



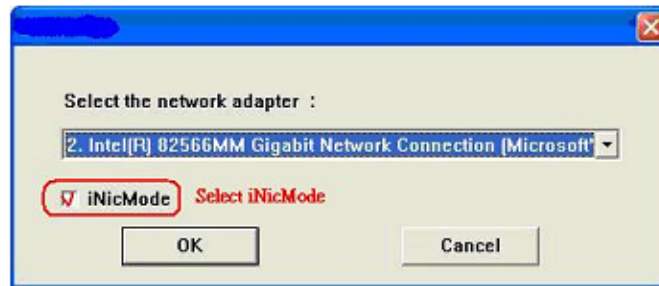
User's Manual
For
USB Module
Model Number : WUS-N19D
Revision: 1.0

Test Utility Installation:

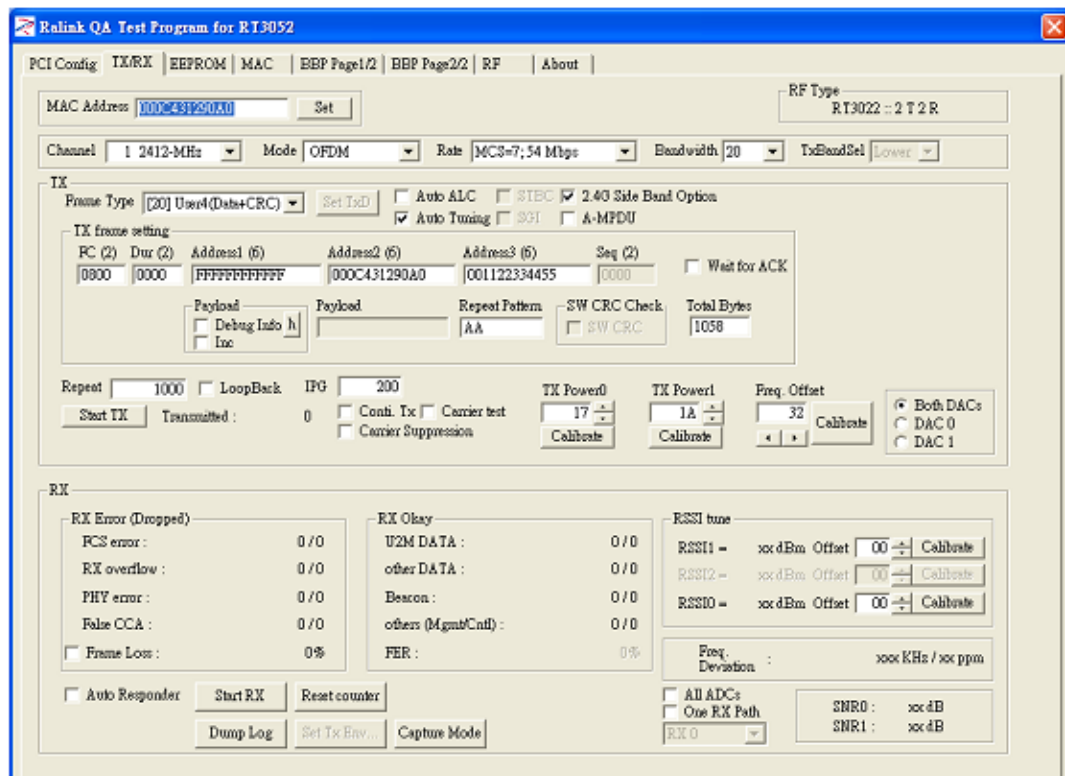
Hardware: BCM43235 RGMII INIC test fixture, with gigabit Ethernet port computer
Software: RT3x5x MII V1.0.1.0

1. Insert WUS-N19D to BCM43235 RGMII INIC test fixture, connect the test fixture to computer with Ethernet cable
2. Use RT3x5x MII V1.0.1.0, make sure the computer has installed the wincap.exe
3. Select GIGABIT INIC

- Select Gigabit Ethernet NIC Card for client iNIC control



4. Use QA tool control WUS-N19D



1.1 Document

This document is to specify the product requirements for **USB Module**. This iNIC Card is based on BCM43235 single chipset that complied with IEEE 802.11n Draft 2.0, IEEE 802.11 b/g standard from 2.4~2.5GHz. It can be used to provide up to 54Mbps for IEEE 802.11g , 11Mbps for IEEE 802.11b and 300Mbps for IEEE 802.11n to connect your wireless LAN.

1.2 Product Features

- BCM43235 , single chip , 2T2R , MA/BBP/RF
- A WLAN intelligent NIC solution to a host SOC platform
- High performance 384 MHz MIPS24Kec CPU inside to Ethernet PHY and Gigabit Ethernet MAC
- 300Mbps PHY data rate for longer range and better throughput
- Compatible with IEEE 802.11g high rate standard to provide wireless 54Mbps data rate
- Compatible with IEEE 802.11b high rate standard to provide wireless 11Mbps data rate
- Compatible with IEEE 802.11n draft standard to provide wireless 300Mbps data rate
- Operation at 2.4 ~ 2.5GHz frequency band to meet worldwide regulations
- Dynamic data rate scaling at 6, 9, 12, 18, 24, 36, 48, 54Mbps for IEEE 802.11a and IEEE 802.11g
- Dynamic data rate scaling at 1, 2, 5.5, and 11Mbps for IEEE 802.11b
- Dynamic data rate of IEEE 802.11n scaling from MCS – 0 to MCS –15 as shown in Appendix I
- Supports wireless data encryption with 64/128 bit WEP for security
- Support WPA and WPA2 enhanced security
- Support QoS – WMM , WMM power save
- Support RGMii signals transmission
- Drivers support Linux 2.6

2.0 Requirements

The following sections identify the detailed requirements of the **USB Module** .

2.2 General Requirements

2.2.1 IEEE 802.11b Section

#	Feature	Detailed Description
2.2.2.1	Standard	<ul style="list-style-type: none"> IEEE 802.11b
2.2.2.2	Radio and Modulation Schemes	<ul style="list-style-type: none"> DQPSK, DBPSK, DSSS, and CCK
2.2.2.3	Operating Frequency	<ul style="list-style-type: none"> 2400 ~ 2483.5MHz ISM band
2.2.2.4	Channel Numbers	<ul style="list-style-type: none"> 11 channels for United States/ TAIWAN 13 channels for Europe Countries 14 channels for Japan
2.2.2.5	Data Rate	<ul style="list-style-type: none"> 11, 5.5, 2, and 1Mbps
2.2.2.6	Media Access Protocol	<ul style="list-style-type: none"> CSMA/CA with ACK
2.2.2.7	Transmitter Output Power	<ul style="list-style-type: none"> Typical RF Output Power (Tolerance +-2dB) at each RF chain, Data Rate and at room Temp. 25degree C 18±2dBm at 1,2,5.5,11Mbps
2.2.2.8	Receiver Sensitivity	<ul style="list-style-type: none"> Typical Sensitivity at Which Frame (1000-byte PDUs) Error Rate = 8% -88 dBm at 1Mbps -88 dBm at 2Mbps -88 dBm at 5.5Mbps -86 dBm for 11Mbps

2.2.2 IEEE 802.11g Section

#	Feature	Detailed Description
2.2.3.1	Standard	<ul style="list-style-type: none"> IEEE 802.11g
2.2.3.2	Radio and Modulation Type	<ul style="list-style-type: none"> BPSK, QPSK, 16QAM, 64QAM with OFDM
2.2.3.3	Operating Frequency	<ul style="list-style-type: none"> 2400 ~ 2483.5MHz ISM band
2.2.3.4	Channel Numbers	<ul style="list-style-type: none"> 11 channels for United States/ TAIWAN 13 channels for Europe Countries 13 channels for Japan
2.2.3.5	Data Rate	<ul style="list-style-type: none"> 6,9,12,18,24,36,48,54Mbps
2.2.3.6	Media Access Protocol	<ul style="list-style-type: none"> CSMA/CA with ACK
2.2.3.7	Transmitter Output Power	<ul style="list-style-type: none"> Typical RF Output Power (tolerance +-2dB) at each RF chain, Data Rate and at room Temp. 25degree C 18±2dBm at 6~18 Mbps 17±2dBm at 36 and 24Mbps 15±2dBm at 54 and 48 Mbps
2.2.3.8	Receiver Sensitivity	<ul style="list-style-type: none"> Typical Sensitivity at Which Frame (1000-byte PDUs) Error Rate = 10% -87 dBm at 6Mbps

#	Feature	Detailed Description
		<ul style="list-style-type: none"> • -86 dBm at 9Mbps • -84 dBm at 12Mbps • -82 dBm at 18Mbps • -79 dBm at 24Mbps • -75 dBm at 36Mbps • -71 dBm at 48Mbps • -70 dBm at 54Mbps

2.2.3 IEEE 802.11n Section for 2.4G Band

#	Feature	Detailed Description
2.2.4.1	Standard	<ul style="list-style-type: none"> • IEEE 802.11n
2.2.4.2	Radio and Modulation Type	<ul style="list-style-type: none"> • BPSK, QPSK, 16QAM, 64QAM with OFDM
2.2.4.3	Operating Frequency	<ul style="list-style-type: none"> • 2400 ~ 2483.5MHz ISM band
2.2.4.4	Data Rate	<ul style="list-style-type: none"> • From MCS – 0 to MCS –15 as shown in Appendix I
2.2.4.5	Media Access Protocol	<ul style="list-style-type: none"> • CSMA/CA with ACK
2.2.4.6	Transmitter Output Power	<ul style="list-style-type: none"> • Typical RF Output Power (tolerance +-2dB) at each RF chain, Data Rate and at room Temp. 25degree C <p>HT 20</p> <ul style="list-style-type: none"> • 17 ± 2 dBm at MCS 0,1 • 17 ± 2 dBm at MCS 2,3 • 16 ± 2 dBm at MCS 4,5 • 14 ± 2 dBm at MCS 6,7 <p>HT 40</p> <ul style="list-style-type: none"> • 15 ± 2 dBm at MCS 0,1 • 15 ± 2 dBm at MCS 2,3 • 14 ± 2 dBm at MCS 4,5 • 12 ± 2 dBm at MCS 6,7
2.2.4.7	Receiver Sensitivity	<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"> • -85 dBm at MCS 0 • -82 dBm at MCS 1 • -80 dBm at MCS 2 • -77 dBm at MCS 3 • -74 dBm at MCS 4 • -70 dBm at MCS 5 • -68 dBm at MCS 6 • -66 dBm at MCS 7 <p>HT40</p> <ul style="list-style-type: none"> • -82 dBm at MCS 0 • -79 dBm at MCS 1 • -77 dBm at MCS 2 • -74 dBm at MCS 3 • -71 dBm at MCS 4 • -67 dBm at MCS 5 • -65 dBm at MCS 6 • -63 dBm at MCS 7

2.3 General Section

#	Feature	Detailed Description
2.3.1.1	Antenna Connector	<ul style="list-style-type: none"> • Three UFL antenna connectors

2.3.1.2	Operating Voltage	<ul style="list-style-type: none"> 3.3VDC +/- 10%
2.3.1.3	Current Consumption	<ul style="list-style-type: none"> 450 mA at continuous transmit mode (2 Tx chains on) 250 mA at continuous receive mode (2 Rx chains on)
2.3.1.4	Form Factor and Interface	<ul style="list-style-type: none"> USB form factor
2.3.1.5	LED	<ul style="list-style-type: none"> External LED function supported

2.4 Software Requirements

The Configuration Software supports Linux2.6. 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, 802.1x, WPA and WPA2.

2.4.1 Information

#	Feature	Detailed Description
2.4.1.1	General Information	<ul style="list-style-type: none"> General Information shows the name of Wireless Adapter, Adapter MAC Address, Regulatory Domain, Firmware Version, and Utility Version.
2.4.1.2	Current Link Information	<ul style="list-style-type: none"> Current Link Information shows the Current Setting ESSID, Channel Number, Associated BSSID, Network Type, Security Status, Link Status, Transmit Speed, Signal Strength, and Link Quality.
2.4.1.3	Site survey	<ul style="list-style-type: none"> To search the neighboring access points and display the information of all access points.

2.4.2 Configuration

#	Feature	Detailed Description
2.4.2.1	ESS ID	<ul style="list-style-type: none"> Input an SSID number if the roaming feature is enabled Supports for ASCII printable characters.
2.4.2.2	Network Type	<ul style="list-style-type: none"> Ad-hoc Mode and 802.11 Ad-hoc Mode for network configurations that do not have any access points Infrastructure Mode for network configurations with access points
2.4.2.3	Power Save	<ul style="list-style-type: none"> Extend the battery life of clients by allowing the client to sleep for short periods of time while the Access Point buffers the messages.
2.4.2.4	RTS Threshold	<ul style="list-style-type: none"> Set the number of bytes used for fragmentation boundary for messages
2.4.2.5	Fragment Threshold	<ul style="list-style-type: none"> Set the number of bytes used for RTS/CTS boundary
2.4.2.6	Transmission Speed	<ul style="list-style-type: none"> This indicates the communication rates. Select appropriate transmission speed to match your wireless LAN settings
2.4.2.7	Roaming	<ul style="list-style-type: none"> Support Automatic or Manual Rescan to associate with access point.

2.4.3 Security

#	Feature	Detailed Description
2.4.3.1	Encryption	<ul style="list-style-type: none"> RC4 encryption algorithm Support 64-bit and 128-bit WEP encryption

#	Feature	Detailed Description
		<ul style="list-style-type: none"> Support open system (OSA) and shared key authentication (SKA)
2.4.3.2	WEP Management	<ul style="list-style-type: none"> 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
2.4.3.3	802.1x	<ul style="list-style-type: none"> Support EAP-TLS, EAP-TTLS, and EAP-PEAP
2.4.3.4	WPA/WPA2	<ul style="list-style-type: none"> Support WPA/WPA2-PSK and WPA/WPA2-EAP Support Cipher Mode AES and TKIP

2.5 Mechanical Requirements

#	Feature	Detailed Description
2.5.1	Length	<ul style="list-style-type: none"> 72mm(max)
2.5.2	Width	<ul style="list-style-type: none"> 48mm (+-0.25)
2.5.3	Height	<ul style="list-style-type: none"> 4.7mm (+-0.1)

2.6 Compatibility Requirements

This device passes the following compatibility requirements.

#	Feature	Detailed Description
2.6.1	Wi-Fi	<ul style="list-style-type: none"> Meet Wi-Fi certification for IEEE 802.11b/g/n product
2.6.2	WHQL	<ul style="list-style-type: none"> Meet applicable WHQL certification requirements
2.6.3	Physical Layer and Functionality	<ul style="list-style-type: none"> Meet ALPHA Engineering Test Plan and Test Report

2.7 Requirements of Reliability, Maintainability and Quality

#	Feature	Detailed Description
2.7.1	MTBF	<ul style="list-style-type: none"> Mean Time Between Failure > 30,000 hours
2.7.2	Maintainability	<ul style="list-style-type: none"> There is no scheduled preventive maintenance required
2.7.3	Quality	<ul style="list-style-type: none"> The product quality is followed-up by ALPHA factory quality control system

2.8 Environmental Requirements

#	Feature	Detailed Description
2.8.1	Operating Temperature Conditions	<ul style="list-style-type: none"> The product is capable of continuous reliable operation when operating in ambient temperature of 0°C to +40°C.
2.8.2	Non-Operating Temperature Conditions	<ul style="list-style-type: none"> 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 -40 °C to +70°C.
2.8.3	Operating Humidity conditions	<ul style="list-style-type: none"> The product is capable of continuous reliable operation when subjected to relative humidity in the range of 10% and 90% non-condensing.
2.8.4	Non-Operating Humidity Conditions	<ul style="list-style-type: none"> The product is not damaged nor the performance is degraded after exposure to relative humidity ranging from 5% to 95% non-condensing

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: RRRKWUSN19DA1”. 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.