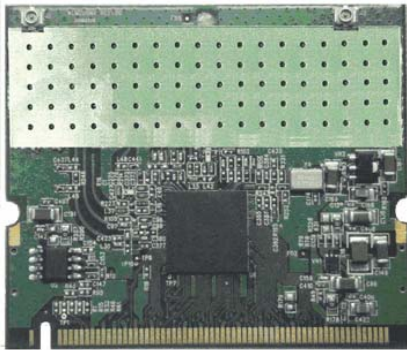


# WLM200NX MINIPCI

## 2 x 2 802.11N MIMO mini-PCI Modules



WLM200NX MiniPCI network adapter provides leading 802.11a/b/g/n performance, supporting up to 300Mbps physical data rates and 200Mbps of actual user throughput on both the uplink and downlink. With the dual-band design you will enjoy universal connectivity to any 802.11 device through your wireless AP or wireless Router.

Built on Atheros chipset, it can be used with all draft IEEE 802.11n compatible WLANs, and is ideally suited to be integrated into a wide range of OEM devices.

### Features

- 2.4/5GHz IEEE 802.11a/b/g/n standard
- Output Power of up to 20dBm @ a/b/g/n Band
- Support for up to 2x2 MIMO with spatial multiplexing
- Four times the throughput of 802.11b/g and 802.11a
- Wireless Encryption and Authentication Supported
- Transmission Power Control (TPC)
- Enhanced performance with Atheros XSPAN technology Optimized for higher throughput at long range
- High Performance (up to 300Mbps physical data rates and 200Mbps of actual throughput) with Low Power Consumption
- Multi-Country Roaming Support (IEEE802.11d)
- 2 X U.FL Antenna Connector
- Suitable for Embedded System or OEM Project
- Affordable and Ideal for a Variety of Applications
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Technical Specifications											
Chipset	AR9220										
Host Interface	PCI Interface v2.3 (Type III-B Mini PCI form factor)										
Operating Voltage	3.3 VDC										
Power Consumption	2.4W										
Antenna Connector	2 x U.FL Antenna Connector										
Data Rate	IEEE 802.11a :	54Mbps	48Mbps	36Mbps	24Mbps	18Mbps	12Mbps	9Mbps	6Mbps		
	IEEE 802.11b :	11Mbps	5.5Mbps	2Mbps	1Mbps						
	IEEE 802.11g :	Fallback to 5.5Mbps, 2Mbps, 1Mbps									
	IEEE 802.11n :	20MHZ	1Nss: 65Mbps @ 800GI, 72.2Mbps @ 400GI (Max.) 2Nss: 130Mbps @ 800GI, 144.4Mbps @ 400GI (Max.)								
		40MHZ	1Nss: 135Mbps @ 800GI, 150Mbps @ 400GI (Max.) 2Nss: 270Mbps @ 800GI, 300Mbps @ 400GI (Max.)								
Modulation Techniques	OFMD: BPSK, QPSK, 16 QAM, 64QAM DSSS: DBPSK, DQPSK, CCK										
Security	64/128-bit WEP, TKIP, AES, IEEE802.1x authentication										
Certificate	FCC, CE										
ROHS Compliance	Yes										
Environment Specifications	Operating: -20°C to 70°C Storage: -65°C to 100°										
Humidity	5% to 95% (non-condensing)										
Dimension	59.6 x 51 x 3 mm										

WLM200NX MIMO MINIPCI CARD RADIO							
TX SPECIFICATIONS				TX SPECIFICATIONS			
	DataRate	TX Power	Tolerance		DataRate	TX Power	Tolerance
802.11a	6-24Mbps	18dBm	±2dB	802.11b	1Mbps	20dBm	±2dB
	36Mbps	18dBm	±2dB		2Mbps	20dBm	±2dB
	48Mbps	17dBm	±2dB		5.5Mbps	20dBm	±2dB
	54Mbps	16dBm	±2dB		11Mbps	20dBm	±2dB
802.11g	6-24Mbps	20dBm	±2dB	802.11n	2.4GHz	HT20 @800GI(400GI): +16 ~ +20dBm	
	36Mbps	19.5dBm	±2dB			HT40 @800GI(400GI): +14 ~ +18dBm	
	48Mbps	18.5dBm	±2dB		5GHz	HT20 @800GI(400GI): +10 ~ +18dBm	
	54Mbps	17dBm	±2dB				

RX SPECIFICATIONS (802.11b)							
	Data Rate	Sensitivity (Typical/Maximum 2Rx)	Tolerance				
802.11b	1M	-96/-92Bm	±2dB				
	5.5M	-94/-90dBm	±2dB				
	11M	-91/-87dBm	±2dB				
RX SPECIFICATIONS(802.11a)				RX SPECIFICATIONS (802.11g)			
	Data Rate	Sensitivity (Typical/Maximum 2Rx)	Tolerance		Data Rate	Sensitivity (Typical/Maximum 2Rx)	Tolerance
802.11a	6M	-95/-91dBm	±2dB	802.11g	6M	-96/-92dBm	±2dB
	9M	-95/-91dBm	±2dB		9M	-96/-92dBm	±2dB
	12M	-95/-91dBm	±2dB		12M	-96/-92dBm	±2dB
	18M	-94/-90dBm	±2dB		18M	-95/-91dBm	±2dB
	24M	-90/-86dBm	±2dB		24M	-92/-88dBm	±2dB
	36M	-87/-83dBm	±2dB		36M	-89/-85dBm	±2dB
	48M	-83/-79dBm	±2dB		48M	-85/-81dBm	±2dB
	54M	-82/-78dBm	±2dB		54M	-83/-79dBm	±2dB

<b>802.11 a/n HT20</b>	MCS0	-95/-91dBm	±2dB	<b>802.11 b/g/n HT20</b>	MCS0	-96/-92dBm	±2dB
	MCS1	-94/-90dBm	±2dB		MCS1	-95/-91dBm	±2dB
	MCS2	-92/-88dBm	±2dB		MCS2	-93/-89dBm	±2dB
	MCS3	-88/-84dBm	±2dB		MCS3	-90/-86dBm	±2dB
	MCS4	-85/-81dBm	±2dB		MCS4	-87/-81dBm	±2dB
	MCS5	-81/-77dBm	±2dB		MCS5	-83/-76dBm	±2dB
	MCS6	-80/-76dBm	±2dB		MCS6	-81/-76dBm	±2dB
	MCS7	-77/-73dBm	±2dB		MCS7	-79/-73dBm	±2dB
	MCS8	-94/-90dBm	±2dB		MCS8	-95/-91dBm	±2dB
	MCS9	-92/-87dBm	±2dB		MCS9	-93/-89dBm	±2dB
	MCS10	-89/-85dBm	±2dB		MCS10	-90/-86dBm	±2dB
	MCS11	-86/-82dBm	±2dB		MCS11	-87/-83dBm	±2dB
	MCS12	-83/-79dBm	±2dB		MCS12	-84/-80dBm	±2dB
	MCS13	-78/-74dBm	±2dB		MCS13	-79/-75dBm	±2dB
	MCS14	-77/-73dBm	±2dB		MCS14	-77/-73dBm	±2dB
MCS15	-74/-69dBm	±2dB	MCS15	-75/-71dBm	±2dB		
<b>802.11 a/n HT40</b>	MCS0	-91/-87dBm	±2dB	<b>802.11 b/g/n HT40</b>	MCS0	-90/-86dBm	±2dB
	MCS1	-90/-86dBm	±2dB		MCS1	-90/-86dBm	±2dB
	MCS2	-88/-84dBm	±2dB		MCS2	-89/-85dBm	±2dB
	MCS3	-85/-81dBm	±2dB		MCS3	-87/-82dBm	±2dB
	MCS4	-82/-78dBm	±2dB		MCS4	-84/-79dBm	±2dB
	MCS5	-78/-74dBm	±2dB		MCS5	-79/-75dBm	±2dB
	MCS6	-77/-73dBm	±2dB		MCS6	-78/-74dBm	±2dB
	MCS7	-74/-70dBm	±2dB		MCS7	-75/-71dBm	±2dB
	MCS8	-91/-87dBm	±2dB		MCS8	-90/-86dBm	±2dB
	MCS9	-88/-84dBm	±2dB		MCS9	-89/-85dBm	±2dB
	MCS10	-86/-82dBm	±2dB		MCS10	-87/-83dBm	±2dB
	MCS11	-83/-79dBm	±2dB		MCS11	-84/-80dBm	±2dB
	MCS12	-80/-76dBm	±2dB		MCS12	-81/-77dBm	±2dB
	MCS13	-75/-71dBm	±2dB		MCS13	-76/-72dBm	±2dB
	MCS14	-73/-69dBm	±2dB		MCS14	-74/-68dBm	±2dB
MCS15	-70/-66dBm	±2dB	MCS15	-71/-67dBm	±2dB		

#### DRIVER INFORMATION

<b>Driver</b>	Linux Madwifi, WindowsXP , Windows 2000, Windows Vista
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#### ORDERING CONFIGURATIONS<sup>①</sup>

CODES	SPEED	Carton Dimension
WLM200NX 6AA1100	Up to 300 Mbps physical data rates	For 50pcs (pcs/ctn), 0.40m * 0.22m * 0.085m / 0.006 = 1.5KG For 250pc (pcs/ctn), 0.45m * 0.45m * 0.24m / 0.006 = 8.1KG
WLM200NX 6AA1300	Up to 300 Mbps physical data rates	

① Configurations are subjected to change without notice

## COMPLIANCE INFORMATION

### FCC NOTICE:

This device 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 device 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 device does cause harmful interference to radio or television reception, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Connect the computer into an outlet on a circuit different from that to which the receiver is connected.
- Increase the separation between the computer and receiver.
- Consult the dealer or an experienced radio/TV technician for help.

This module is intended for OEM integrator. The OEM integrator is still responsible for the FCC compliance requirement of the end product which integrates this module.

30cm 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 an 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 30cm 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. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: 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.

### LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: **TK4-09-MMNX** ". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement 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.

FCC15.19

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.

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.

### **RF exposure warning**

The equipment complies with FCC RF exposure limits set forth for an uncontrolled environment.

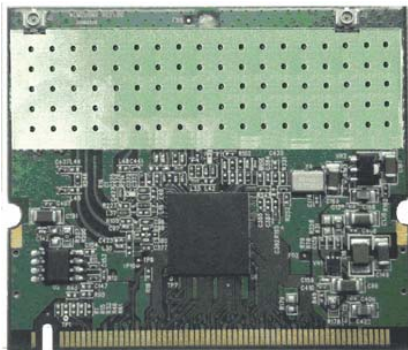
The equipment must not be co-located or operating in conjunction with any other antenna or transmitter.

### **IMPORTANT NOTE REGARDING ANTENNA USE**

#### **Antenna Use**

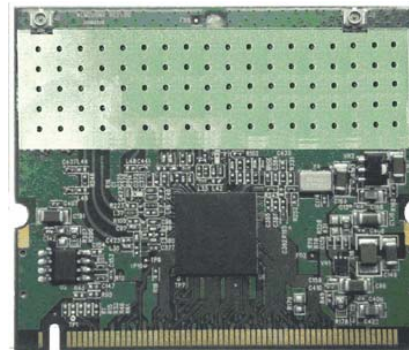
##### **2x2 Operation**

Chain1 Chain2

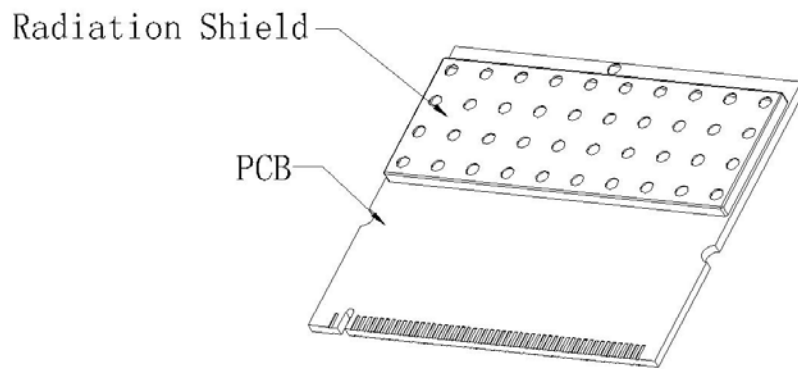
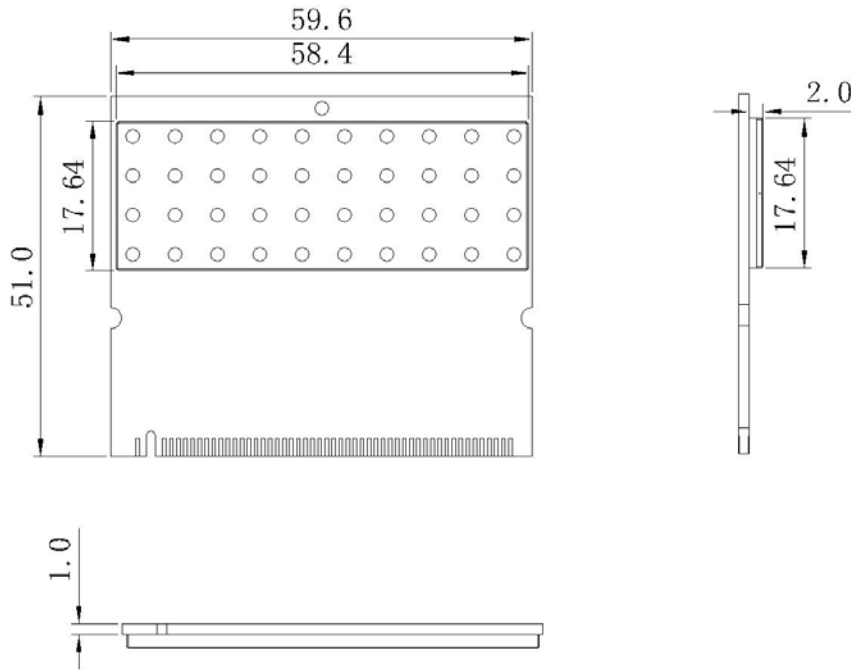


##### **1x1 Operation**

Chain1



## DIMENSIONS DRAWING



## WLM FAMILY SERIES OF MINIPCI

b / g (2.4GHz)						a / b / g (2.4/5GHz)		
MODEL	WLM 54G-20dBm	WLM 54G-23dBm	WLM 54G-26dBm	WLM 54G – 28dBm	WLM200N2	WLM 54AG – 20dBm	WLM 54 AG – 23dBm	WLM 54A – 26dBm
CHIPSET	AR 2413/2414 (AR5005G/GS)	AR 2413/2414 (AR5005G/GS)	AR 2413/2414 (AR5005G/GS)	AR 2413/2414 (AR5005G/GS)	AR9223	AR 5413/5414 (AR5006X/XS)	AR 5413/5414 (AR5006X/XS)	AR5414 (AR5006XS)
SPEED	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 300Mbps physical data rates	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 108Mbps
OUTPUT POWER (Average)								
802.11a	-	-	-	-	-	-	23dBm@6-24Mbps	26dBm@6-24Mbps
						17dBm@36Mbps	21dBm@36Mbps	24dBm@36Mbps
						16dBm@48Mbps	19dBm@48Mbps	22dBm@48Mbps
						13dBm@54Mbps	17dBm@54Mbps	20dBm@54Mbps
802.11b	20dBm@1-11Mbps	23dBm@1-11Mbps	26dBm@1-11Mbps	28dBm@1-11Mbps	20dBm@1-11Mbps	20dBm@1-11Mbps	23dBm@1-11Mbps	
802.11g	20dBm@6-24Mbps	23dBm@6-24Mbps	26dBm@6-24Mbps	28dBm@6-24Mbps	20dBm@6-24Mbps	20dBm@6-24Mbps	23dBm@6-24Mbps	
	19dBm@36Mbps	22dBm@36Mbps	25dBm@36Mbps	26dBm@36Mbps	19.5dBm@36Mbps	18dBm@36Mbps	21dBm@36Mbps	
	17dBm@48Mbps	19dBm@48Mbps	24dBm@48Mbps	25dBm@48Mbps	18.5dBm@48Mbps	17dBm@48Mbps	19dBm@48Mbps	
	16dBm@54Mbps	17dBm@54Mbps	22dBm@54Mbps	23dBm@54Mbps	17dBm@54Mbps	15dBm@54Mbps	17dBm@54Mbps	
Modulation Techniques	OFDM and DSSS OFDM: BPSK, QPSK, 16QAM, 64QAM DSSS: DBPSK, DQPSK, CCK							
Interface	PCI Interface v2.3 (Type III-B Mini PCI Form Factor)							
Receiver Sensitivity	802.11g < -90dBm @ 6Mbps < -70dBm @ 54Mbps		802.11b < -92dBm@ 6Mbps < -87dBm @11Mbps		802.11a < -90dBm @ 6Mbps < -70dBm @ 54Mbps			
Operating Channels	IEEE 802.11g: 11 Channel (US & Canada) 13 Channel (Europe) 14 Channel (Japan)				IEEE 802.11a: 13 Channel (US & Canada) 19 Channel (Europe) 10 Channel (Japan)			
Power	3.3VDC							
Operating Temperature	-20°C to 70°C							
Dimensions	6.0cm x 4.5cm High Power Cards (26dBm/30dBm) has bigger dimensions.							

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