



LM-WM860A-R

Preliminary Product Specification

IEEE802.11n 2.4GHz WLAN Mini-PCI Adapter

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1. Revision History

Revision	Date	Remark
1.00	2009/0213	▪ Product Initial

1.1. Document Revision History

Revision	Date	Remark
1.00	2009/02/13	▪ Preliminary product spec

2. General Description

LM-WM860A-R is compliant with mini PCI standard Adapter. The Atheros 802.11b/g/n IEEE802.11n technique delivers up to 54Mbps (802.11g) or 300Mbps 11n data rate, the bandwidth support 20MHz and 40MHz for legacy WLAN standard and also fulfilled high throughput data rate requirement on IEEE802.11n, it uses 2 sets of 2.4GHz Tx / Rx antenna's combinations, since the IEEE802.11b/g is CCK & OFDM modulation scheme and used CCK modulation to follow backward compatible with IEEE802.11b, up to 54Mbps on single 2.4GHz frequency band. It supports the Quality of Service for 802.11e. (WMM) feature to enable robust wireless streaming of audio and video content while remaining compatible with any 802.11b/g devices.

2.1. Features

- Form Factor – a compatible with Mini-PCI Adapter
- 32-bit 33 and 66MHz PCI v2.3 interface
- Support for IEEE 802.11g standard, IEEE802.11b and IEEE802.11n compliant
- Support 802.11e-compatible bursting, 802.11h, 802.11j and 802.11i
- Security Cypher text WEP, TKIP and AES hardware encryption
- 2x2 MIMO technology improves effective throughput and range over existing 802.11b/g/n products
- Frame aggregation with A-MPDU
- Wake-on-Wireless feature supported
- Supports spatial multiplexing, cyclic-delay diversity (CDD) and Maximal Ratio Combining (MRC)
- Data rate 802.11b/g: 1,2,5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54-Mbps
and Atheros IEEE802.11n rate at 150Mbps (HT20MHz channel bandwidth; 300Mbps (for HT40MHz channel bandwidth)
- Drivers - Microsoft[®] Windows[®] 2000, XP and Vista and Linux

2.2. Mechanical Design

To be defined as standard Mini-PCI TypeIII A form factor

2.3. IC Solution

The IC solution for LM-WM860A-R:based on Atheros MB91 chipset

P/N	Functionality	Description
AR9223	IEEE802.11n MIMO MAC/BB/RF for 2.4 GHz WLANs	The Atheros AR9223 is a highly integrated single-chip solution for 2.4GHz 802.11n-ready wireless local area networks (WLANs) that enable high-performance 2x2 MIMO configurations for wireless station applications demanding robust link quality and maximum throughput and range. The AR9223 integrates a multi-protocol MAC, baseband processor, analog to digital and digital to analog (ADC/DAC) converters, 2x2 MIMO radio transceiver, and PCI interface in an all CMOS device for low power and small form factor applications.

2.4. VID, DID, SVID and SPID assignment

1. Vendor ID (VID): use Chip's vendor ID = 0x168C
2. Device ID (DID): use Chip's device ID = 0x??
3. Sub-Vendor ID (SVID): use manufacture's ID = 0x4033
4. Sub-Product ID (SPID): use manufacture's product ID = 0x7827

3. Technical Specifications

LM-WM860A-R Specification

Specification	Wireless LAN PC Card
WLAN Standard	IEEE802.11b, IEEE 802.11g; IEEE802.11e, IEEE802.11h; IEEE802.11i; IEEE802.11j; IEEE802.11n standard
Data Rate	IEEE802.11b/g: 1/2/5.5/6/9/11/12/18/24/36/48 and 54Mbps And with IEEE802.11n data rate up to 150Mbps (HT20MHz) and 300Mbps(HT40MHz)
Wireless Medium	Complementary code keying (CCK) and Orthogonal Frequency Division Multiplexing (OFDM); MIMO-OFDM
Frequency Band	2.4GHzband:ISM band 2.412 – 2.484GHz and FCC band 2.412-2.462GHz
Modulation Technique	OFDM: BPSK@6/9 Mbps, QPSK@12/18Mbps, 16-QAM@24Mbps 64-QAM@48/54Mbps DSSS: DBPSK @1Mbps, DQPSK@2Mbps, and CCK@5.5/11Mbps MIMO-OFDM: BPSK, QPSK, 16QAM and 64QAM
Wired Equivalent Privacy	64-bit, 128-bit data encryption
Antenna	2X Tx and 2X Rx

LM-WM860A-R specification (continued)

Specification	Wireless LAN PC Card
Receive Sensitivity	TBD
Max output power	TBD
Power consumption	Measured for 2xTx / 2x Rx: TBD
Drivers	Windows 2000, XP, Vista and Linux version
Security	WPA, 802.1x, TKIP
Certification	Certified with embedded product as radio module for pre-scan on FCC Part 15 (North America) Compliant
Form Factor	Mini-PCI TypeIIIA
Operating Environment	Temperature: 0~40°C (operating) -40~85°C (storage) Humidity (non-condensing): 10~95% RH
Dimension (L x W)	60mmx50mm

4. Delivery Package

- IEEE802.11n 2.4GHz WLAN Mini-PCI TypeIIIA Adapter
- Driver CD
- The product Spec and Datasheets are based on Atheros reference design from MB91

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device is intended only for OEM integrators under the following conditions:

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna,
- 3) For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as 3 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE: In the event that these conditions can not 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 can not 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.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: PD5-LMWM860A".

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.