

# WM141

## 2.4GHz Draft 802.11n 2\*2 miniCard Module PRODUCT SPECIFICATION

**Revision 1.0.0**

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## 1 DOCUMENT REVISION HISTORY

Revision	Date	Author	Remark
1.0.0	March 06, 2009	Bryan Chou	Initialize.

## 2 PRODUCT INTRODCUTION

The WM141 is a Draft IEEE802.11n-compatible half miniCard module in a 2x2 configuration and operating in the 2.4GHz band. This module allows an embedded host to use its PCI-E base 1.1 compatible interface to connect to a Draft IEEE802.11n compatible access point at unprecedented speeds.

The WM141 half miniCard module is based on Atheros's AR9283 chipset. It provides greater than 150Mbps real world throughput using high-speed spatial multiplexing modes. Configuration and testing of this module must be done on the host via Broadcom provided software tools.

### 3 FEATURES

- PCI-E v1.0 compatible.
- miniCard connector to the host PCB's needs.
- Draft IEEE 802.11n version 2.0 compatible.
- Backward compatible with IEEE 802.11b/g standards.
- Wire-free access to networked resources from anywhere beyond the DUT.
- Delivers data rate up to 270 Mbps.
- 802.11n: Dynamically shifts among 130, 117, 104, 78, 52, 39, 26 and 13Mbps in a 20MHz bandwidth and 300, 270, 243, 216, 162, 108, 81, 54 and 27Mbps in a 40MHz bandwidth, based on signal strength, for maximum availability and reliability of connection.
- 802.11b: Dynamically shifts among 11M, 5.5M, 2M, and 1 Mbps network speed, based on signal strength, for maximum availability and reliability of connection.
  
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- Uses 2.4GHz frequency band, which complies with worldwide non-license bands.
- Ensures great security by providing the 64/128 bits Wired Equivalent Privacy (WEP) and WiFi Protected Access
- Protected Access (WPA) defined in the IEEE standard

## 4 PRODUCT FEATURES

### 4.1 RADIO SPECIFICATIONS

<b>Solution Vendor</b>	Atheros 11b/g/n solution, AR9283	
<b>WLAN Standard</b>	Draft IEEE802.11n and 11b/g -compliant	
<b>Operating Frequency</b>	North American	2.412 - 2.462 GHz
	Europe	
	Other domain	By request
<b>Operating Channels</b>	11b Mode	1~11 for American; 1~13 for Europe (ETSI)
	11g/n Mode	1~11 for American; 1~13 for Europe (ETSI)
	Other domain	By request
<b>Data Rate Shifting</b>	11b/g Mode	54, 48, 36, 24, 18, 12, 9, 6, 11, 5.5, 2,1 Mbps
	11n Mode	20MHz BW: 130, 117, 104, 78, 52, 39, 26, and 13Mbps (lan to update)
		40MHz BW: 270, 243, 216, 162, 108, 81, 54, and 27Mbps(lan to update)
<b>Modulation Technique</b>	11b Mode	CCK (5.5, 11Mbps), QPSK (2Mbps), BPSK (1Mbps)
	11g/n Mode	OFDM (54, 48, 36, 24, 12, 9, 6Mbps)
<b>Wireless Distribution System</b>	AP mode only	
<b>Security</b>	WEP	Support 64-bit & 128-bit Encryption, Passphrase, Manual key for Hex
	TKIP	Required for Wi-Fi WPA stage 1 certificate
	AES	Required for Wi-Fi WPA stage 2 certificate
	WPA	Support both personal mode and enterprise mode

	WPA2	Support both personal mode and enterprise mode
	802.1x	EAP-MD5, EAP-TLS, EAP-TTLS
	Support Wireless MAC address filtering	
	SSID broadcast enable/disable supported	
<b>QoS</b>	WMM	
<b>Output Power Need to double check with Atheros</b>	16 dBm +/- 1.5dBm (2.4GHz, 11Mbps, CCK) 13.5 dBm +/- 1.5dBm (2.4GHz, 54Mbps. OFDM) (TBD) 13.5 dBm +/- 1.5dBm	
<b>Receive Sensitivity</b>	-60 dBm @ 270Mbps (1RX 11n OFDM with 40MHz BW, 10% PER) -68 dBm @ 130Mbps (1RX 11n OFDM with 20MHz BW, 10% PER) -70 dBm @ 54Mbps (1RX 11n OFDM, 10% PER) -70 dBm @ 54Mbps (1RX 11n OFDM, 10% PER) -85 dBm @ 11Mbps (CCK, 10% PER)	
<b>Antenna</b>	I-PEX connector * 2 (Detachable Antenna) ; 1.8dBi	
<b>LED</b>	N/A	
<b>Coverage Area</b>	Indoor: 20M@54 Mbps, 35M@24Mbps, 60M@6Mbps, 100M@11 Mbps	
<b>Power Consumption</b>	TX Power consumption: < ?? mA RX Power consumption: < ?? mA	
<b>Operation requirements</b>	Operating Temp. 0°C to 40°C (32°F to 104°F) Storage Temp. -20°C to 60°C (-4°F to 140°F) Operating Humidity 10% to 80% relative humidity, Non-Condensing Storage Humidity 5% to 90% Non-Condensing	
<b>Dimension</b>		
<b>Weight (g)</b>	?? g	
<b>Voltage</b>	3.3V	

## 4.2 DRIVER RELEASE PLAN

RTOS	Driver Release Item	Utility Tools Release time
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<b>Windows 2000</b> <b>Windows XP</b>		
<b>Linux</b>		
<b>VxWorks</b>		

### 4.3 CERTIFICATION/APPROVAL/WARRANTY (Pre-Scan)

<b>EMI</b>	North America	FCC Part 15 Class A
	European Union	EN55022 Class A
<b>EMS</b>	European Union	CE mark EN55024



## **7 COMPLIANT PTT APPROVAL**

Supported by customer request: USA, CE

## **8 Warranty**

One year limited warranty.

## 9. Warning statement

### **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.

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.

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.

### **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.

IEEE 802.11b or 802.11g operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.

#### **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 (for example, digital device emissions, PC peripheral requirements, etc.).

**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: N89-WM141".

### **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.

## **Industry Canada Statement**

This device complies with RSS-210 of the Industry Canada Rules. Operation is subject to the following two conditions:

- 1) this device may not cause interference and
- 2) this device must accept any interference, including interference that may cause undesired operation of the device

This device has been designed to operate with an antenna having a maximum gain of 1.8dBi.

Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the EIRP is not more than required for successful communication.

## **IMPORTANT NOTE:**

### **IC Radiation Exposure Statement:**

This equipment complies with IC 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 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 CANADA, OEM has to limit the operation channels in CH1 to CH11 for 2.4GHz 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 (for example, digital device emissions, PC peripheral requirements, etc.).

**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 IC authorization is no longer considered valid and the IC 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 IC authorization.

## **End Product Labeling**

The final end product must be labeled in a visible area with the following: "Contains TX IC : 5005A-WM141".

### **Manual Information That Must be Included**

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 user's manual for OEM Integrators must include the following information in a prominent location "IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements. The antenna must not be co-located or operating in conjunction with any other antenna or transmitter".