



LM511 WiFi 802.11ac Dual Band 2T2R PCIe Minicard

2.4GHz & 5GHz ISM Band Mini PCI Express Card with RF IPEX Receptical



Linux



Win XP



Win Vista



Win 7



Win 8.1



Win 10

Product
Part No
Revised
Datasheet Version

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8/JUN/2020
v1.4



Features

- WiFi 802.11 ac (2x2 MIMO technology improves effective throughput and range over existing 802.11 a/b/g/n/ac products).
- PCI express & 2 x IPEX recepticals.
- Linux, Windows XP, Vista, 7, 8.1, 10 compatible.
- Up to 866.7 Mbps High Speed Data Transfer Rate.
- 802.11e-compatible bursting and I standards.
- BPSK, QPSK, 16 QAM, 64 QAM, 256 QAM, DBPSK, DQPSK and CCK modulation schemes.
- WEP, TKIP, and AES hardware encryption Schemes.
- Support soft AP for Windows XP, Vista and Windows 7.
- WiFi Direct supports wireless peer to peer applications.
- Complete 802.11n MIMO solution for 2.4GHz and 5Ghz band.
- Support 2.4Ghz and 5Ghz band channels.
- 2.4 GHz backward compatible with 802.11a/b/g devices while operating at 802.11n data rates.
- 5 GHz backward compatible with 802.11a/n devices while operating at 802.11ac data rates.
- Complies with PCI Express Base Specification Revision 1.1.
- 2T2R Two Transmit and Two Receive paths.
- RoHS, REACH and WEEE compliant.
- See our website for more information and certifications.

Overview

The LM511 WiFi PCIe Minicard, fully supports IEEE 802.11 e and i standards.

It supports up to 866.7Mbps high-speed wireless network connections and is designed to provide excellent performance with low power consumption.

It is designed to be a highly cost-effective module that offers superior performance, better power management applications above its competitors.

Shield Option

This card is also offered with or without a shielding cover. Please speak with our team for guidance when looking at this option.





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Features (Continued)

MAC Features

- Frame aggregation for increased MAC efficiency (A-MSDU, A-MPDU)
- Low latency immediate High-Throughput Block Acknowledgement (HT-BA)
- Long NAV for media reservation with CF-End for NAV release
- PHY-level spoofing to enhance legacy compatibility
- MIMO power saving mechanism
- Channel management and co-existence
- Multiple BSSID feature allows the LM511 to assume multiple MAC identities when used as a wireless bridge
- Transmit Opportunity (TXOP) Short Inter-Frame Space (SIFS) bursting for higher multimedia bandwidth

Other Features

- Supports Wake-On-WLAN via Magic Packet and Wake-up frame
- Transmit Beamforming
- CCA on secondary through RTS/CTS handshake.
- Support TCP/UDP/IP checksum offload

Peripheral Interfaces

- Configurable Bluetooth Coexistence Interface (mux with GPIO pins)
- Single external power source 3.3v only.

PHY Features

- 2x2 MIMO technology for extended reception robustness and exceptional throughput. IEEE 802.11ac MIMO OFDM.
- IEEE 802.11n MIMO OFDM.
- 5MHz / 10MHz / 20MHz / 40MHz / 80MHz bandwidth transmission.
- Short Guard Interval (400ns).
- Sounding packet.
- Support STBC.
- Support LDPC.
- Selectable digital transmit and receiver FIR filters.
- Programmable scaling in transmitter and receiver to trade quantization noise against increased probability of clipping.
- Fast receiver Automatic Gain Control (AGC).
- On-chip ADC and DAC.
- Build-in both 2.4GHz and 5GHz PA.
- Build-in both 2.4GHz and 5GHz LNA.

Standards Supported

- IEEE 802.11a/b/g/n/ac Draft 2.0 compatible WLAN.
- IEEE 802.11e QoS Enhancement (WMM).
- IEEE 802.11i (WPA, WPA2). Open, shared key, and pair-wise key authentication services.
- IEEE 802.11h TPC, Spectrum Measurement.
- IEEE 802.11k Radio Resource Measurement.
- WAPI (Wireless Authentication Privacy Infrastructure) certified.
- Cisco Compatible Extensions (CCX) for WLAN devices.



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General Specification

Wireless

Wireless Standard	802.11 a/b/g/n/ac
Card Type	11ac 2T2R Minicard (PCI express)
OS Compatibility	Linux, Windows XP, Vista, 7, 8.1, 10 compatible
Security	WPA, WPA-PSK, WPA2, WPA2-PSK, WEP 64bit & 128bit, IEEE 802.11x, IEEE 802.11i
Network Architecture	Ad hoc mode (Peer-to-Peer), Infrastructure mode, Soft AP
Data Rate	802.11b: 11, 5.5, 2, 1 Mbps; 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: MCS 0 to 15 for HT20MHz; MCS 0 to 15 for HT40MHz 802.11ac: MCS 0 to 8 for HT20MHz; MCS 0 to 9 for HT40MHz; MCS 0 to 9 for HT80MHz
Media Access Control	CSMA/CA with ACK

Hardware

Chipset	Realtek
Antenna	2 x IPEX recepticals
Interfaces	PCI express (PCIe)

RF Characteristics

Tx Output Power	17dBm – 802.11b@CCK 11Mbps 13dBm – 802.11n@MCS7_HT20 13dBm – 802.11a@OFDM 54Mbps 10dBm – 802.11ac@NSS1 MCS9_BW20, BW40, BW80	15dBm – 802.11g@OFDM 54Mbps 13dBm – 802.11n@MCS7_HT40 12dBm – 802.11ac@NSS1 MCS7_BW20, BW40, BW80
Rx Sensitivity	-82dBm – 802.11b@11Mbps -67dBm – 802.11n@MCS7_BW20 -57dBm – 802.11ac@NSS1_MCS9_BW20 -51dBm – 802.11ac@NSS1_MCS9_BW80	-71dBm – 802.11g@54Mbps -64dBm – 802.11n@MCS7_BW40 -54dBm – 802.11ac@NSS1_MCS9_BW40
Power Consumption	Transmit: max. 533 mA (Maximum) Receive: max 391 mA (Maximum)	
Operating Voltage	3.3v ±9% I/O supply voltage	
Frequency	2.400GHz ~ 2.4835 GHz 5.4700GHz ~ 5.7250GHz	5.1500GHz ~ 5.3500GHz 5.7250GHz ~ 5.8500GHz
Modulation Scheme	802.11b: CCK, DQPSK, DBPSK 802.11a/g/n: 64 QAM, 16 QAM, QPSK, BPSK 802.11ac: 256QAM, 64 QAM, 16 QAM, QPSK, BPSK	
Spread Spectrum	IEEE 802.11b: CCK (Complimentary Code Keying) IEEE 802.11g/n/a/ac: OFDM (Orthogonal Frequency Division Multiplexing)	



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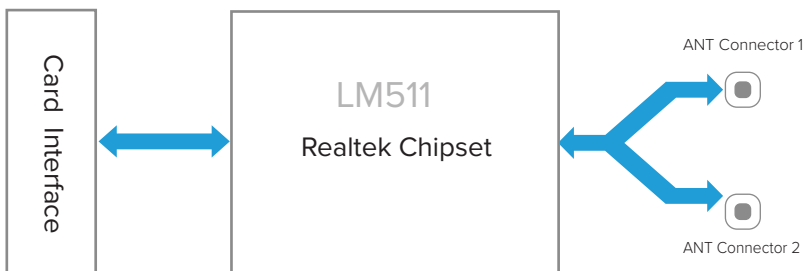
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General Specification (Continued)

Physical Characteristics

Operating Temperature	-20°C to +70°C ambient temperature, Humidity: 5-90% (non-condensing)
Storage Temperature	-55°C to +125°C ambient temperature, Humidity: 5-95% (non-condensing)
Dimensions (L x W x H)	29.85mm x 26.65mm x 4.45mm
Weight	7g +/- 0.25g tolerance
Certifications	See our website for this products certifications.
Compliance	RoHS, REACH and WEEE

Block Diagram



Frequency Bands

Freq	Bands	Bands
2.4 GHz		2.412-2.472 GHz, 2.484 GHz
5 GHz	UNII1	5.18 -5.825 GHz

Pin Assignments

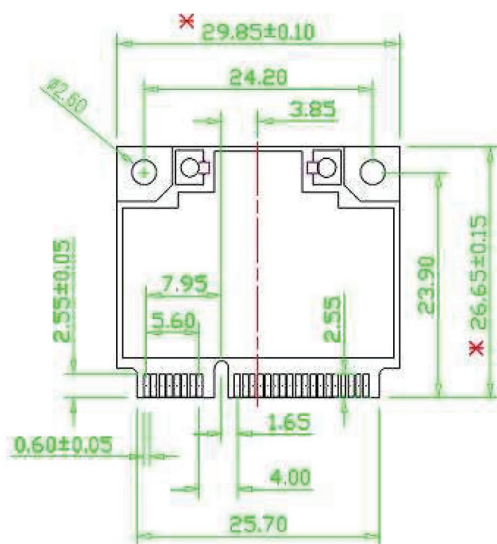
Pin	Pin Name	Pin	Pin Name	Pin	Pin Name	Pin	Pin Name	Pin	Pin Name	Pin	Pin Name
1	WAKE#	10	UIM_DATA	19	RESERVED	28	+1.5V	37	GND	46	LED_WPAN#
2	+3.3 Vaux	11	REFCLK-	20	W_DISABLE1#	29	GND	38	USB_D+	47	RESERVED
3	COEX1	12	UIM_CLK	21	GND	30	SMB_CLK	39	+3.3 Vaux	48	+1.5V
4	GND	13	REFCLK+	22	PERST#	31	PETn0	40	GND	49	RESERVED
5	COEX2	14	UIM_RESET	23	PERn0	32	SMB_DATA	41	+3.3 Vaux	50	GND
6	+ 1.5V	15	GND	24	+3.3 Vaux	33	PETp0	42	LED_WWAN#	51	W_DISABLE2#
7	CLKREQ#	16	UIM_VPP	25	PERp0	34	GND	43	GND	52	+3.3 Vaux
8	UIM_PWR	17	RESERVED	26	GND	35	GND	44	LED_WLAN#		
9	GND	18	GND	27	GND	36	USB_D-	45	RESERVED		

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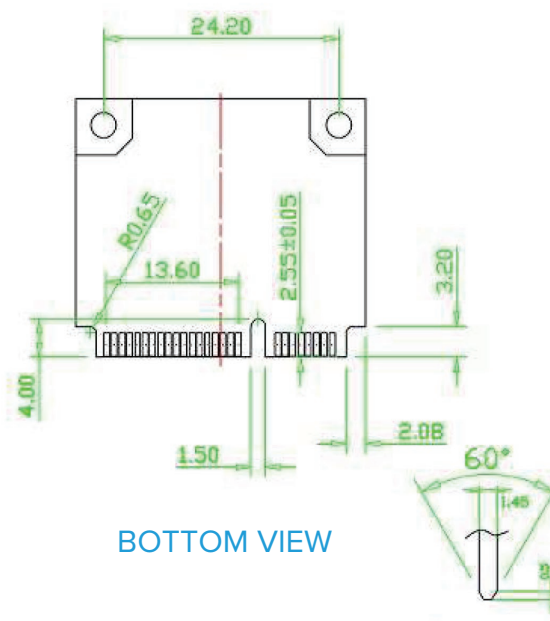
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Diagrams



TOP VIEW



BOTTOM VIEW



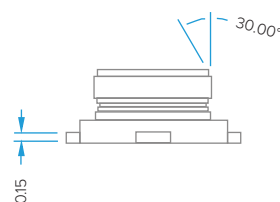
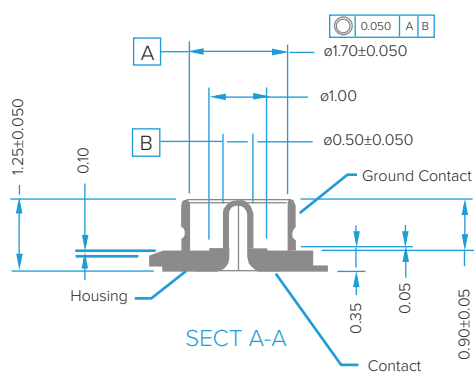
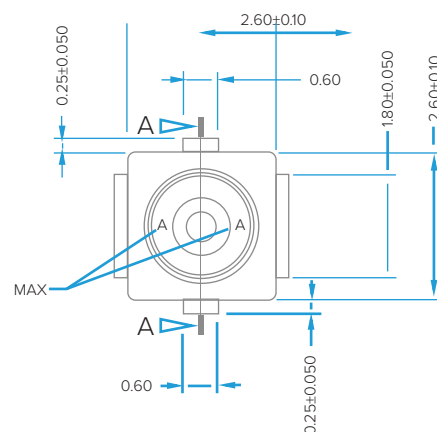
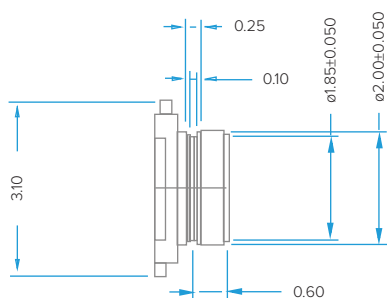
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IPEX Connector Dimensions





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Datasheet Version Notes

v1.0	29 JAN 2018	Added version notes to datasheet.
v1.1	01 MAY 2019	Updated Draft status
v1.3	04 DEC 2019	New Page 1, 2 and 3. Plus Packing page updates.
v1.4	08 JUN 2020	Operating Temperature Revision





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LM511 Packaging Options



511-0511

LM511

PCIe M2 WiFi 802.11ac RTL8812ae 2T2R REALTEK TRAY

- See our website to download any applicable Product Software, Manuals and Notes - <http://www.lm-technologies.com/downloads>