

## EMP-8602 (FCC)PLUS

2.4 / 5.0 GHz

802.11a/b/g

54 Mbps

NMP-8602 is a mini-PCI type III B High-Power card supporting dual-band (2.4GHz & 5GHz) radio operation. It provides high-speed wireless connection with data rate up to 54Mbps. The shirking dimension and light weight can easily integrate into a wide range of AP/Bridge device.

The 802.11g standard is backwards compatible with 802.11b products. This means that you do not need to change your entire network to maintain connectivity. You may sacrifice some of 802.11g speed when you mix 802.11b and 802.11g devices, but you will not lose the ability to communicate when you incorporate the 802.11g standard into your 802.11b network.



Features	Benefits
High Speed Data Rate up to 54Mbps	Capable of handling heavy data payloads such as MPEG video streaming
High Output Power up to 26 dBm	More high power can advance the distance.
Advanced Power Management	Low power consumption in power saving mode.
Support eXtended Range technology	eXtended Range technology give Wi-Fi products twice the range of existing designs

\* Theoretical wireless signal rate based on IEEE standard of 802.11a, b, g chipset used. Actual throughput may vary. Network conditions and environmental factors lower actual throughput rate.

\*\* All specifications are subject to change without notice.

12/9/2005

## Technical Specifications

### Data Rates

- 802.11a:** 6, 9, 12, 18, 24, 36, 48, 54Mbps  
**802.11g:** 6, 9, 12, 18, 24, 36, 48, 54Mbps  
**802.11b:** 1, 2, 5.5, 11Mbps

### Standards / Compliance

WECA (Wi-Fi & Wi-Fi5 compliance), IEEE802.11, IEEE802.11a, IEEE802.11g, IEEE802.11b

### Regulation Certifications

FCC Part 15

### Operating Voltage

3.3V±0.15V

### Current consumption

Tx Current 1A  
Rx Current 400mA  
Card on Current 400mA  
Sleep Current 100mA

### RF Information

#### Frequency Band

**802.11a:**  
5.15~5.35GHz,  
5.47~5.725GHz,  
5.725~5.850GHz

#### 802.11b/g:

U.S., Europe and Japan product covering 2.4 to 2.4835 GHz, programmable for different country regulations

### Modulation Technology

**802.11a/g:**  
OFDM (64-QAM, 16-QAM, QPSK, BPSK)

**802.11b:**  
DSSS (DBPSK, DQPSK, CCK)

### Operating Channels

#### 802.11b/g

11 for North America, 14 for Japan, 13 for Europe, 2 for Spain, 4 for France

#### 802.11a

US/Canada:13 non-overlapping channel (5.15~5.35GHz, 5.725~5.850GHz)

Europe:19 non-overlapping channel (5.15~5.35GHz, 5.47~5.825GHz)

Japan:4 non-overlapping channel (5.15~5.25GHz)

China:5 non-overlapping channel (5.725~5.85GHz)

### Receive Sensitivity (Typical)

**802.11a:**  
-90dBm @ 6Mbps,  
-72dBm @ 54Mbps

**802.11g:**  
-91 dBm @ 6Mbps,  
-74 dBm @ 54Mbps

**802.11b:**  
-95 dBm @ 1Mbps  
-90 dBm @ 11Mbps

### Available transmit power (Typical)

#### NMP-8602 (ETSI)

- 5.15~5.35 & 5.47~5.6 GHz  
20 dBm @6Mbps  
15 dBm @54Mbps
- 5.62~5.725 GHz  
19 dBm @6Mbps  
14 dBm @54Mbps
- 5.725~5.85 GHz  
18 dBm @6Mbps  
13 dBm @54Mbps
- 2.412~2.472 GHz (IEEE802.11g)  
20 dBm @6~54Mbps
- 2.412~2.472 GHz (IEEE802.11b)  
20 dBm @1~11Mbps

#### EMP-8602 (FCC)PLUS

- 5.15~5.25 GHz  
17dBm
- 5.26~5.35 GHz  
17dBm
- 5.725~5.825GHz  
23dBm
- 2.412~2.462 GHz (IEEE802.11g)  
Up to 26 dBm
- 2.412~2.462 GHz (IEEE802.11b)  
Up to 25 dBm

### Antenna

Two antenna connectors (U.FL)

### Form Factor

Mini-PCI type III B

### Dimensions (LxWxH)

59.60mm X 44.45mm

### Weight

15g (0.53 oz)

### Environmental

#### Temperature Range

Operating: -0°C to 70°C  
Storage: -20°C to 80°C

#### Humidity (non-condensing)

5% ~ 95% typical

### Related Product(s)

NMP-560 (802.11a)  
NMP-360 (802.11b/g)  
NMP-352 (802.11b/g)  
NL-2511MP+ (802.11b)

\* Theoretical wireless signal rate based on IEEE standard of 802.11a, b, g chipset used. Actual throughput may vary. Network conditions and environmental factors lower actual throughput rate.

\*\* All specifications are subject to change without notice.

12/9/2005

## Summary

### 1. Product Highlight

#### AR5006X Solution Highlights

- Highly integrated single chip CMOS solution with multi-protocol MAC/baseband processor and 2.4/5 GHz radio
- Uses digital CMOS technology exclusively, minimizing power consumption and cost while maximizing reliability
- Support for IEEE 802.11a, 802.11b, 802.11g
- 802.11e standard compatible bursting
- Wi-Fi Multimedia Quality of Service support (QoS)
- Hardware encryption for the Wi-Fi Protected Access (WPA, WPA2) and IEEE 802.11i security specifications, provides Advanced Encryption
- Standard (AES), Temporal Key Integrity Protocol (TKIP) and Wired Equivalent Privacy (WEP) without performance degradation
- Extended tuning range (2.400-2.4835 & 5.150-5.350 ,5725-5850 GHz) for worldwide use Dynamic Frequency Selection/Transmit Power Control (DFS/TPC) for international operation
- Support for draft IEEE 802.11e, h, i and j standards
- Atheros XR™ eXtended Range technology to give Wi-Fi products twice the range of existing designs Power-saving design improvements reduce system power consumption by 98%

#### AR5413 Single-Chip CMOS MAC/Baseband/Radio

- Support for IEEE 802.11a, 802.11b, 802.11g
- Operates from 2.400-2.4835 & 5.150-5.350 ,5.725-5.850 GHz
- Advanced wideband receiver with best path sequencer for better range and multipath resistance than conventional equalizer-based designs
- Integrated low-noise amplifier (LNA) External PA and/or LNA can be used for special applications
- Eliminates all IF filters and most RF filters; no external voltage-controlled oscillators (VCOs) or surface acoustic wave (SAW) filters needed
- Enhanced transmit and receive chains
  
- Atheros XR eXtended Range technology to give Wi-Fi products twice the range of existing designs
- No external FLASH or RAM memory needed
- PCI 2.3 and PC Card 7.1 host interfaces with DMA support
- Integrated analog-to-digital and digital-to-analog converters
- High speed UART with DMA supports data rates up to 1 Mbps
- Serial EEPROM, LEDs, GPIOs peripheral interfaces
- Low power operational and sleep modes

### 2. Product ID & Cosmetic

mini-PCI type III B form factor (Dimension: 59.60mm X 44.45mm)

3. Product Performance  
High-power performance
4. Accessories or Sub-system  
No accessories or sub-system needed.
5. Operation Environment
  - Operation temperature: 0°C~ +50°C
  - Storage temperature: -40°C~ +70°C
  - Humidity: 5% ~ 95% typical
6. Reliability 20,000 hours

## **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.

The available channels supported by the wireless products in various countries are different by firmware.

**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 antenna should be integral if the end device is intended to be operated in 5.15 ~ 5.25GHz frequency range.

As long as 2 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 (for example Access Point ,Router). The final end product must be labeled in a visible area with the following: “Contains TX FCC ID: NI3-MP86005001Manual 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 users manual of the end product which integrate this module.

The users manual for OEM integrators end users must include the following information in a prominent location “ IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter” .

If the end product integrating this module is going to be operated in 5.15 ~ 5.25GHz frequency range, the warning statement in the user manual of the end product should include the restriction of operating this device in indoor could void the user’s authority to operate the equipment.