



## Radio module

# WLM200N5-23 ESD MINIPCI

Single-Band 5GHz 802.11n MIMO 2 x 2 miniPCI

## Features

- Atheros XSPAN family chipset
- 5GHz IEEE 802.11n compliant and backward compatible with 802.11a
- 5GHz Single-band MIMO 2x2 spatial multiplexing technique
- Maximum 20.0dBm output (per chain)/23.0dBm aggregate for 5.7G  
Maximum 23.5dBm output (per chain)/26.5dBm aggregate for 5.8G.
- Built-in ESD Protection with ESD/EMP Immunity Threshold: 15KeV<sup>①</sup>
- Supports up to 300Mbps physical data rates
- Delivers 10 times the throughput and nearly twice the range of legacy 802.11a network
- Transmission Power Control (IEEE 802.11h TPC)
- Dynamic Frequency Selection (DFS)
- Multi-Country Roaming Supported (IEEE802.11d Global Harmonization Standard)
- 2 x MMCX or 2 x U.FL Antenna Connectors<sup>②</sup>

Technical Specifications									
<b>Chipset</b>	Atheros AR9220								
<b>Host Interface</b>	PCI Interface v2.3 (Type III-A Mini PCI form factor)								
<b>Operating Voltage</b>	3.3 VDC								
<b>Power Consumption</b>	11a Cont. Tx @6M	3.5W							
	11na Cont. Tx@HT20 MCS0	3W							
	11na Cont. Tx@HT40 MCS0	3W							
	11a Cont. Rx	0.9W							
	Standby	0.7W							
<b>Antenna Connector</b>	2 x MMCX or 2 x U.FL <sup>②</sup>								
<b>Data Rate</b>	IEEE 802.11a :	54Mbps	48Mbps	36Mbps	24Mbps	18Mbps	12Mbps	9Mbps	6Mbps
	IEEE 802.11n :	20MHz	1Nss: 65Mbps @ 800GI, 72.2Mbps @ 400GI (Max.)						
		40MHz	2Nss: 130Mbps @ 800GI, 144.4Mbps @ 400GI (Max.)						
				1Nss: 135Mbps @ 800GI, 150Mbps @ 400GI (Max.)					
<b>Frequency Range</b>	IEEE 802.11a/n:	5.470 ~ 5.725GHz, 5.725 ~ 5.850 GHz (US & Canada)							
		5.470 ~ 5.725GHz, 5.725 ~ 5.875 GHz (Europe)							
		5.150 ~ 5.250 GHz, 5.250 ~ 5.350GHz, 5.470 ~ 5.725GHz(Japan)							
<b>Modulation Techniques</b>	OFDM: BPSK, QPSK, 16QAM, 64QAM								
<b>Radio &amp; EMC Certification</b>	CE, FCC								
<b>RoHS Compliance</b>	Yes								
<b>Temperature Range</b>	Operating: -20°C to 70°C Storage: -40°C to 90°C								
<b>Humidity</b>	Operating: 5% to 95% (non-condensing) Storage: Max.90% (non-condensing)								
<b>Dimension</b>	59.6mm x 51.5mm x 6mm								

ESD CABLE SPECIFICATION	
Cable Dimensions	26cm length
Terminal Material	Copper
Attachment Procedure	End of ESD Cable tied to Earth Ground

### Ordering Information <sup>③</sup>

CODES	Antenna Connectors type	Carton Dimension
WLM200N5-23 6AA1300ESD	U.FL	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
WLM200N5-23 6BA1300ESD	MMCX	

- ① Module grounding cable included
- ② Depends on your order configuration
- ③ Configurations are subject to change without notice  
Please contact Complex sales representatives for other available configurations

## Compliance Information

### FCC Compliance 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 device must accept any interference received, including interference that may cause undesired operation. Product that is a radio transmitter is labeled with FCC ID.

### FCC Caution:

(1) Exposure to Radio Frequency Radiation. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance which shown as following table from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

Antenna Used	Frequency Range (MHz)	Maximum Conducted Power (dBm)	Limit of Power Density S(W/m <sup>2</sup> )	Safety Distance r (cm)
Dipole Antenna (C0053-ANG0003) 2dBi	5470 ~ 5850	26.51	10	7.5
Panel Antenna (MJE2-5N17) 17dBi	5725 ~ 5850	26.51	10	42.3
Panel Antenna (MME2-5N19) 19dBi	5725 ~ 5850	26.51	10	51.9
Dual Polarized Wide-Band Antenna (58DP) 26dBi	5725 ~ 5850	26.51	10	119.1

End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Note: this device is used exclusively for fixed, point to point operation, and it will be installed professionally. According to the above antenna list, if dipole antenna (C0053-ANG0003) is used, the operation frequency range will cover from 5500 to 5825MHz; if the left three antennae are used, the operation frequency will just cover from 5745 to 5825MHz. The proper operation frequency band shall be controlled by the professional installer through changing the software.

- (2) Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.
- (3) This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

(4) Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

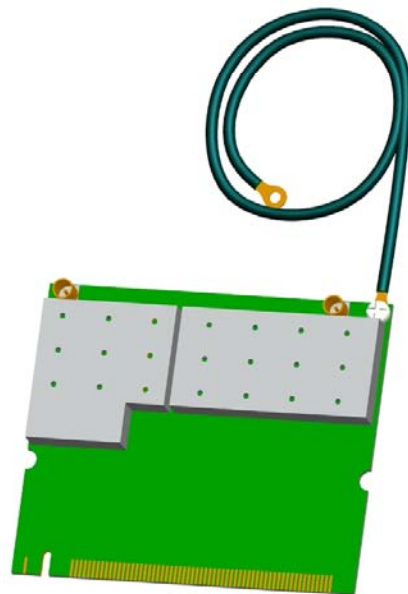
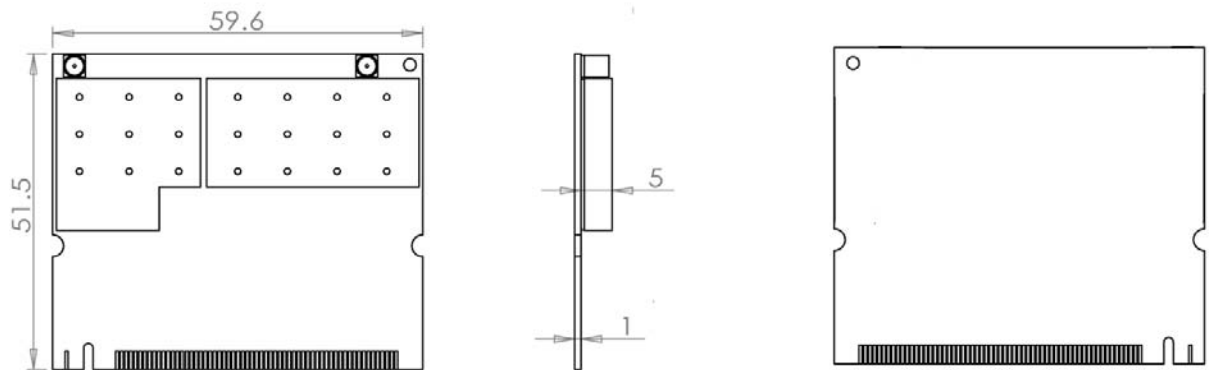
(5) Outdoor Operations in the 5.15~5.25GHz band is prohibited.

**IMPORTANT NOTE:** In the event that these conditions cannot 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 cannot 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.

**WARNING:** This Wireless Mini PCI Adapter does not support ad-hoc mode Function

## FCC ID: TK4WLM200N5-23ESD

### Dimensions Drawing



**WLM SERIES MINIPCI**

b / g (2.4GHz)								a / b / g (2.4/5GHz)				
MODEL	WLM 54G-20dBm	WLM 54G-23dBm	WLM 54G-26dBm	WLM 54G-28dBm	WLM54G-30dBm	WLM200N2	WLM200N2-26dBm	WLM 54AG – 20dBm	WLM 54AG – 23dBm	WLM 54A – 26dBm	WLM200NX	WLM200N5-26
CHIPSET	AR 2413/2414 (AR5005G/GS)	AR 2413/2414 (AR5005G/GS)	AR 2413/2414 (AR5005G/GS)	AR 2413/2414 (AR5005G/GS)	AR 2413/2414 (AR5005G/GS)	AR9223	AR9223	AR 5413/5414 (AR5006X/XS)	AR 5413/5414 (AR5006X/XS)	AR5414 (AR5006XS)	AR9220	AR9220
SPEED	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 300Mbps physical data rates	UP TO 300Mbps physical data rates	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 108Mbps	UP TO 300Mbps physical data rates	UP TO 300Mbps physical data rates
OUTPUT POWER (Average)												
802.11a								20dBm@6-24Mbps	23dBm@6-24Mbps	26dBm@6-24Mbps	20dBm@6-24Mbps	26dBm@6-24Mbps
								17dBm@36Mbps	21dBm@36Mbps	24dBm@36Mbps	17dBm@36Mbps	26dBm@36Mbps
								16dBm@48Mbps	19dBm@48Mbps	22Bm@48Mbps	16dBm@48Mbps	25Bm@48Mbps
								13dBm@54Mbps	17dBm@54Mbps	20dBm@54Mbps	13dBm@54Mbps	19dBm@54Mbps
802.11b	20dBm@1-11Mbps	23dBm@1-11Mbps	26dBm@1-11Mbps	28dBm@1-11Mbps	30Bm@1-11Mbps	20dBm@1-11Mbps	26dBm@1-11Mbps	20dBm@1-11Mbps	23dBm@1-11Mbps	-	20dBm@1-11Mbps	-
802.11g	20dBm@6-24Mbps	23dBm@6-24Mbps	26dBm@6-24Mbps	28dBm@6-24Mbps	30dBm@6-24Mbps	20dBm@6-24Mbps	26dBm@6-24Mbps	20dBm@6-24Mbps	23dBm@6-24Mbps	-	20dBm@6-24Mbps	-
	19dBm@36Mbps	22dBm@36Mbps	25dBm@36Mbps	26dBm@36Mbps	28dBm@36Mbps	19.5dBm@36Mbps	26dBm@36Mbps	18dBm@36Mbps	21dBm@36Mbps	-	18dBm@36Mbps	-
	17dBm@48Mbps	19dBm@48Mbps	24dBm@48Mbps	25dBm@48Mbps	27dBm@48Mbps	18.5dBm@48Mbps	22dBm@48Mbps	17dBm@48Mbps	19dBm@48Mbps	-	17dBm@48Mbps	-
	16dBm@54Mbps	17dBm@54Mbps	22dBm@54Mbps	23dBm@54Mbps	25dBm@54Mbps	17dBm@54Mbps	21dBm@54Mbps	15dBm@54Mbps	17dBm@54Mbps	-	15dBm@54Mbps	-
Interface	PCI Interface v2.3 (Type III-B Mini PCI Form Factor)					PCI Interface v2.3 (Type III-A Mini PCI Form Factor)		PCI Interface v2.3 (Type III-B Mini PCI Form Factor)			PCI Interface v2.3 (Type III/A Mini PCI Form Factor)	
Receiver Sensitivity	802.11g -94dBm @ 6Mbps < -73dBm @ 54Mbps		802.11g -96dBm @ 6Mbps < -83dBm @ 54Mbps			802.11g -96dBm @ 6Mbps < -83dBm @ 54Mbps		802.11g -94dBm @ 6Mbps < -73dBm @ 54Mbps		-94dBm @6Mbps -73dBm @54Mbps	Refer to datasheet	Refer to datasheet
802.11b	-94dBm @ 6Mbps -91dBm @11Mbps		802.11b -96dBm@ 6Mbps -91dBm @11Mbps			802.11b -96dBm@ 6Mbps -91dBm @11Mbps		802.11b -94dBm@ 6Mbps -91dBm @11Mbps				
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)					
Input Power	3.3V DC											
Operating Temperature	-20°C to 70°C											

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