40 MCS0
2.2.4.4	Interface	• 6-pin pinch connector , wafer

2.3 Software Requirements

The Configuration Software supports Microsoft Windows XP, Vista, Win7. This configuration software includes the following functions:

- **Information**

  Information allows you to monitor network status.

- **Configuration**

  Configuration allows you to configure parameters for wireless networking.

- **Security**

  Supports enhanced security WEP, WPA and WPA2.

2.3.1 nformation

#	Feature	Detailed Description
2.3.1.1	General Information	• General Information shows the name of Wireless Adapter, Adapter MAC Address, Regulatory Domain, Driver Version, and Utility Version.
2.3.1.2	Current Link Information	• Current Link Information shows the Current Setting ESSID, Channel Number, Associated BSSID, Network Type, Security Status, Link Status, Signal Strength.
2.3.1.3	Site survey	• To search the neighboring access points and display the information of all access points.

2.3.2 Configuration

#	Feature	Detailed Description
2.3.2.1	ESS ID	• Input an SSID number if the roaming feature is enabled • Supports for ASCII printable characters.
2.3.2.2	MAC	• The MAC address of the wireless device
2.3.2.3	Signal	• The link quality of the wireless connection
2.3.2.4	Security	• If there is a “lock” icon, it means the wireless network is secure. Must know the encryption key/security settings to connect.
2.3.2.5	Channel	• The wireless network

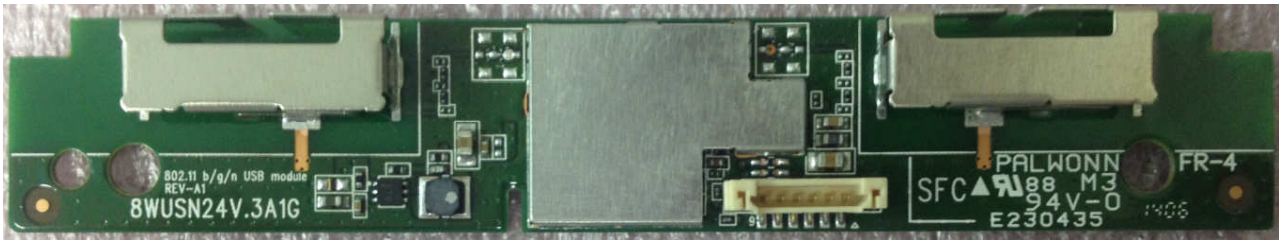
2.3.3 curity

#	Feature	Detailed Description
2.3.3.1	Encryption	• RC4 encryption algorithm • Support 64/128 bit WEP encryption • Support open system and shared key authentication
2.3.3.2	WEP Management	• Four WEP keys can be selected • STA with WEP off will never associate any AP with WEP enabled • WEP Key Format: Option for Hex format

#	Feature	Detailed Description
2.3.3.4	WPA/WPA2	• Support WPA/WPA2-PSK and WPA/WPA2-EAP • Support Cipher Mode AES and TKIP

2.4 Mechanical Requirements

#	Feature	Detailed Description
2.4.1	Length	• 100mm ± 0.005mm (PCB)
2.4.2	Width	• 17mm ±0.005mm (PCB)



2.5 Compatibility Requirements

This device passes the following compatibility requirements.

#	Feature	Detailed Description
2.5.1	Wi-Fi	• Meet Wi-Fi certification for IEEE 802.11 product
2.5.2	Physical Layer and Functionality	• Meet ALPHA Engineering Test Plan and Test Report

2.6 Requirements of Reliability, Maintainability and Quality

#	Feature	Detailed Description
2.6.1	MTBF	• Mean Time Between Failure > 30,000 hours
2.6.2	Maintainability	• There is no scheduled preventive maintenance required
2.6.3	Quality	• The product quality is followed-up by ALPHA factory quality control system

2.7 Environmental Requirements

#	Feature	Detailed Description
2.7.1	Operating Temperature Conditions	• The product is capable of continuous reliable operation when operating in ambient temperature of 0 ℃ to +50℃.
2.7.2	Non-Operating Temperature Conditions	• Neither subassemblies is damaged nor the operational performance is degraded when restored to the operating temperature after exposing to storage temperature in the range of –20 ℃ to +75 ℃.
2.7.3	Operating Humidity conditions	• The product is capable of continuous reliable operation when subjected to relative humidity in the range of 10% and 90% non-condensing.
2.7.4	Non-Operating Humidity Conditions	• The product is not damaged nor the performance is degraded after exposure to relative humidity ranging from 5% to 95% non-condensing

2.8 FCC ID

FCC ID: RRK-WUSN24V2

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.

Federal Communication Commission Interference Statement

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.

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

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 & your body.

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.

As long as **2** conditions above are 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

IMPORTANT NOTE: In the event that these conditions can not 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 can not 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-WUSN24V2. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

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.