



# MINIPCI RADIO CARD

## WLM200N5-23 ESD

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

### Features

- Atheros XSPAN family chipset
- 5GHz IEEE 802.11n compliant and backward compatible with 802.11a
- Maximum 23dBm output power(per chain)/ 26dBm(aggregate)
- Built-in ESD Protection with ESD/EMP Immunity Threshold: 15KeV<sup>①</sup>
- 4.9GHz & 5.9GHz support (Optional)<sup>②</sup>
- Enhanced noise immunity and sensitivity
- 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 variants<sup>③</sup>
- Cost-effective and flexible for outdoor broadband wireless applications

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, 16-QAM, 64-QAM									
Radio & EMC Certification	CE, FCC, IC									
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)									
Dimensions	59.6mm x 51.5mm x 6mm (H x W x D)									

WLM200N5-23 ESD MIMO MINIPCI CARD RADIO										
TX SPECIFICATIONS										
	DataRate	TX Power				TX Power			Tolerance	
		(per chain)	(2 chains)			(per chain)	(2 chains)			
802.11a	6-24Mbps	23dBm	26dBm	±2dB		23dBm	26dBm	±2dB		
	36Mbps	21dBm	24dBm	±2dB		24dBm	24dBm	±2dB		
	48Mbps	20dBm	23dBm	±2dB		23dBm	23dBm	±2dB		
	54Mbps	18dBm	21dBm	±2dB		21dBm	21dBm	±2dB		
	DataRate	TX Power	TX Power	Tolerance		DataRate	TX Power	TX Power	Tolerance	
		(per chain)	(2 chains)				(per chain)	(2 chains)		
5GHz 11n HT 20	MCS 0/8	23dBm	26dBm	±2dB		MCS 0/8	21dBm	24dBm	±2dB	
	MCS 1/9	22dBm	25dBm	±2dB		MCS 1/9	21dBm	24dBm	±2dB	
	MCS 2/10	20.5dBm	23.5dBm	±2dB		MCS 2/10	19.5dBm	22.5dBm	±2dB	
	MCS 3/11	20.5dBm	23.5dBm	±2dB		MCS 3/11	19.5dBm	22.5dBm	±2dB	
	MCS 4/12	19.5dBm	22.5dBm	±2dB		MCS 4/12	19dBm	22dBm	±2dB	
	MCS 5/13	19dBm	22dBm	±2dB		MCS 5/13	17.5dBm	20.5dBm	±2dB	
	MCS 6/14	18dBm	21dBm	±2dB		MCS 6/14	17.5dBm	20.5dBm	±2dB	
	MCS 7/15	17dBm	20dBm	±2dB		MCS 7/15	14dBm	17dBm	±2dB	
RX SPECIFICATIONS										
	Data Rate	Sensitivity		Tolerance		DataRate	Sensitivity		Tolerance	
		(2 chains)					(2 chains)			
802.11a	6M	-97dBm	-97dBm	±2dB		24M	-90dBm	-90dBm	±2dB	
	9M	-97dBm	-97dBm	±2dB		36M	-87dBm	-87dBm	±2dB	
	12M	-96dBm	-96dBm	±2dB		48M	-83dBm	-83dBm	±2dB	
	18M	-94dBm	-94dBm	±2dB		54M	-80dBm	-80dBm	±2dB	
5GHz 11n HT 20	MCS0	-97dBm	-97dBm	±2dB		MCS0	-92dBm	-92dBm	±2dB	
	MCS1	-94dBm	-94dBm	±2dB		MCS1	-90dBm	-90dBm	±2dB	
	MCS2	-92dBm	-92dBm	±2dB		MCS2	-87dBm	-87dBm	±2dB	
	MCS3	-87dBm	-87dBm	±2dB		MCS3	-84dBm	-84dBm	±2dB	
	MCS4	-84dBm	-84dBm	±2dB		MCS4	-82dBm	-82dBm	±2dB	
	MCS5	-80dBm	-80dBm	±2dB		MCS5	-78dBm	-78dBm	±2dB	
	MCS6	-79dBm	-79dBm	±2dB		MCS6	-76dBm	-76dBm	±2dB	
	MCS7	-77dBm	-77dBm	±2dB		MCS7	-74dBm	-74dBm	±2dB	

WLM200N5-23 ESD-4.9(4.900-4.985)GHz MIMO MINIPCI CARD RADIO <sup>②</sup>							
TX SPECIFICATIONS							
	DataRate	TX Power	Tolerance		DataRate	TX Power (per chain)	Tolerance
802.11a	6M	20dBm	±2dB	5GHz 11n HT 20	MCS 0/8	20dBm	±2dB
	9M	20dBm	±2dB		MCS 1/9	20dBm	±2dB
	12M	20dBm	±2dB		MCS 2/10	19dBm	±2dB
	18M	20dBm	±2dB		MCS 3/11	19dBm	±2dB
	24M	20dBm	±2dB		MCS 4/12	17dBm	±2dB
	36M	20dBm	±2dB		MCS 5/13	16.5dBm	±2dB
	48M	19dBm	±2dB		MCS 6/14	16dBm	±2dB
	54M	18dBm	±2dB		MCS 7/15	16dBm	±2dB
RX SPECIFICATIONS							
	Data Rate	Sensitivity (2 chains)	Tolerance		Data Rate	Sensitivity (2 chains)	Tolerance
802.11a	6M	-97dBm	±2dB	5GHz 11n HT 20	MCS0	-97dBm	±2dB
	9M	-97dBm	±2dB		MCS1	-94dBm	±2dB
	12M	-96dBm	±2dB		MCS2	-92dBm	±2dB
	18M	-94dBm	±2dB		MCS3	-87dBm	±2dB
	24M	-90dBm	±2dB		MCS4	-84dBm	±2dB
	36M	-87dBm	±2dB		MCS5	-80dBm	±2dB
	48M	-83dBm	±2dB		MCS6	-79dBm	±2dB
	54M	-80dBm	±2dB		MCS7	-77dBm	±2dB

WLM200N5-23 ESD-5.9 ( 5.905-5.985 ) GHz MIMO MINIPCI CARD RADIO <sup>②</sup>							
TX SPECIFICATIONS							
	DataRate	TX Power	Tolerance		DataRate	TX Power (per chain)	Tolerance
802.11a	6M	20dBm	±2dB	5GHz 11n HT 20	MCS 0/8	20dBm	±2dB
	9M	20dBm	±2dB		MCS 1/9	19dBm	±2dB
	12M	20dBm	±2dB		MCS 2/10	17dBm	±2dB
	18M	20dBm	±2dB		MCS 3/11	17dBm	±2dB
	24M	20dBm	±2dB		MCS 4/12	16dBm	±2dB
	36M	18dBm	±2dB		MCS 5/13	16dBm	±2dB
	48M	17dBm	±2dB		MCS 6/14	15dBm	±2dB
	54M	15dBm	±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	5GHz 11n HT 20	MCS0	-97dBm	±2dB
	9M	-97dBm	±2dB		MCS1	-94dBm	±2dB
	12M	-96dBm	±2dB		MCS2	-92dBm	±2dB
	18M	-94dBm	±2dB		MCS3	-87dBm	±2dB
	24M	-90dBm	±2dB		MCS4	-84dBm	±2dB
	36M	-87dBm	±2dB		MCS5	-80dBm	±2dB
	48M	-83dBm	±2dB		MCS6	-79dBm	±2dB
	54M	-80dBm	±2dB		MCS7	-77dBm	±2dB

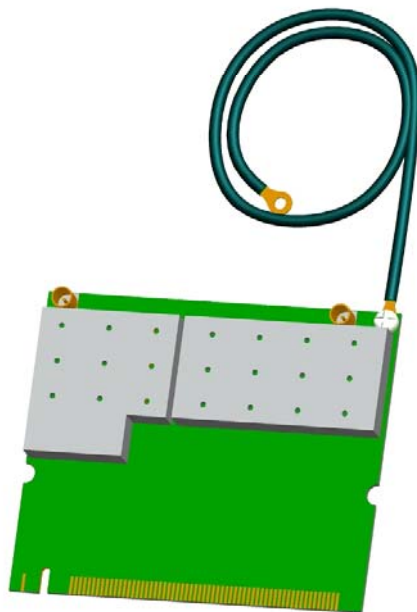
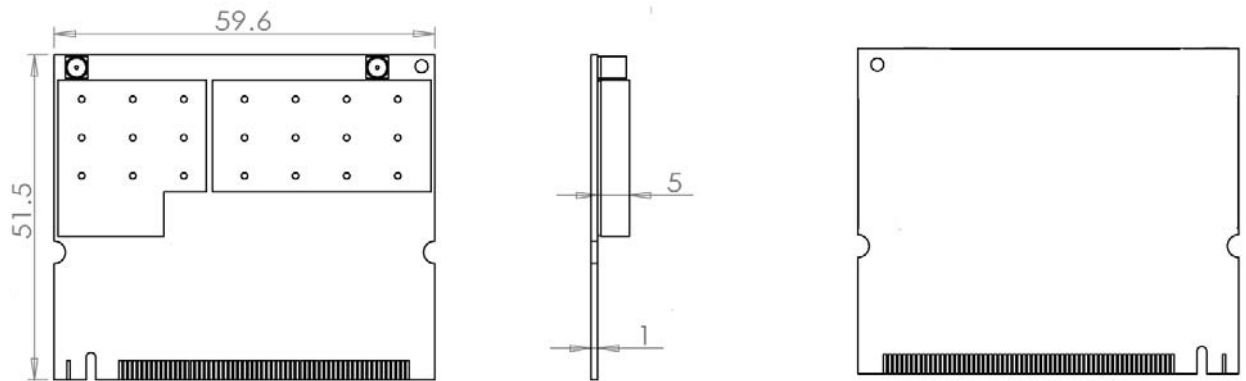
ESD CABLE SPECIFICATION	
Cable Dimensions	26cm length
Terminal Material	Copper
Attachment Procedure	End of ESD cable tied to Earth Ground

## 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 For 250pc (pcs/ctn), 0.45m * 0.45m * 0.24m / 0.006 = 8.1KG
WLM200N5-23 6BA1300ESD	MMCX	
WLM200N5-23 6AA1300ESD4.9	U.FL	
WLM200N5-23 6BA1300ESD4.9	MMCX	
WLM200N5-23 6BA1300E5.95	MMCX	

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

## Dimensions Drawing



## WLM SERIES MINIPCI

WLM54 series miniPCI (legacy a/b/g card)								
MODEL	WLM 54G-20dBm	WLM 54G-23dBm	WLM 54G-23 ESD	WLM 54G-26dBm	WLM54G-30 ESD	WLM 54AG - 20dBm	WLM 54AG - 23dBm	WLM 54A - 26 ESD
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)	AR 5413/5414 (AR5006/XS)	AR 5413/5414 (AR5006/XS)	AR5414 (AR5006XS)
SPEED	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 108Mbps
OUTPUT POWER						20dBm@6-24Mbps	23dBm@6-24Mbps	26dBm@6-24Mbps
802.11a						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	23dBm@1-11Mbps	26dBm@1-11Mbps	30Bm@1-11Mbps	20dBm@1-11Mbps	23dBm@1-11Mbps	-
	20dBm@6-24Mbps	23dBm@6-24Mbps	23dBm@6-24Mbps	26dBm@6-24Mbps	30dBm@6-24Mbps	20dBm@6-24Mbps	23dBm@6-24Mbps	-
	19dBm@36Mbps	22dBm@36Mbps	22dBm@36Mbps	25dBm@36Mbps	28dBm@36Mbps	18dBm@36Mbps	21dBm@36Mbps	-
	17dBm@48Mbps	19dBm@48Mbps	19dBm@48Mbps	24dBm@48Mbps	27dBm@48Mbps	17dBm@48Mbps	19dBm@48Mbps	-
802.11g	16dBm@54Mbps	17dBm@54Mbps	17dBm@54Mbps	23dBm@54Mbps	25dBm@54Mbps	15dBm@54Mbps	17dBm@54Mbps	-
Receiver Sensitivity								
802.11a						-93dBm @ 6Mbps	-93dBm @ 6Mbps	-96dBm @ 6Mbps
						-72dBm @ 54Mbps	-72dBm @ 54Mbps	-76dBm @ 54Mbps
802.11b	-96dBm @ 6Mbps	-96dBm @ 6Mbps	-93dBm @ 6Mbps	-93dBm @ 6Mbps	-96dBm @ 6Mbps	-96dBm @ 6Mbps	-96dBm @ 6Mbps	-96dBm @ 6Mbps
	-90dBm @ 11Mbps	-90dBm @ 11Mbps	-90dBm @ 11Mbps	-90dBm @ 11Mbps	-90dBm @ 11Mbps	-90dBm @ 11Mbps	-90dBm @ 11Mbps	-90dBm @ 11Mbps
802.11g	-93dBm @ 6Mbps	-93dBm @ 6Mbps	-93dBm @ 6Mbps	-93dBm @ 6Mbps	-93dBm @ 6Mbps	-93dBm @ 6Mbps	-93dBm @ 6Mbps	-93dBm @ 6Mbps
	-74dBm @ 54Mbps	-74dBm @ 54Mbps	<-72dBm @ 54Mbps	<-72dBm @ 54Mbps	-74dBm @ 54Mbps	-96dBm @ 6Mbps	-96dBm @ 6Mbps	-96dBm @ 6Mbps
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)		
Interface	PCI Interface v2.3 (Type III-B Mini PCI Form Factor)							
Input Power	3.3V DC							
Operating Temperature	-20°C to 70°C							

WLM200 series miniPCI (11n MIMO 2*2 card)					
MODEL	WLM200N2	WLM200N2-26dBm	WLM200NX	WLM200N5-23 ESD	WLM200N5-26 ESD
CHIPSET	AR9223	AR9223	AR9220	AR9220	AR9220
SPEED	UP TO 300Mbps physical data rates	UP TO 300Mbps physical data rates	UP TO 300Mbps physical data rates	UP TO 300Mbps physical data rates	UP TO 300Mbps physical data rates
OUTPUT POWER					
802.11a			18dBm@6-24Mbps	23dBm@6-24Mbps	26dBm@6-24Mbps
			18dBm@36Mbps	22dBm@36Mbps	25dBm@36Mbps
			17dBm@48Mbps	21dBm@48Mbps	24dBm@48Mbps
			16dBm@54Mbps	20dBm@54Mbps	23dBm@54Mbps
5G HT20			18dBm @MCS0	23dBm @MCS0	25dBm @MCS0
			12dBm @MCS7	17dBm @MCS7	20dBm @MCS7
5G HT40			16.5dBm @MCS0	21dBm @MCS0	24dBm @MCS0
			9dBm @MCS7	14dBm @MCS7	17dBm @MCS7
802.11b	20dBm@1-11Mbps	26dBm@1-11Mbps	20dBm@1-11Mbps		
	20dBm@6-24Mbps	26dBm@6-24Mbps	20dBm@6-24Mbps		
	20dBm@36Mbps	26dBm@36Mbps	19.5dBm@36Mbps		
	16dBm@48Mbps	22dBm@48Mbps	18.5dBm@48Mbps		
	15dBm@54Mbps	21dBm@54Mbps	17dBm@54Mbps		
2.4G HT20	17dBm @MCS0	23dBm @MCS0	18dBm @MCS0		
	14dBm @MCS7	20dBm @MCS7	15dBm @MCS7		
2.4G HT40	16dBm @MCS0	22dBm @MCS0	18dBm @MCS0		
	14dBm @MCS7	20dBm @MCS7	14.5dBm @MCS7		
Receiver Sensitivity					
802.11a			-94dBm@6M	-97dBm@6M	-96dBm@6M
			-77dBm@54M	-80dBm@54M	-79dBm@54M
5G HT20			-93dBm@MCS0	-97dBm@MCS0	-95dBm@MCS0
			-74dBm@MCS7	-77dBm@MCS7	-75dBm@MCS7
5G HT40			-90dBm@MCS0	-92dBm@MCS0	-92dBm@MCS0
			-72dBm@MCS7	-74dBm@MCS7	-74dBm@MCS7
802.11b	-94dBm@1M	-94dBm@1M	-94dBm@1M		
	-92dBm@11M	-92dBm@11M	-94dBm@11M		
802.11g	-94dBm@6M	-94dBm@6M	-94dBm@6M		
	-78dBm@54M	-74dBm@54M	-78dBm@54M		
2.4G HT20	-93dBm@MCS0	-92dBm@MCS0	-93dBm@MCS0		
	-76dBm@MCS7	-73dBm@MCS7	-74dBm@MCS7		
2.4G HT40	-90dBm@MCS0	-90dBm@MCS0	90dBm@MCS0		
	-73dBm@MCS7	-71dBm@MCS7	-72dBm@MCS7		
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)	
Interface	PCI Interface v2.3 (Type III-A Mini PCI form factor)				
Input Power	3.3V DC				
Operating Temperature	-20°C to 70°C				

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