

3eTI WLAN Mini-PCI Module

CM9

Internal Installation Manual

(FCC ID: QVT-WLAN-MP2)



20000505-001 Revision A

August, 2005

Important Note:

The CM9 module, combined with the proven high-gain antennas, is only for 3e Technologies International (3eTI) internal use to build Wireless Local Area Network (WLAN) Equipment. 3eTI does not sell the CM9 WLAN module to either end users or OEM parties.

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FEDERAL COMMUNICATION COMMISSION 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 these 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 3eTI for help.

FCC Caution: To assure continued compliance (example - use only shielded interface cables when connecting to computer or peripheral devices), 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 NOTES

RF APPLICATION

This FCC ID (QVT-WLAN-MP2) for the combination of the CM9 WLAN module and high gain antennas is restricted to the outdoor application only. It is only used for 3eTI WLAN outdoor equipment application and the module cannot be sold to end-users or OEM parties directly. It has to always meet the conditions below:

- 1. The antenna model **4010 or equipment** of the module should be installed and operated with a minimum distance of one (1) meter between the radiator and all persons. The other antenna model **HG5822G or equipment** of the module should also be installed and operated with minimum distance of one (1) meter between the radiator and all persons.*
- 2. The directional antennas should be separated from other WLAN directional antennas with the similar frequency at a minimum distance of one (1) meter. The antennas cannot be pointed to the same direction.*

As long as the two conditions above are met, further transmitter testing will not be required. However, 3eTI is still responsible for testing the 3eTI end product for any additional compliance requirements required with this module installed (e.g., FCC part 15 for digital device emissions test).

FCC ID

In the event that these conditions listed above cannot be met (e.g., use of the 5.8GHZ high gain antennas for indoor application), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the 3eTI 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 devices where the antenna may be installed such that one (1) meter (refer to RF Application Note above) may be maintained between the antenna and users (e.g., wireless outdoor access points and bridges). The final end product must be labeled in a visible area with the following: **"Contains FCC ID: QVT-WLAN-MP2"**.*

PROHIBITIONS

The end user SHALL NOT be provided with any instructions on how to remove or install the CM9 device.

APPROVALS

Prepared By: _____
 Frank Li _____ (Date) _____

Hardware Engineering: _____
 Norm Lutz _____ (Date) _____

Software Engineering: _____
 John Fossaceca _____ (Date) _____

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CHANGE HISTORY

Revision	Release Doc	Approval Date	Change Description
A	?	08/18/05	Initial Release.

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1. INTRODUCTION

The CM9 Wireless Local Area Network (WLAN) module supports the IEEE 802.11a/b/g specification. It uses the standard mini-PCI interface as the digital port and a special U.FL connector as the RF port.

The CM9 WLAN mini-PCI Module provides a wireless networking function. The dual-band wireless 802.11a/b/g mini-PCI bus adapter operates seamlessly and simultaneously in both the 2.4GHz and 5GHz frequency spectrums supporting the 802.11b (2.4GHz, 11Mbps) and the newer, faster 802.11a (5.8GHz, 54Mbps/108Mbps turbo mode) and 802.11g (2.4GHz, 54Mbps) wireless standards. It is the best way to add wireless capability to an existing wired network, or to add bandwidth to a wireless installation.

To protect wireless connectivity, the dual-band wireless 802.11a/b/g mini-PCI bus adapter can encrypt all wireless transmissions through 64/128/152-bit WEP data encryption. Dynamic Frequency Selection (DFS) puts the network on the cleanest channel in a given location.

1.1. Features

- High-Speed data transfer rate up to 108Mbps
- 64-bit and 128-bit WEP Encryption
- MAC Address filtering
- Web-Based Network Manager/Telnet for Configuring and Managing Access Points
- SNMP MIB I and MIB II supported
- Capable of acting as a DHCP Server
- Remote Management supported
- Firmware Upgrade via WEB/TFTP
- IEEE802.1x/RADIUS Client (EAP-MD5/TLS/TTLS) Support

1.2. Basic System Requirements

- A computer system that supports the mini-PCI platform and contains:
 - 32MB of memory, or greater
 - 200MHz processor, or higher

1.3. RF Connection

The CM9 WLAN module uses 50 ohm impedance U.FL connectors with maximum RF power of 18dbm. It has two RF connectors for the two RF ports (primary and secondary). The two RF ports provided an antenna diversity feature such that only the port with the best receiving signal quality will be used dynamically. The two ports support both 802.11b and 802.11g in the 2.4GHZ band, and 802.11a in the 5.8GHZ band with a software switch. See Figure A for details.

2. HARDWARE SPECIFICATION

Table A lists the hardware specification for the CM9 Wireless Local Area Network (WLAN) module.

3. HARDWARE INSTALLATION & ANTENNA INFORMATION

The FCC ID for the CM9 module when combined with proven high gain antennas shall be used only for the 3eTI outdoor WLAN access point or bridge applications. The module is not allowed to be sold to any retail party or to any OEM party. Due to FCC frequency restrictions and to the requirement of the high gain antennas for indoor and outdoor applications, the 5.15GHZ to 5.25GHZ indoor frequency band is disabled in 3eTI outdoor products.

Figure C shows an example of the outdoor bridge 3e-523. Figure D is the open case view of the 3e-523 : The 3e-523 Processor PCBA loaded with the CM9 module is mounted in the outdoor enclosure.

4. FCC LABEL

The CM9 Module must be labeled with its FCC ID (see Figure F). If the FCC ID label shown in Figure F is not visible when the module is installed inside another (external) device, the external device must also display a label referring to the enclosed module. The exterior label can be "Contains Transmitter Module FCC ID:QVT-WLAN-MP2" or similar wording (see Figure G).

5. ANTENNA INSTALLATION

The high gain antennas must be installed outdoors on rooftops, towers, or poles in compliance with FCC rules. 3eTI enforces the requirement that its products must have professional installation due to the technical difficulty level during installation for all products that use standard polarity RF connectors. This professional installation requirement is written into the User Manual and sales agreement for 3eTI products. The following text provides an example of the requirement from the 3e-525A-2 Users Manual (Document 29000154-001 Revision A Page 11).

FCC Regulations require that the 3e-525A-2 be professionally installed by an installer certified by the National Association of Radio and Telecommunications Engineers or equivalent institution.

Only the following antenna types can be used:

- Antenna 1: Vendor: NEARSON, Model: 4010 (use on the 2400-2483.5 MHz band only).

ALERT!: The module antennae should be installed and operated with minimum distance of one (1) meter - 100 cm - between the radiator and all persons.

- Antenna 2: Vendor: HyperGain, Model: HG5822G (use on the 5725-5826 MHz band only).

ALERT!: The module antennae should be installed and operated with minimum distance of one (1) meter - 100 cm - between the radiator and all persons.

6. APPENDIX A - FIGURES

Figure A. Front View of the CM9 WLAN Module

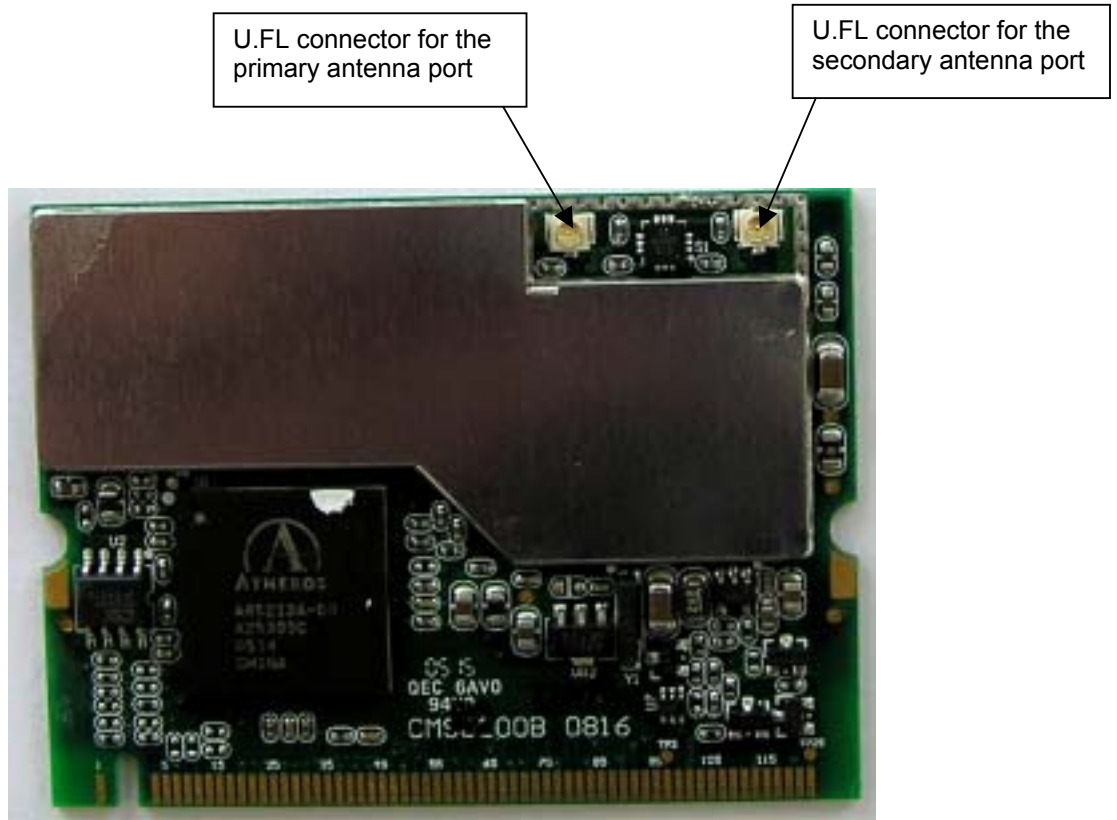


Figure B. Rear View of the CM9 WLAN Module



Figure C. Internal View - CM9 Card Mounted on the 3e-523 Processor PCBA



Figure D. 3e-523 Open Case View



Figure E. 3e-523 Outside View

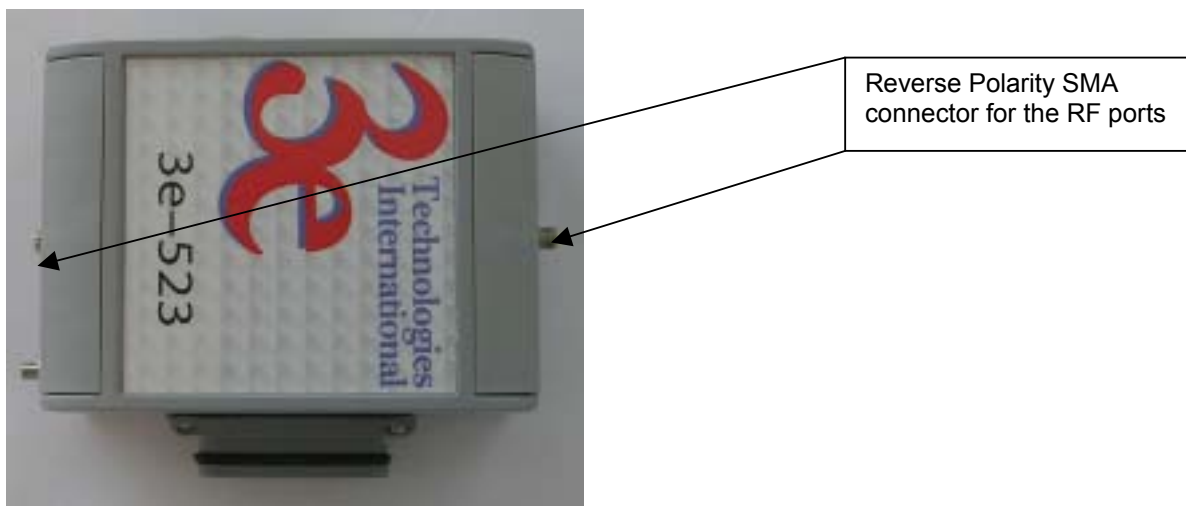


Figure F. CM9 Module FCC ID Label

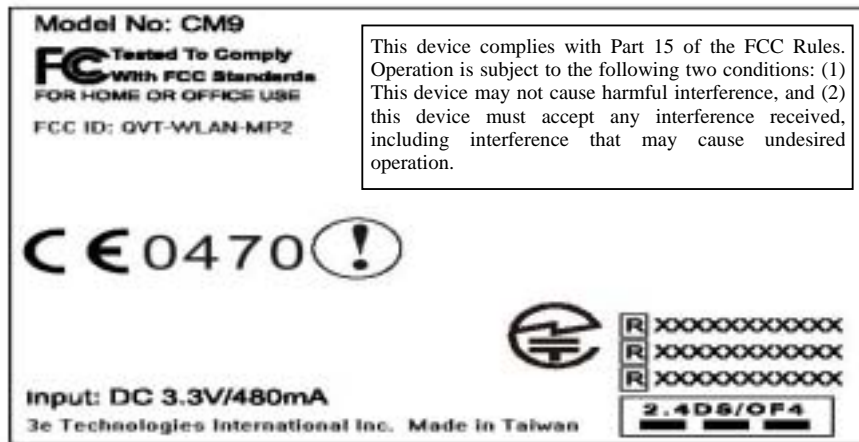
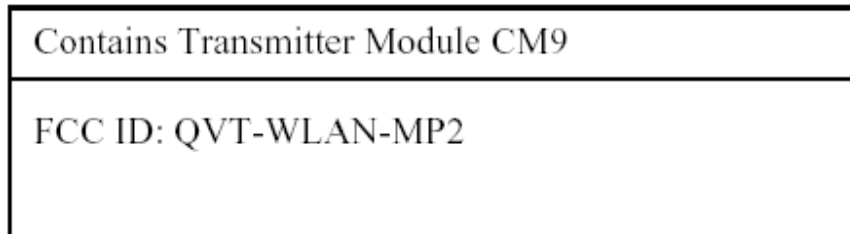


Figure G. External Device CM9 Module FCC ID Citation Label



7. APPENDIX B - TABLES

Item	Key specifications																																											
Frequency range	➤ U-NII: 5.725 ~ 5.825GHz 2.400 – 2.483GHz																																											
Modulation technique	➤ 802.11b/g DSSS (DBPSK, DQPSK, CCK) OFDM for data rate > 20 Mbps ➤ 802.11a OFDM(BPSK,QPSK, 16-QAM, 64-QAM)																																											
Channels support	➤ 802.11b/g US/Canada: 11 (1 ~ 11) ➤ 802.11a 1). US/Canada:4 non-overlapping channels (5.725 ~ 5.825GHz)																																											
Operation voltage	➤ 3.3V +/- 5%																																											
Maximum Output Transmit Power	802.11a 20.27 dBm	802.11b 22.72 dBm	802.11g 22.91 dBm																																									
Power consumption	<table border="0"> <thead> <tr> <th></th> <th>802.11a</th> <th>802.11b</th> <th colspan="2">802.11g</th> </tr> </thead> <tbody> <tr> <td>➤ Continuous Tx</td> <td>490~510mA @18dBm</td> <td>570~590mA @18dBm</td> <td colspan="2">610~640mA@18dBm</td> </tr> <tr> <td>➤ Continuous Rx</td> <td>340~350mA</td> <td>360~380mA</td> <td colspan="2">420~440mA</td> </tr> <tr> <td>➤ FTP Tx</td> <td>420~440mA</td> <td>510~530mA</td> <td colspan="2">530~545mA</td> </tr> <tr> <td>➤ FTP Rx</td> <td>400~420mA</td> <td>470~485mA</td> <td colspan="2">490~510mA</td> </tr> <tr> <td>➤ Standby mode</td> <td>360~380mA</td> <td>440~450mA</td> <td colspan="2">450~470mA</td> </tr> <tr> <td>➤ Power saving mode</td> <td>50mA</td> <td>50mA</td> <td colspan="2">50mA</td> </tr> <tr> <td>➤ RF Kill</td> <td>40mA</td> <td>40mA</td> <td colspan="2">40mA</td> </tr> </tbody> </table>					802.11a	802.11b	802.11g		➤ Continuous Tx	490~510mA @18dBm	570~590mA @18dBm	610~640mA@18dBm		➤ Continuous Rx	340~350mA	360~380mA	420~440mA		➤ FTP Tx	420~440mA	510~530mA	530~545mA		➤ FTP Rx	400~420mA	470~485mA	490~510mA		➤ Standby mode	360~380mA	440~450mA	450~470mA		➤ Power saving mode	50mA	50mA	50mA		➤ RF Kill	40mA	40mA	40mA	
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➤ RF Kill	40mA	40mA	40mA																																									
Operation distance	➤ 802.11a Outdoor: 40m@72Mbps,85m@54Mbps,250m@48Mbps,310m@36Mbps Indoor:20m@72Mbps,25m@54Mbps,35m@48Mbps,40m@36Mbps ➤ 802.11b Outdoor:300m@11Mbps,465m@5.5Mbps,500m@2Mbps,515m@1Mbps Indoor: 60m@11Mbps,70m@5.5Mbps,83m@2Mbps,85m@1Mbps ➤ 802.11g Outdoor: 82m@54Mbps,100m@48Mbps,300m@36Mbps Indoor:20m@54Mbps,25m@48Mbps,35m@36Mbps																																											
Operation System supported	➤ Windows® 98SE, ME, 2K, XP																																											
Security	➤ 64-bit,128-bit, 152-bit WEP Encryption ➤ 802.1x Authentication ➤ AES-CCM & TKIP Encryption																																											
Operation mode	➤ Infrastructure & Ad-hoc mode																																											
Transfer data rate	➤ 802.11b/g 11, 5.5, 2, 1 Mbps, auto-fallback, up to 54 Mbps ➤ 802.11a (Normal mode) 54, 48, 36, 24, 18, 12, 9, 6Mbps, auto-fallback ➤ 802.11a (Turbo mode) 108,96,72,48,36,24,18,12 Mbps, auto-fallback																																											
Operation temperature	➤ 0° ~ 70° C																																											
Storage temperature	➤ -20° ~ 80° C																																											
Wi-Fi® Alliance	➤ WECA Compliant																																											
WHQL	➤ Microsoft® 2K, XP Complaint																																											
FAA	➤ S/W audio On/Off support																																											
Media access protocol	➤ CSMA/CA with ACK architecture 32-bit MAC																																											