



## 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 23dBm output (per chain)/26dBm aggregate
- 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									
Chipset	Atheros AR9220								
Host Interface	PCI Interface v2.3 (Type III-A Mini PCI form factor)								
Operating Voltage	3.3 VDC								
Power Consumption	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							
Antenna Connector	2 x MMCX or 2 x U.FL <sup>②</sup>								
Data Rate	IEEE 802.11a :	54Mbps	48Mbps	36Mbps	24Mbps	18Mbps	12Mbps	9Mbps	6Mbps
	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.)									
Frequency Range	IEEE 802.11a/n:	5.150 ~ 5.350 GHz, 5.470 ~ 5.725GHz, 5.725 ~ 5.850 GHz (US & Canada)							
		5.150 ~ 5.350 GHz, 5.470 ~ 5.725GHz, 5.725 ~ 5.875 GHz (Europe)							
		5.150 ~ 5.250 GHz, 5.250 ~ 5.350GHz, 5.470 ~ 5.725GHz(Japan)							
Modulation Techniques	OFDM: BPSK, QPSK, 16QAM, 64QAM								
Radio & EMC Certification	CE, FCC								
RoHS Compliance	Yes								
Temperature Range	Operating: -20°C to 70°C Storage: -40°C to 90°C								
Humidity	Operating: 5% to 95% (non-condensing) Storage: Max.90% (non-condensing)								
Dimension	59.6mm x 51.5mm x 6mm								

WLM200N5-23 ESD MIMO MINIPCI CARD RADIO									
TX SPECIFICATIONS									
	DataRate	TX Power				Tolerance			
802.11a	6-24Mbps	23dBm				±2dB			
	36Mbps	22dBm				±2dB			
	48Mbps	21dBm				±2dB			
	54Mbps	20dBm				±2dB			
	DataRate	TX Power (per chain)	Tolerance		DataRate	TX Power (per chain)	Tolerance		
5GHz 11n HT 20	MCS 0/8	23dBm	±2dB	5GHz 11n HT 40	MCS 0/8	21dBm	±2dB		
	MCS 1/9	22dBm	±2dB		MCS 1/9	21dBm	±2dB		
	MCS 2/10	20.5dBm	±2dB		MCS 2/10	19.5dBm	±2dB		
	MCS 3/11	20.5dBm	±2dB		MCS 3/11	19.5dBm	±2dB		
	MCS 4/12	19.5dBm	±2dB		MCS 4/12	19dBm	±2dB		
	MCS 5/13	19dBm	±2dB		MCS 5/13	17.5dBm	±2dB		
	MCS 6/14	18dBm	±2dB		MCS 6/14	17.5dBm	±2dB		
	MCS 7/15	17dBm	±2dB		MCS 7/15	14dBm	±2dB		
RX SPECIFICATIONS									
	Data Rate	Sensitivity (2 chains)	Tolerance		Data Rate	Sensitivity (2 chains)	Tolerance		
802.11a	6M	-97dBm	±2dB	802.11a	24M	-90dBm	±2dB		
	9M	-97dBm	±2dB		36M	-87dBm	±2dB		
	12M	-96dBm	±2dB		48M	-83dBm	±2dB		
	18M	-94dBm	±2dB		54M	-80dBm	±2dB		
5GHz 11n HT 20	MCS0	-97dBm	±2dB	5GHz 11n HT 40	MCS0	-92dBm	±2dB		
	MCS1	-94dBm	±2dB		MCS1	-90dBm	±2dB		
	MCS2	-92dBm	±2dB		MCS2	-87dBm	±2dB		
	MCS3	-87dBm	±2dB		MCS3	-84dBm	±2dB		
	MCS4	-84dBm	±2dB		MCS4	-82dBm	±2dB		
	MCS5	-80dBm	±2dB		MCS5	-78dBm	±2dB		
	MCS6	-79dBm	±2dB		MCS6	-76dBm	±2dB		
	MCS7	-77dBm	±2dB		MCS7	-74dBm	±2dB		

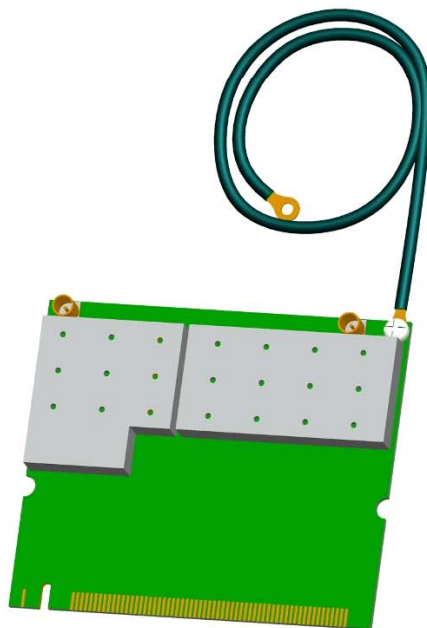
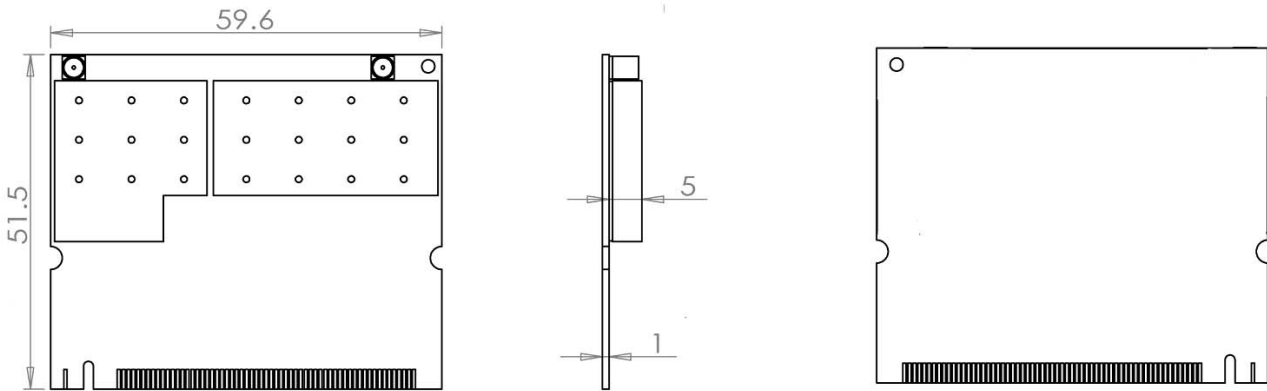
ESD CABLE SPECIFICATION	
Cable Dimensions	26cm length
Terminal Material	Copper
Attachment Procedure	End of ESD Cable tied to Earth Ground

### 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
WLM200N5-23 6BA1300ESD	MMCX	For 250pc (pcs/ctn), 0.45m * 0.45m * 0.24m / 0.006 = 8.1KG

- 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

### 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	22dBm@48Mbps	16dBm@48Mbps	25dBm@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	30dBm@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 802.11b -94dBm @ 6Mbps -91dBm @ 11Mbps		802.11g -96dBm @ 6Mbps < -83dBm @ 54Mbps 802.11b -96dBm @ 6Mbps -91dBm @ 11Mbps			802.11g -96dBm @ 6Mbps < -83dBm @ 54Mbps 802.11b -96dBm @ 6Mbps -91dBm @ 11Mbps		802.11g -94dBm @ 6Mbps < -73dBm @ 54Mbps 802.11b -94dBm @ 6Mbps -91dBm @ 11Mbps 802.11a -94dBm @ 6Mbps < -73dBm @ 54Mbps		-94dBm @ 6Mbps -73dBm @ 54Mbps	Refer to datasheet	Refer to datasheet
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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