



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
- Maximum 23dBm output power(per chain)/ 26dBm(aggregate)
- Built-in ESD Protection with ESD/EMP Immunity Threshold: 15KeV^①
- 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^②
- 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 ^②		
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.)
	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		
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	21dBm				±2dB	
	48Mbps	20dBm				±2dB	
	54Mbps	18dBm				±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

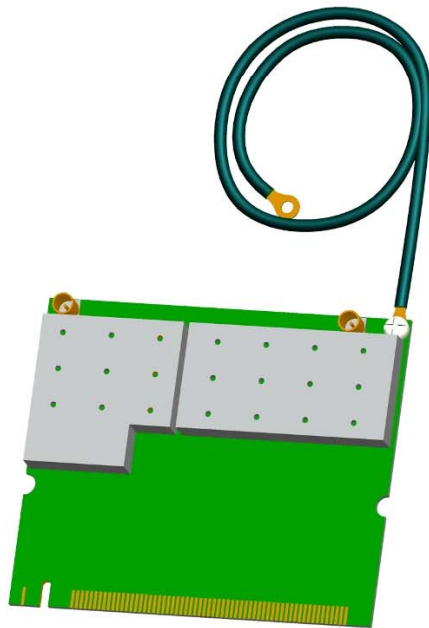
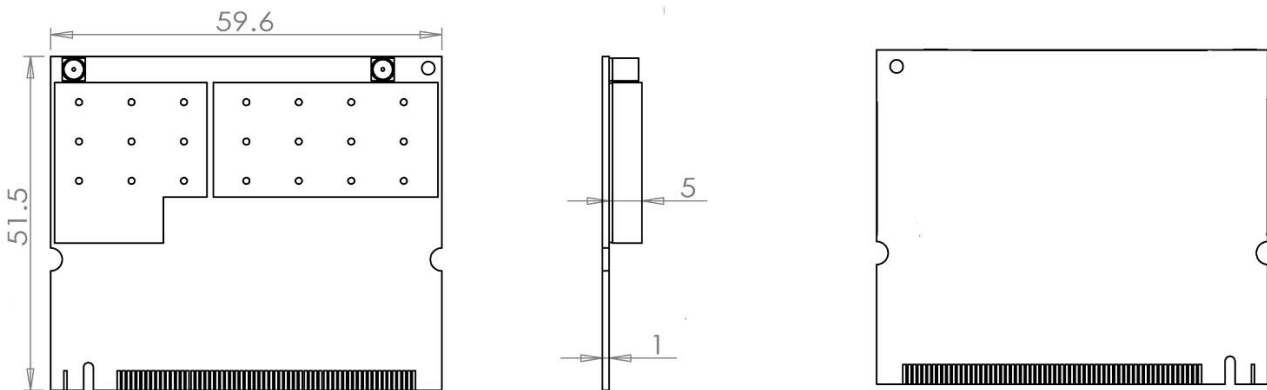
ESD CABLE SPECIFICATION	
Cable Dimensions	26cm length
Terminal Material	Copper
Attachment Procedure	End of ESD cable tied to Earth Ground

Ordering Information ^③

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 ordering configuration
- ③ Configurations are subject to change without notice

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 (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 54/108Mbps	UP TO 54/108Mbps	UP TO 54/108Mbps	UP TO 108Mbps	
OUTPUT POWER						20dBm@6-24Mbps 17dBm@36Mbps 16dBm@48Mbps 13dBm@54Mbps	23dBm@6-24Mbps 21dBm@36Mbps 19dBm@48Mbps 17dBm@54Mbps	26dBm@6-24Mbps 24dBm@36Mbps 22dBm@48Mbps 20dBm@54Mbps	
802.11a									
802.11b	20dBm@1-11Mbps 20dBm@6-24Mbps 19dBm@36Mbps 17dBm@48Mbps 16dBm@54Mbps	23dBm@1-11Mbps 23dBm@6-24Mbps 22dBm@36Mbps 19dBm@48Mbps 17dBm@54Mbps	23dBm@1-11Mbps 23dBm@6-24Mbps 22dBm@36Mbps 19dBm@48Mbps 17dBm@54Mbps	26dBm@1-11Mbps 26dBm@6-24Mbps 25dBm@36Mbps 24dBm@48Mbps 23dBm@54Mbps	30Bm@1-11Mbps 30dBm@6-24Mbps 28dBm@36Mbps 27dBm@48Mbps 25dBm@54Mbps	20dBm@1-11Mbps 20dBm@6-24Mbps 18dBm@36Mbps 17dBm@48Mbps 15dBm@54Mbps	23dBm@1-11Mbps 23dBm@6-24Mbps 21dBm@36Mbps 19dBm@48Mbps 17dBm@54Mbps	- - - - -	
802.11g									
Receiver Sensitivity						-93dBm @ 6Mbps -72dBm @ 54Mbps	-93dBm @ 6Mbps -72dBm @ 54Mbps	-96dBm @ 6Mbps -76dBm @ 54Mbps	
802.11a									
802.11b	-96dBm @ 6Mbps -90dBm @ 11Mbps -93dBm @ 6Mbps -74dBm @ 54Mbps	-96dBm @ 6Mbps -90dBm @ 11Mbps -93dBm @ 6Mbps -74dBm @ 54Mbps	-93dBm @ 6Mbps -90dBm @ 11Mbps -93dBm @ 6Mbps -72dBm @ 54Mbps	-93dBm @ 6Mbps -90dBm @ 11Mbps -93dBm @ 6Mbps -72dBm @ 54Mbps	-96dBm @ 6Mbps -90dBm @ 11Mbps -93dBm @ 6Mbps -74dBm @ 54Mbps	-96dBm @ 6Mbps -90dBm @ 11Mbps -93dBm @ 6Mbps -96dBm @ 6Mbps	-96dBm @ 6Mbps -90dBm @ 11Mbps -93dBm @ 6Mbps -96dBm @ 6Mbps	-96dBm @ 6Mbps -90dBm @ 11Mbps -93dBm @ 6Mbps -96dBm @ 6Mbps	
802.11g									
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)							32-bit mini-PCI Type IIIA+ (1.85mm longer than IIIA type)	
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			18dBm@6-24Mbps 18dBm@36Mbps 17dBm@48Mbps 16dBm@54Mbps	23dBm@6-24Mbps 22dBm@36Mbps 21dBm@48Mbps 20dBm@54Mbps	26dBm@6-24Mbps 25dBm@36Mbps 24dBm@48Mbps 23dBm@54Mbps	
802.11a						
5G HT20			18dBm @MCS0 12dBm @MCS7	23dBm @MCS0 17dBm @MCS7	25dBm @MCS0 20dBm @MCS7	
5G HT40			16.5dBm @MCS0 9dBm @MCS7	21dBm @MCS0 14dBm @MCS7	24dBm @MCS0 17dBm @MCS7	
802.11b	20dBm@1-11Mbps 20dBm@6-24Mbps 20dBm@36Mbps 16dBm@48Mbps 15dBm@54Mbps	26dBm@1-11Mbps 26dBm@6-24Mbps 26dBm@36Mbps 22dBm@48Mbps 21dBm@54Mbps	20dBm@1-11Mbps 20dBm@6-24Mbps 19.5dBm@36Mbps 18.5dBm@48Mbps 17dBm@54Mbps	23dBm@6-24Mbps 22dBm@36Mbps 21dBm@48Mbps 20dBm@54Mbps	26dBm@6-24Mbps 25dBm@36Mbps 24dBm@48Mbps 23dBm@54Mbps	
802.11g						
2.4G HT20	17dBm @MCS0 14dBm @MCS7	23dBm @MCS0 20dBm @MCS7	18dBm @MCS0 15dBm @MCS7	23dBm @MCS0 20dBm @MCS7	25dBm @MCS0 22dBm @MCS7	
2.4G HT40	16dBm @MCS0 14dBm @MCS7	22dBm @MCS0 20dBm @MCS7	18dBm @MCS0 14.5dBm @MCS7	23dBm @MCS0 20dBm @MCS7	25dBm @MCS0 22dBm @MCS7	
Receiver Sensitivity			-94dBm@6M -77dBm@54M	-97dBm@6M -80dBm@54M	-96dBm@6M -79dBm@54M	
802.11a						
5G HT20			-93dBm@MCS0 -74dBm@MCS7	-97dBm@MCS0 -77dBm@MCS7	-95dBm@MCS0 -75dBm@MCS7	
5G HT40			-90dBm@MCS0 -72dBm@MCS7	-92dBm@MCS0 -74dBm@MCS7	-92dBm@MCS0 -74dBm@MCS7	
802.11b	-94dBm@1M -92dBm@11M -94dBm@6M	-94dBm@1M -92dBm@11M -94dBm@6M	-94dBm@1M -92dBm@11M -94dBm@6M	-94dBm@1M -92dBm@11M -94dBm@6M	-94dBm@1M -92dBm@11M -94dBm@6M	
802.11g						
2.4G HT20	-78dBm@54M -93dBm@MCS0 -76dBm@MCS7	-78dBm@54M -92dBm@MCS0 -73dBm@MCS7	-78dBm@54M -93dBm@MCS0 -74dBm@MCS7	-78dBm@54M -93dBm@MCS0 -74dBm@MCS7	-78dBm@54M -93dBm@MCS0 -74dBm@MCS7	
2.4G HT40	-90dBm@MCS0 -73dBm@MCS7	-90dBm@MCS0 -71dBm@MCS7	-90dBm@MCS0 -72dBm@MCS7	-90dBm@MCS0 -72dBm@MCS7	-90dBm@MCS0 -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)				32-bit mini-PCI Type IIIA+ (6.55mm longer than IIIA type)	
Input Power	3.3V DC					
Operating Temperature	-20°C to 70°C					

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