mini PCI High Power MIMO IEEE 802.11 a/b/g/n

RF Module User’s Guide

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This document use information provided by Atheros Communications Inc. (Atheros), Atheros radio and chipsets user manuals, technical specifications, and Atheros regulatory manual.

INTRODUCTION

The Proxim PROXMB82 miniPCI module implements an IEEE 802.11a/b/g/n wireless LAN (WLAN) with DFS Master function. MIMO operation is implemented using three transmit and three receive chains per the 802.11n standard.

The device will be marketed under brand name: PROXMB and model: PROXMB82.

This module may be installed in PC and host processor systems using approved external antennas. The module may be configured for 2.4 GHz or 5 GHz operation USING THE Web Server function provided by Atheros Communications Inc. Please, refer to Atheros' driver User Manual instructions for details.

CONFIGURATION

This section provide procedures for connecting and configuring
the AP. Configuration can be performed either from a web browser accessing the build-in web server, or by entering commands using the command line interface (CLI). For detailed information on using the server refer to “AP Web Server and for using CLI, refer to detailed operational guide provided by Atheros for the chipset.

AP Initial Configuration

Configure the AP for its Service Set Identifier (SSID) unique to the application. This configuration can be done either through a web browser with access to the build-in AP web server, or by commands using the command line interface (CLI).

WEB Browser

3. Select the Access Point Web Server hotlink.
4. A dialog box appears requesting login authorization. When prompted, enter the following

Follow these steps to configure the channel frequency and SSID using a web browser:

1. Launch a web browser (Netscape Navigator or Internet Explorer are examples of commonly used web browsers).
2. From the HPC, enter the IP address that is assigned to the AP as the URL address, for example http://192.168.1.1.

information to log in:

Login: **Admin** (case-sensitive) Password: 5up

5. Click OK to complete the login process. The 5 GHz Statistics window will appear.

6. Select the Configuration hotlink from the navigation menu. The system Configuration window will appear.

7. Enter the SSID (name or address) for the AP in the SSID field. The SSID must be 132 characters in length.

To configure a single SSID to have more then one AP in a single SSID, specify a unique System Name for each AP within that single SSID. Note that range of available channels will be automatically determined by factory settings.

Note that the radio channel is specified using the IEEE 802.11 a standard. For example, channel 48 is the equivalent of 5.240 GHz. The channel number is derived as:

Channel Frequency (in MHz) – 5000 MHz

Channel Number = 5MHz

1 Click Update to commit the changes.

2 After all configuration changes are complete, reboot the AP to enable them. To reboot AP, click on the REBOOT AP button that appears.

For detailed information on using the server refer to “AP Web Server” and for using CLI refer to “AP Command-Line Interface” provided in Appendixes A and B of Atheros MPCI Module User’s Guide.

FCC Requirements for Operation in the United States

This device is restricted to **indoor** use only due to its operation in 5150 to 5250 MHz and 5470 to 5725 MHz frequency ranges in accordance with latest FCC regulations.

Host systems using Porxim Firmware with this 802.11 a/b/g/n 3x3 MIMO nimiPCI module to be sold in the United States do not have country code settings and are factory configured to only operate on the channels allowed by the FCC. Master devices with a US SKU that contain the 802.11 a/b/g/n Radio module are limited to the following operating channels:

? 1 -11 (2412 to 2462 MHz) in the 2.4 GHz band
? 36 – 64 (5180 to 5320 MHz) in the 5150 to 5350 MHz band
? 100 – 116 (5500 to 5580 MHz) and 132 – 140 (5660 to 5700 MHz) in the 5470 to 5725 MHz band
? 149 – 165 (5745 to 5825 MHz) in the 5725 to 5825 MHz band

High power radars may use the 5250 to 5350 MHz and 5470 to 5725 MHz frequency ranges in your area. Such radar stations can cause interference and damage to this device. This radio module implements a radar detection function which may cause interruption of normal operation when radar signal is detected.

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.

RF Exposure
To ensure compliance with FCC RF exposure requirements, the antennas used for this device must be installed to provide a separation distance of at least 20 cm from all persons.

Outdoor operations in the 5150~5250MHz, 5600~5650MHz band is prohibited.
This device has no Ad-hoc capability for 5250~5350MHz and 5470~5725MHz.

In order to meet new FCC, NTIA, FAA and industry restrictions to resolve interference to Terminal Doppler Weather Radar (TDWR) systems used at airports, any outdoor device installed within 35 km of a TDWR location must be separated by at least 30 MHz (center-to-center) from TDWR operating frequency (as shown in the table below). Channels 120-132 and 5600-5650 MHz band are disabled on outdoor products.

We recommend that all operators and installers register the location information of the UNII devices operating outdoors in the 5470 – 5725 MHz band within 35 km of any TDWR location at the WISPA sponsored database (see http://www.spectrumbridge.com/udia/home.aspx). This database may be used by government agencies in order to expedite resolution of any interference to TDWRs.

Procedures on how to register the devices in the industry-sponsored database with the appropriate information regarding the location and operation of the device and installer information can be found on the database.

TDWR Location Information:

STATE	CITY	LONGITUDE	LATITUDE	FREQUENCY	TERRAIN ELEVATION (MSL) [ft]	ANTENNA HEIGHT ABOVE TERRAIN [ft]
AZ	PHOENIX	W 112 09 46	N 33 25 14	5610 MHz	1024	64
CO	DENVER	W 104 31 35	N 39 43 39	5615 MHz	5643	64
FL	FT LAUDERDALE	W 080 20 39	N 26 08 36	5645 MHz	7	113
FL	MIAMI	W 080 29 28	N 25 45 27	5605 MHz	10	113
FL	ORLANDO	W 081 19 33	N 28 20 37	5640 MHz	72	97
FL	TAMPA	W 082 31 04	N 27 51 35	5620 MHz	14	80
FL	WEST PALM BEACH	W 080 16 23	N 26 41 17	5615 MHz	20	113
GA	ATLANTA	W 084 15 44	N 33 38 48	5615 MHz	962	113
IL	MCCOOK	W 087 51 31	N 41 47 50	5615 MHz	646	97
IL	CRESTWOOD	W 087 43 47	N 41 39 05	5645 MHz	663	113
IN	INDIANAPOLIS	W 086 26 08	N 39 38 14	5605 MHz	751	97
KS	WICHITA	W 097 26 13	N 37 30 26	5603 MHz	1270	80
KY	COVINGTON CINCINNATI	W 084 34 48	N 38 53 53	5610 MHz	942	97
KY	LOUISVILLE	W 085 36 38	N 38 02 45	5646 MHz	617	113
LA	NEW ORLEANS	W 090 24 11	N 30 01 18	5645 MHz	2	97
MA	BOSTON	W 070 56 01	N 42 09 30	5610 MHz	151	113
MD	BRANDYWINE	W 076 50 42	N 38 41 43	5635 MHz	233	113
MD	BENFIELD	W 076 37 48	N 39 05 23	5645 MHz	184	113
MD	CLINTON	W 076 57 43	N 38 45 32	5615 MHz	249	97
MI	DETROIT	W 083 30 54	N 42 06 40	5615 MHz	656	113
MN	MINNEAPOLIS	W 092 55 58	N 44 52 17	5610 MHz	1040	80
MO	KANSAS CITY	W 094 44 31	N 39 29 55	5605 MHz	1040	64
MO	SAINT LOUIS	W 090 29 21	N 38 48 20	5610 MHz	551	97
MS	DESOTO COUNTY	W 089 59 33	N 34 53 45	5610 MHz	371	113
NC	CHARLOTTE	W 080 53 06	N 35 20 14	5608 MHz	757	113
NC	RALEIGH DURHAM	W 078 41 50	N 36 00 07	5647 MHz	400	113
NJ	WOODBRIDGE	W 074 16 13	N 40 35 37	5620 MHz	19	113
NJ	PENNSAUKEN	W 075 04 12	N 39 56 57	5610 MHz	39	113
NV	LAS VEGAS	W 115 00 26	N 36 08 37	5645 MHz	1995	64
NY	FLOYD BENNETT FIELD	W 073 52 49	N 40 35 20	5647 MHz	8	97
OH	DAYTON	W 084 07 23	N 40 01 19	5640 MHz	922	97
OH	CLEVELAND	W 082 00 28	N 41 17 23	5645 MHz	817	113
OH	COLUMBUS	W 082 42 55	N 40 00 20	5605 MHz	1037	113
OK	AERO. CTR TDWR #1	W 097 37 31	N 35 24 19	5610 MHz	1285	80
OK	AERO. CTR TDWR #2	W 097 37 43	N 35 23 34	5620 MHz	1293	97
OK	TULSA	W 095 49 34	N 36 04 14	5605 MHz	712	113
OK	OKLAHOMA CITY	W 097 30 36	N 35 16 34	5603 MHz	1195	64
PA	HANOVER	W 080 29 10	N 40 30 05	5615 MHz	1266	113
PR	SAN JUAN	W 066 10 46	N 18 28 26	5610 MHz	59	113
TN	NASHVILLE	W 086 39 42	N 35 58 47	5605 MHz	722	97
TX	HOUSTON INTERCONTL	W 095 34 01	N 30 03 54	5605 MHz	154	97

TX	PEARLAND	W 095 14 30	N 29 30 59	5645 MHz	36	80
TX	DALLAS LOVE FIELD	W 096 58 06	N 32 55 33	5608 MHz	541	80
TX	LEWISVILLE DFW	W 096 55 05	N 33 03 53	5640 MHz	554	31
UT	SALT LAKE CITY	W 111 55 47	N 40 58 02	5610 MHz	4219	80
VA	LEESBURG	W 077 31 46	N 39 05 02	5605 MHz	361	113
WI	MILWAUKEE	W 088 02 47	N 42 49 10	5603 MHz	820	113

FCC Statement:

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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

This device is going to be operated in 5.15~5.25GHz frequency range, it is restricted in indoor environment only.

FCC NOTICE: To comply with FCC part 15 rules in the United States, the system must be professionally installed to ensure compliance with the Part 15 certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination (such as co-located antennas transmitting the same information) is expressly forbidden.

IMPORTANT NOTE:
FCC 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.

IMPORTANT NOTE:
This module is intended for OEM integrator only and limited to host with brand: Tsunami/ORiNOCO and model list. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for a population/uncontrolled environment can be satisfied.

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

USERS MANUAL OF THE END PRODUCT:
In the user's manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

LABEL OF THE END PRODUCT:
The final end product must be labeled in a visible area with the following " Contains TX FCC ID: HZB-PROXMB92 ". The FCC part 15.19 statement below has to also be available on the label: This device complies with Part 15 of 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.

IC Statement

This Class B digital apparatus complies with Canadian ICES-003.

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 numérique de la classe B est conforme á la norme NMB-003 du Canada.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p) is not more than that permitted for successful communication.

This device has been designed to operate with the antennas listed below, and having a maximum gain of [30] dB. Antennas not included in this list or having a gain greater than [30] dB are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

The device could automatically discontinue transmission in case of absence of information to transmit, or operational failure. Note that this is not intended to prohibit transmission of control or signaling information or the use of repetitive codes where required by the technology.

The device for the band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems.

The maximum antenna gain permitted (for devices in the band 5725-5825 MHz) to comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate, as stated in section A9.2(3).

IMPORTANT NOTE:
IC Radiation Exposure Statement:
This equipment complies with IC RSS-102 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.

IMPORTANT NOTE:
This module is intended for OEM integrator only and limited to host with brand: Tsunami/ORiNOCO and model list. The OEM integrator is still responsible for the IC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the IC RSS-102 radiation exposure limits set forth for a population/uncontrolled environment can be satisfied.

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

USERS MANUAL OF THE END PRODUCT:
In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. IC statement is required to be available in the users manual: This Class B digital apparatus complies with Canadian ICES-003. 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.

LABEL OF THE END PRODUCT:
The final end product must be labeled in a visible area with the following " Contains TX IC: 1856A-PROXMB92 ".

Model list:

Product Series	Models	Description
Tsunami™ Point-to-Multipoint series	MP-8ABC-ZZZ-YYY-XX MM-8ABC-ZZZ-YYY-XX	A - Represents number of radios (1, 2) B - Represents the operating frequency band of the first radio C - Represents the frequency band of the second radio Example: 0 - Dual band and connectorized 2 - 2Ghz band with integrated antenna 5 - 5Ghz band with integrated antenna ZZZ - Represents the type of the network unit Example: CPE - Customer Premise Equipment BSU - Base Station Unit SUA - Subscriber Unit with external antenna SUR - Subscriber Unit with Integrated antenna EPR - End Point with Integrated antenna EPA - End Point with external antenna LNK - Link consisting of two End Points YYY - Represents the bandwidth limit of the network unit and optionally a letter at the end representing the device configuration Example: 5, 12, 25, 50, 100 - Bandwidth limits in Mbps 100i - 100Mbps indoor unit 100c - 100Mbps unit with external antenna 100a - 100Mbps unit with Integrated Antenna XX - Represents the regulatory domain Example: US - Compliant to FCC WD - Complaint to ETSI/CE and IC
Tsunami™ QuickBridge Point to Point series	QB-8ABC-ZZZ-YYY-XX	

ORiNOCO® Access Points	AP-810M-xx	Indoor AP with single radio and Mesh Capability	XX - Represents the regulatory domain Example: US - Compliant to FCC WD - Complaint to ETSI/CE and IC
	AP-8100M-xx	Indoor AP with dual radio and Mesh Capability	
	AP-820MR-xx	Outdoor AP with single radio and Mesh Capability	
	AP-822MR-xx	Outdoor AP with single radio and Mesh Capability, Integrated 2.4GHz Panel Antenna	
	AP-810MR-xx	Outdoor AP with single radio and Mesh Capability	
	AP-812MR-xx	Outdoor AP with single radio and Mesh Capability, Integrated 2.4GHz Sector Antenna	
	AP-8100MR-xx	Outdoor AP with dual radio and Mesh Capability	