WTM1100
Wireless Modem Card
Users Guide

July 2009

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1

Chapter 1: Introduction

This guide will assist you with the use, installation, and configuration of the WTM1100 Wireless Modem Card (WMC). The WTM1100 is in a half mini-PCIe form factor. Due to the physical similarities of WMC cards, many of the explanations and procedures described in this manual apply to other Motorola WMC cards (HTM1000, LTM1000) except where expressly noted.

In addition, a section describing the Radio Statistics application, which is used for direct user interface with the Wireless Modem Card, is also included.

The WTM1100 is an IEEE 802.16e Wave 2 compliant, single-band Half Mini-PCIe wireless network adapter that operates in the 2.5 GHz or 3.5 GHz spectrum for WiMAX connectivity. This product is available in Half-Mini Card form factor with optional extender for Full-Mini slots. This integrated module provides high performance broadband wireless connectivity to a wide range of next generation mobile, low power consumer electronic devices to enhance today's mobile lifestyles.

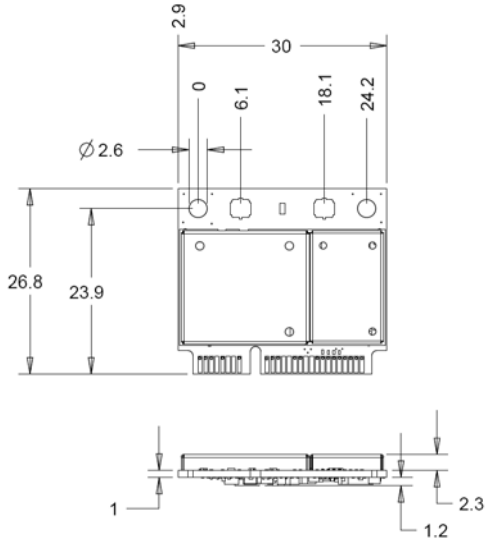


Figure 1-1 WTM1100 Dimensions

Signal	PIN(s)	Signal	Direction	Description
Power	02, 24, 39, 41, 52	+3.3VAUX		3.3V Source
	04, 09, 15, 18, 21, 26, 27, 29, 34, 35, 37, 40, 43, 50	GND		Ground
Universal Serial Bus (USB)	38	USB_D+	Input/Output	USB2.0 Serial Data Interface
	36	USB_D-	Input/Output	USB2.0 Serial Data Interface
Auxiliary Signals (3.3V Compliant)	22	PERST#	Input	System Power Stable Indication and Functional Reset
Mini-PCIe Interface Specific Signals	44	LED_WLAN#	Output	LED Status Indicator (Open Drain Active Low)
	42	LED_WWAN#	Output	LED Status Indicator (Open Drain Active Low)
	20	W_DISABLE#	Input	Disable Radio Operation
	03	COEX1	Input	Wireless Coexistence
	05	COEX2	Output	Wireless Coexistence

Table 1-1 Pin Designators

WTM1100 PCIe Half-Mini Card Specifications		
Standard	IEEE 802.16e WiMAX Forum® Compliant Wave 2, CRSL 6.0	
Frequency Band	2.495GHz – 2.695GHz	3.3GHz - 3.6GHz
Channel Bandwidth	5MHz, 10MHz	5MHz, 7MHz, 10MHz
Mobile Profile	MP05	MP10, MP11, MP12
Maximum Output Power	23dBm	
Sensitivity	-94dBm (10MHz QPSK-CTC3/4), -88dBm (10MHz, 16QAM-CTC3/4), -81dBm (10MHz 64QAM-CTC3/4)	
MIMO	2RX+1TX Supporting MRC,STC Matrix A / SM Matrix B	
Duplex/Multiple Access	TDD/OFDMA	
RF Modulation	BPSK/QPSK/16QAM/64QAM	
FFT	512 and 1024	
Decoder Engine	Quad FEC, 34Mbps Downlink Throughput	
End to End Throughput	DL - 16Mbps ; UL - 4.5Mbps	
Bursts	64 Concurrent Downlink, 7 Concurrent Uplink	
Payload	IP Header Suppression, IPv4, IPv6, Packing/Fragmentation, ARQ	
QoS	BE, UGS, RT-VR, NRT-VR, ERT-VR	
Antenna Connector	Hirose UFL Ultra-Miniature SMT	
Host Interface	Mini-PCI Express v1.2 (USB 2.0 Electrical Interface)	
Security		
Authentication	EAP-TLS, EAP-TTLS, PKMv2, CMAC and Security Associations	
Cryptographic Suites	3-DES,128 CCM-Mode, 128-AES, AES Key Wrap	
Device Driver		
Client Software	Connection Manager, Radio Statistics, WTM1100 Configuration	
Supported Operation Systems	Windows XP, Linux, Windows Mobile 6.0	
Planned OS Support	Windows CE 6.0, Android, Windows Vista, Windows 7	
Power (RMS)		
Supply	3.3V DC	
Power Consumption (TX) High Power	2.07W	
Power Consumption (TX) Low Power	1.79W	
Power Consumption (Rx)	1.12W (HD Video Streaming)	
Sleep Mode	<3mW	
Idle Mode	<78mW	
Physical		
Dimension	30mm x 26.8mm x 4.5mm (Double Sided)	
LED Indicators	LEDWLAN# or LEDWWAN# Supported	
Environmental		
Ambient Temperature Range	-25°C to +65°C (Ambient Temperature Exposed to Card)	
Available Options		
USB Adapter	USB Dongle Adaptor Board w/ Internal Antennas	
Card Slot Extender	PCIe Half-Mini to Full-Mini extension	

Table 1-2 WTM1100 Specifications

General System Requirements

Host computers must comply with the following minimum requirements to ensure optimal performance of the WTM1100 WMC.

Windows XP Minimum System Requirements

- Laptop or Notebook PC running the Microsoft Windows XP (Service Pack 2) operating system
- 500 MHz Processor
- 10 MB of available hard disk storage
- Keyboard, Mouse, CD-ROM drive or DVD drive
- Available MINI-PCIE V2 card slot in the Host device

Ubuntu 8.04 Minimum System Requirements

- Laptop or Notebook PC running the Ubuntu 8.04 operating system and/or LiveCD provided by Motorola
- 500 MHz Processor
- 10 MB of available hard disk storage
- Keyboard, Mouse, CD-ROM drive or DVD drive
- Available MINI-PCIE V2 card slot in the Host device
- Update and Install packages (ssh, libpcre3, libgtk2.6-0, iperf)

What's in the Box

Each WTM1100 WMC is a full-featured wireless networking interface. The following is a list of the items provided with each Wireless Modem Card:

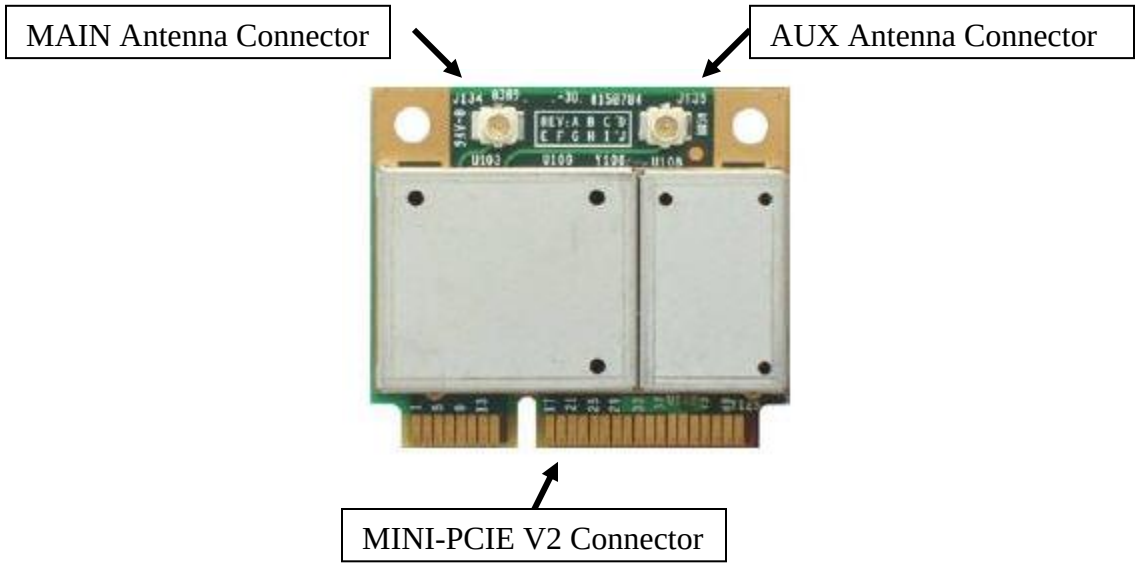
- WTM1100 Wireless Modem Card
- Half to Full MINI PCIE card extender (Optional)
- WTM1100 Wireless Modem Card Software and Documentation CD ROM

The CD ROM contains a PDF version of the Wireless Modem Card User's Guide. The CD also contains an installation executable to load Adobe Acrobat Reader software if it is not already resident on your computer.

External Connections

The WTM1100 Wireless Modem Card is designed for insertion into an industry-standard MINI-PCIE V2 card slot located in a Host device. The Wireless Modem Card has two antenna ports to connect the external antennas. As shown in Figure 1-2 the left antenna UFL connector is the main transmit /receiver and the right is the secondary receiver.

Figure 1-2 WTM1100 showing Antenna Port and LED Indicators



Chapter

2

Chapter 2: Software Installation

This chapter will assist you with the software installation portion of the process and is further separated into two main sections: *Installing WTM1100 Client Software on Windows XP* and *Installing WTM1100 Client Software on Ubuntu 8.04*.

Installing WTM1100 Client Software on Windows XP

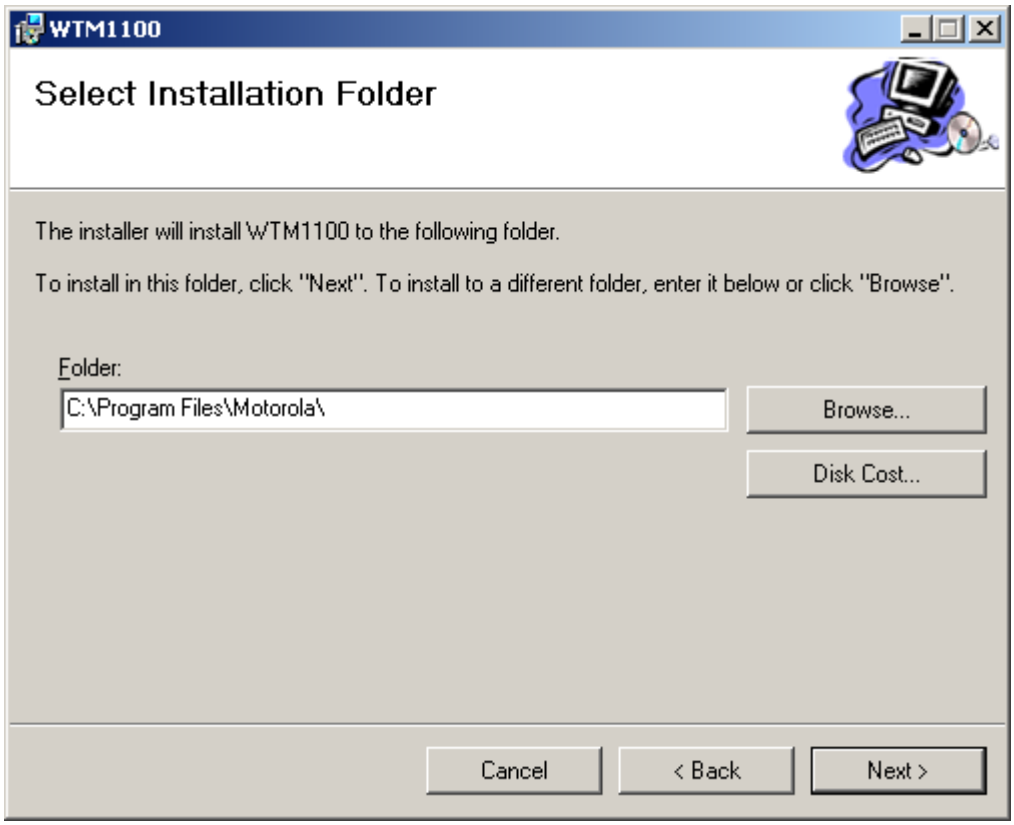
The following procedure outlines the installation of the WTM1100 client software on a typical Windows XP platform. Some of the steps may vary slightly based on the configuration of the individual computers.

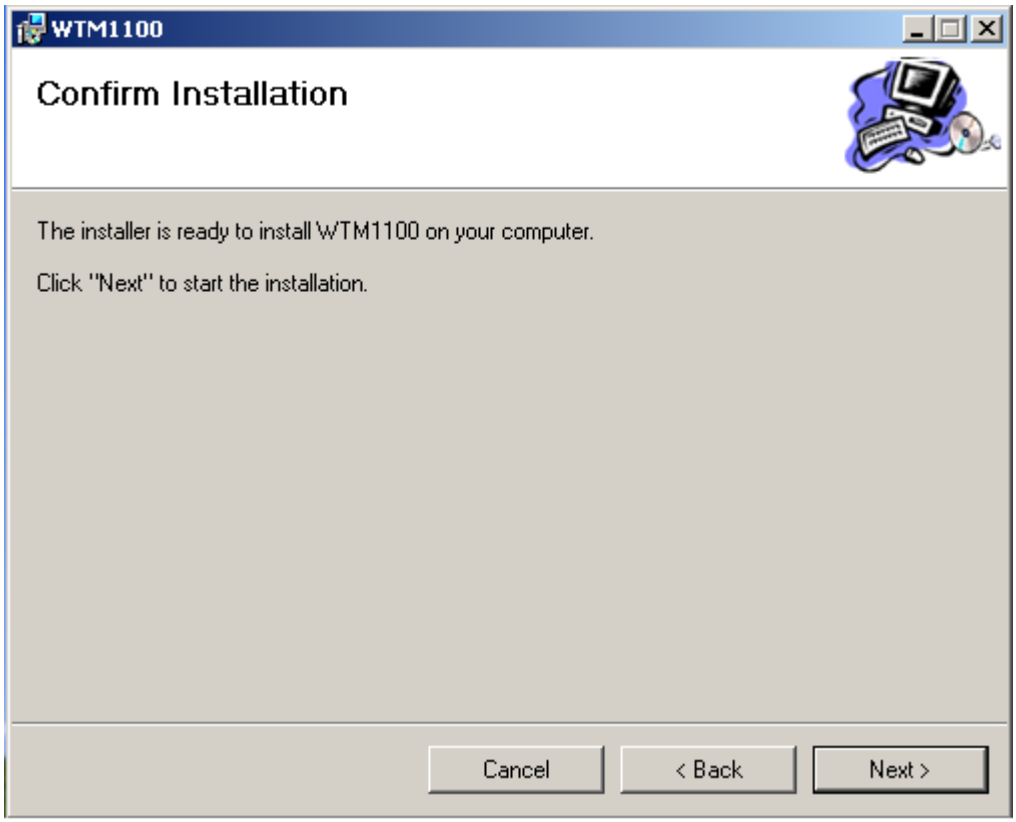
Procedure 2-1 WTM1100 Client Software Installation on Windows XP

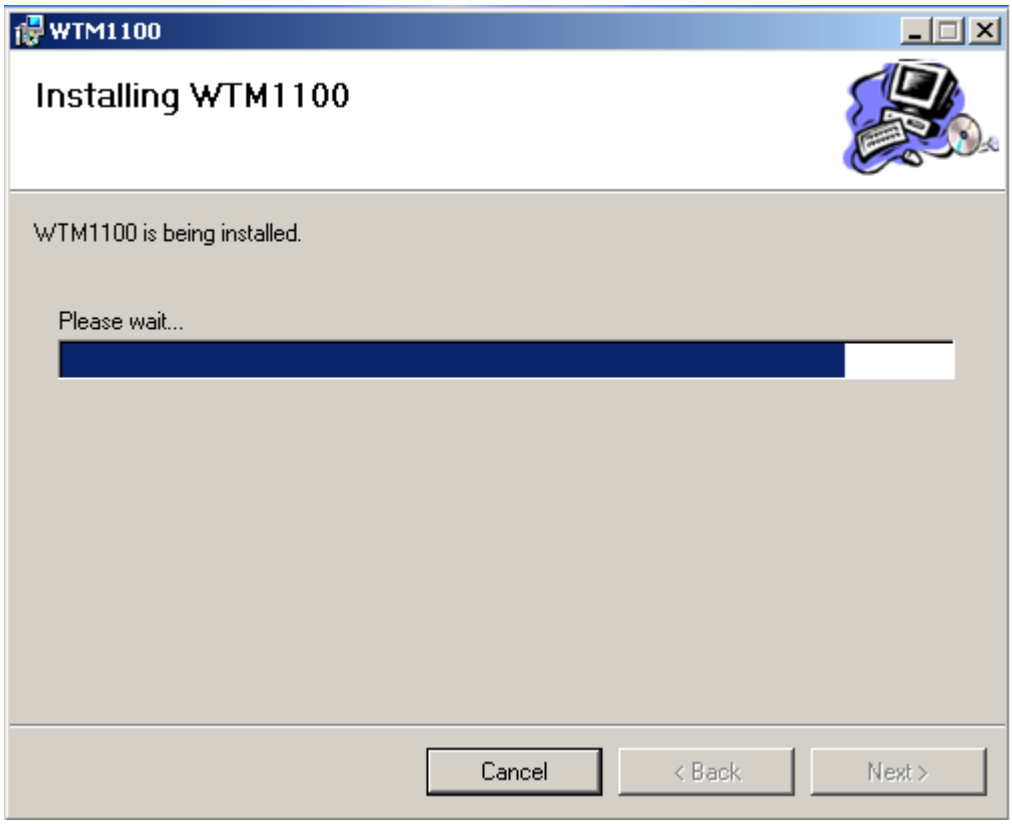
1	Close and exit any existing WTM1100 applications running on the computer prior to installation.
2	Insert the Software and Documentation CD into the CD-ROM drive.
3	If the installation program does not start automatically, open the Windows **Start** menu. Click on **Run** then type the following into the dialog box: **d:\WiMAX_WTM1100_Installation.msi** where **d:** specifies the CD-ROM drive and click the **OK** button.
4	Click the **Next** button to continue the installation process.
5	The *WTM1100 Setup* dialog box will be displayed as shown in Figure 2-3.

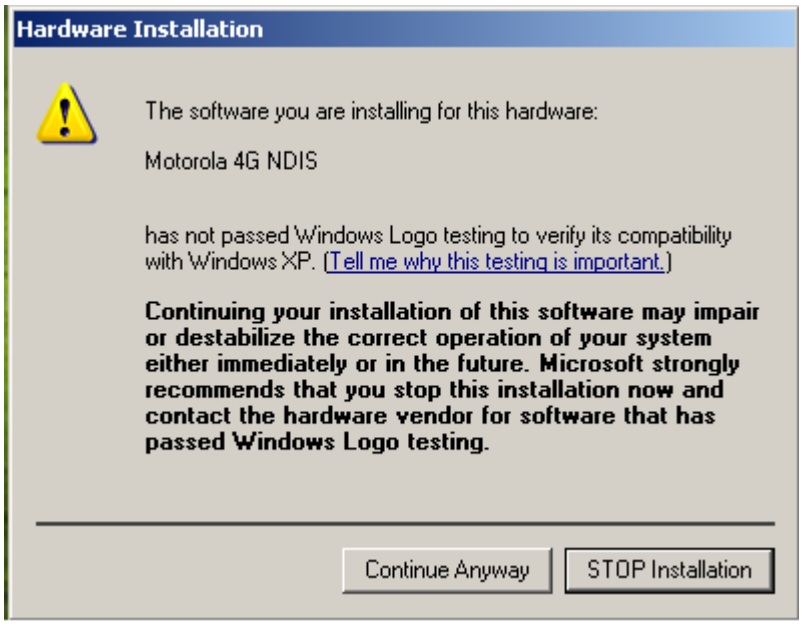
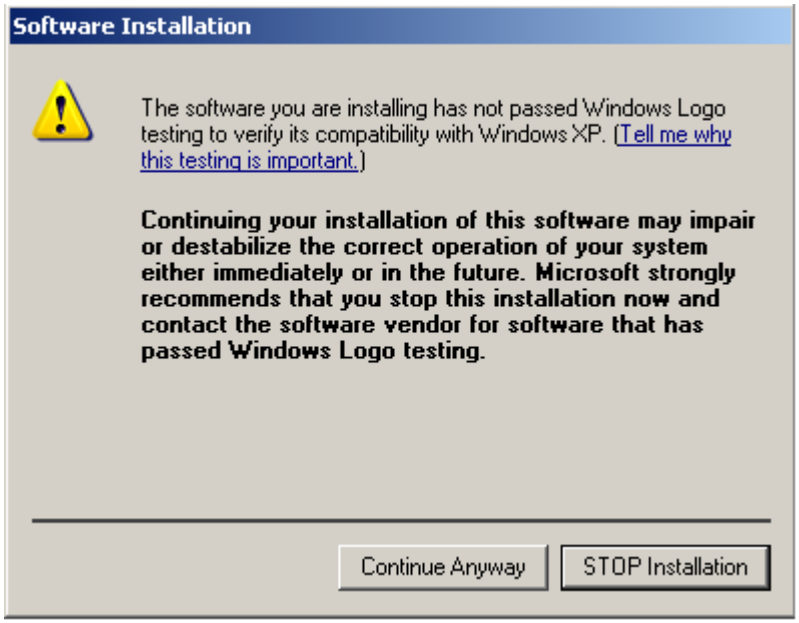
6	Click the **Next** button to continue the installation process.

Figure 2-3 WTM1100 Setup - Welcome Dialog (XP)

7	The *Select Installation Folder* dialog box displays the **Install Folder** location. Click the **Next** button to continue the installation process. **Figure 2-4 WTM1100 Setup – Startup Options (XP)** 
8	The *Confirm Installation* dialog confirms the installation is ready to commence. Click on the **Next** button to proceed with the installation process. **Figure 2-5 WTM1100 Setup - Ready to Install (XP)**

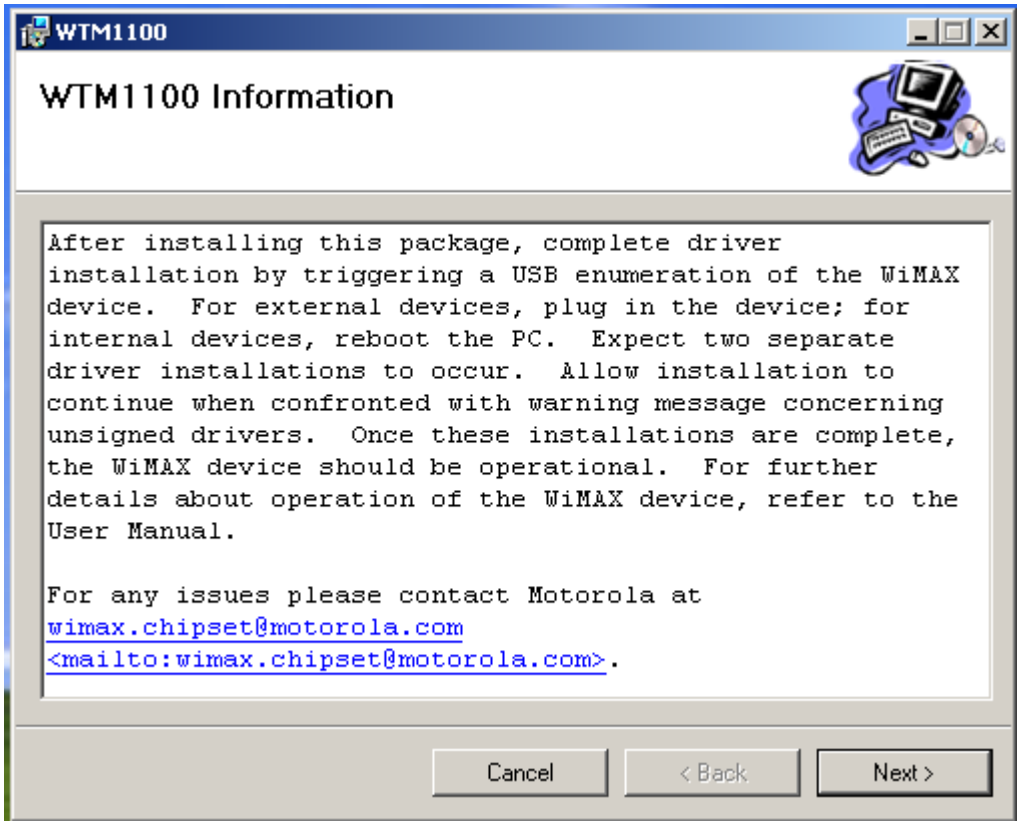

WTM1100
Confirm Installation
The installer is ready to install WTM1100 on your computer.
Click "Next" to start the installation.
Cancel
< Back
Next >

9	The *Installing WTM1100* window displays a status bar to indicate the progress of the installation and will be automatically dismissed as soon as file installation has completed. **Figure 2-6 WTM1100 Setup - Installing Files Window (XP)** 
10	.

11	A *Software Installation* dialog indicates that the software is not Windows Logo tested. Select the **Continue Anyway** button to complete the installation process. **Figure 2-7 Software Installation Dialog Box** 
12	If a second *Software Installation* dialog box is displayed as shown in Figure 2-8. Click on the **Continue Anyway** button to complete the installation process. **Figure 2-8 Software Installation Dialog Box** 
13	Select the **Continue Anyway** button if additional windows display on the screen containing the same screen contents as in the step above.

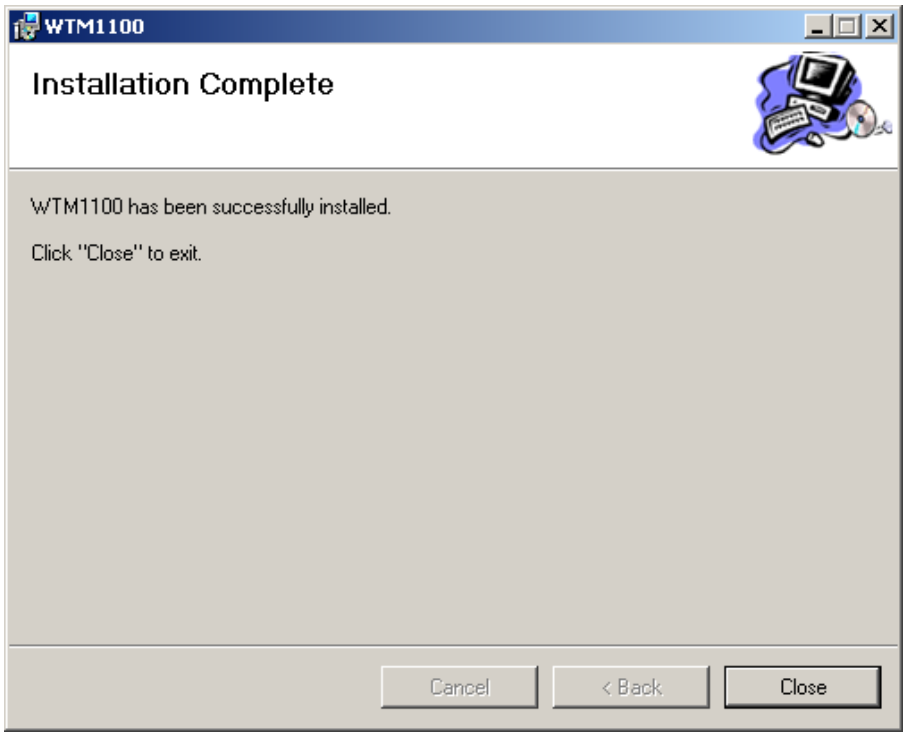
14	The *WTM1100 Information* dialog box will be displayed as shown in Figure 2-9. This installation screen instructs the user to view the *ReadMe* file during the installation and to run Radio Statistics immediately following installation. Click on the **Next** button to proceed with the installation process.

Figure 2-9 Software Installation Dialog Box – Select Options



15	From the *WTM1100 Installed Successfully* dialog click on the **Finish** button to exit.

Figure 2-10 WTM1100 Setup - WTM1100 Installed Successfully (XP)



Installing WTM1100 Client Software on Ubuntu 8.04

The following procedure outlines the installation of WTM1100 client software on a typical Ubuntu 8.04 platform. Some of the steps may vary slightly based on the configuration of an individual computer.

Complete the following procedure to install the WTM1100 client software:

Procedure 2-2 WTM1100 Client Software Installation on Windows 2000

1	Remove any existing WTM1100 applications running on the computer prior to installation.
2	Insert the WTM1100 Software and Documentation CD into the CD-ROM drive.
3	Open a terminal window.
4	Set the linux root password >>**sudo passwd**
5	Install the WTM1100 software package using the following command >>**dpkg –i /media/CDROM/WiMAX_WTM1100_Installation.deb**

Chapter

3

Chapter 3: WTM1100 Installation

This chapter will assist you with the physical installation and configuration of the WTM1100 Wireless Modem Card.

Working with the Card Extender

The following sections will focus on the proper handling and usage of the card extender and ESD when using a WTM1100 card.

Connecting the Card Extender Assembly

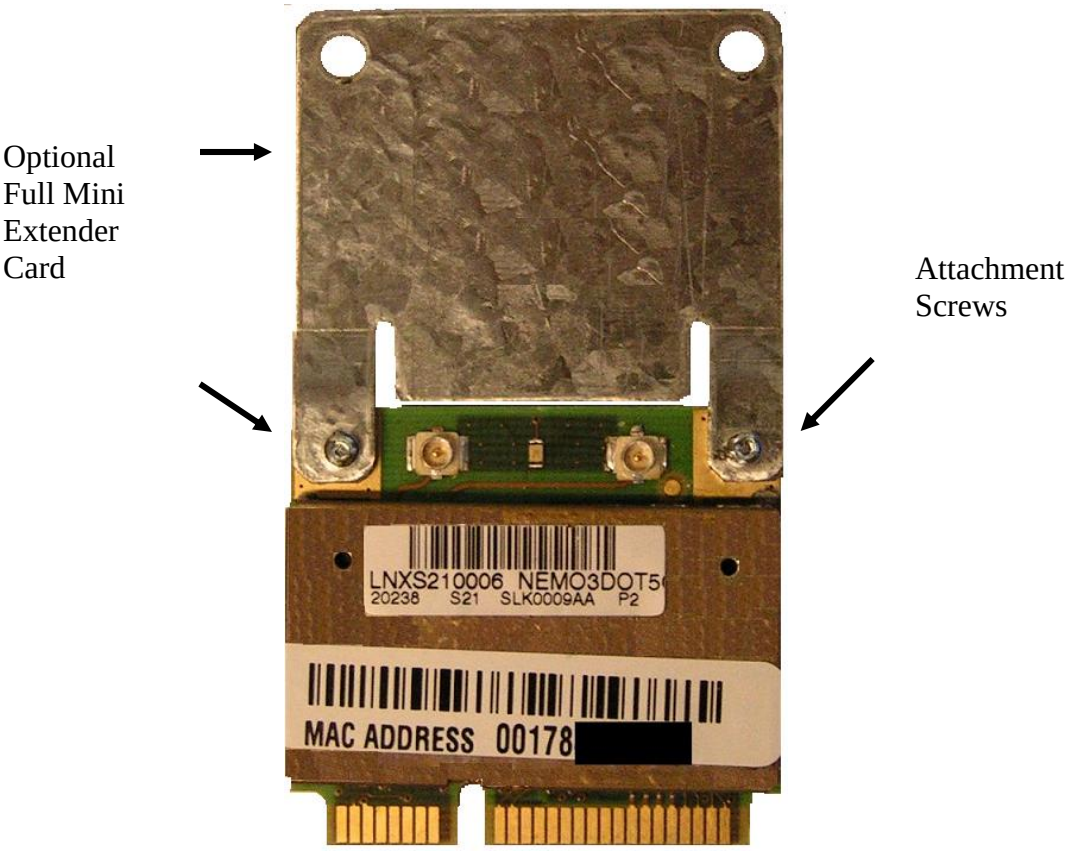
Complete the following procedure to connect the Card Extender Assembly to the WTM1100 WMC for use in a standard laptop computer.

WARNING

Always wear a static strap when working with the WTM1100.

Procedure 3-3 Connecting the Card Extender Assembly

1	Locate the Card Extender adapter and align it with the WTM1100, as shown below in Figure 3-11. The provided mating screws should come up from underneath the card with the thread protruding from the top. **Figure 3-11 Attach the Card Extender to the WTM1100**



NOTE

When properly aligned, the Card Extender will allow the WTM1100 to snap or screw into place inside a standard laptop PC with a full Mini-PCIe connector.

CAUTION

Applying force in any direction other than to secure the Card Extender may result in excess pressure being applied to the WTM1100 board and damage the card.

WARNING

Use only FCC approved antennas or those provided by the vendor

Installing the WTM1100

The following sections will describe the proper installation and removal of the WTM1100.

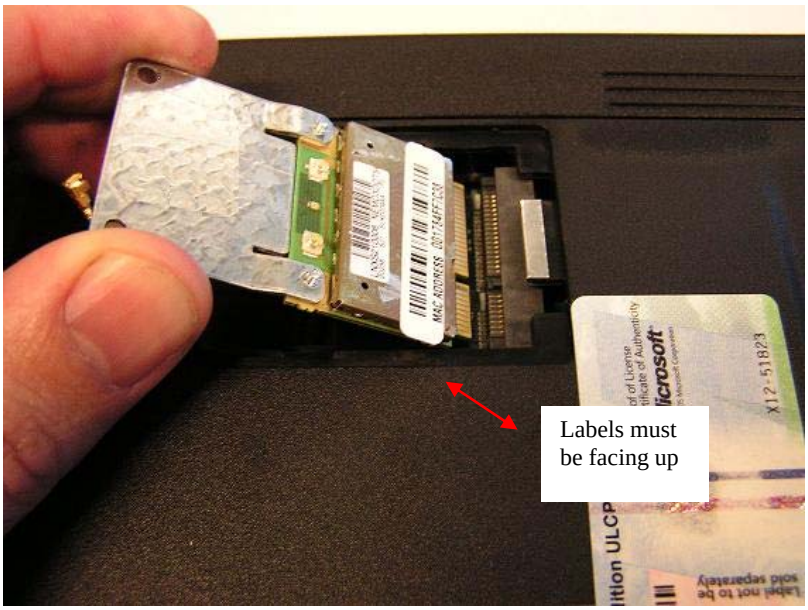
Installing the WTM1100 Wireless Modem Card

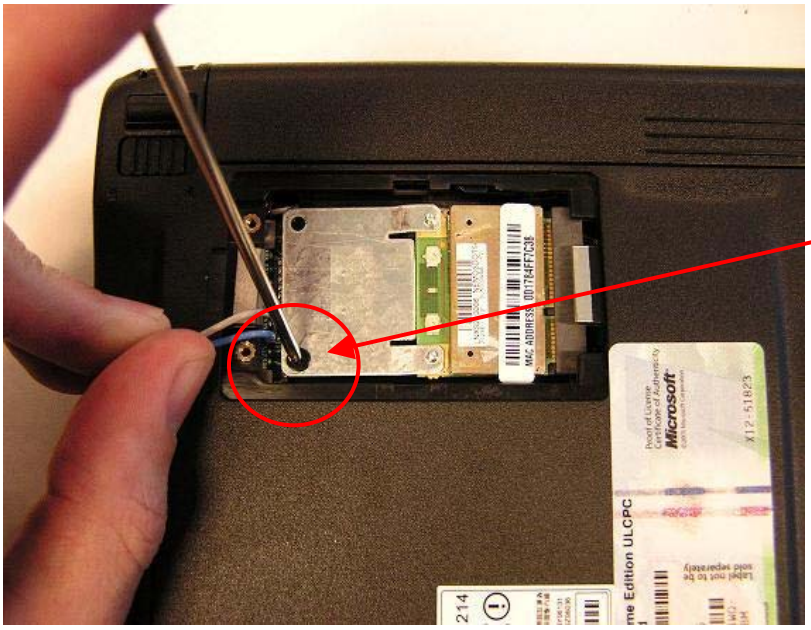
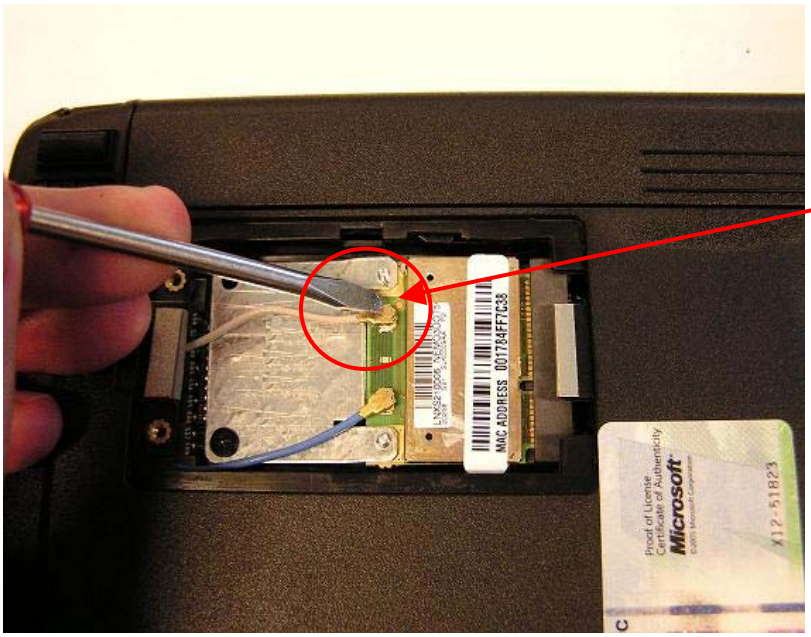
Complete the following procedure to install the WTM1100 wireless modem card. The same installation procedure applies to both wireless modem card model numbers.

Procedure 3-4 Installing the Wireless Modem Card

1 Locate an available MINI-PCIE V2 card slot in the computer. If necessary, remove the dust cover from the slot.

Figure 3-12 Locating the Mini-PCIE Card Slot

2	To insure the correct orientation, insert the WTM1100 card into the computer's MINI-PCIE V2 card slot at a 45 degree angle with the label side up as shown. **CAUTION** *Never force the card into the slot.* **Figure 3-13 Installing the WTM1100 Card** 

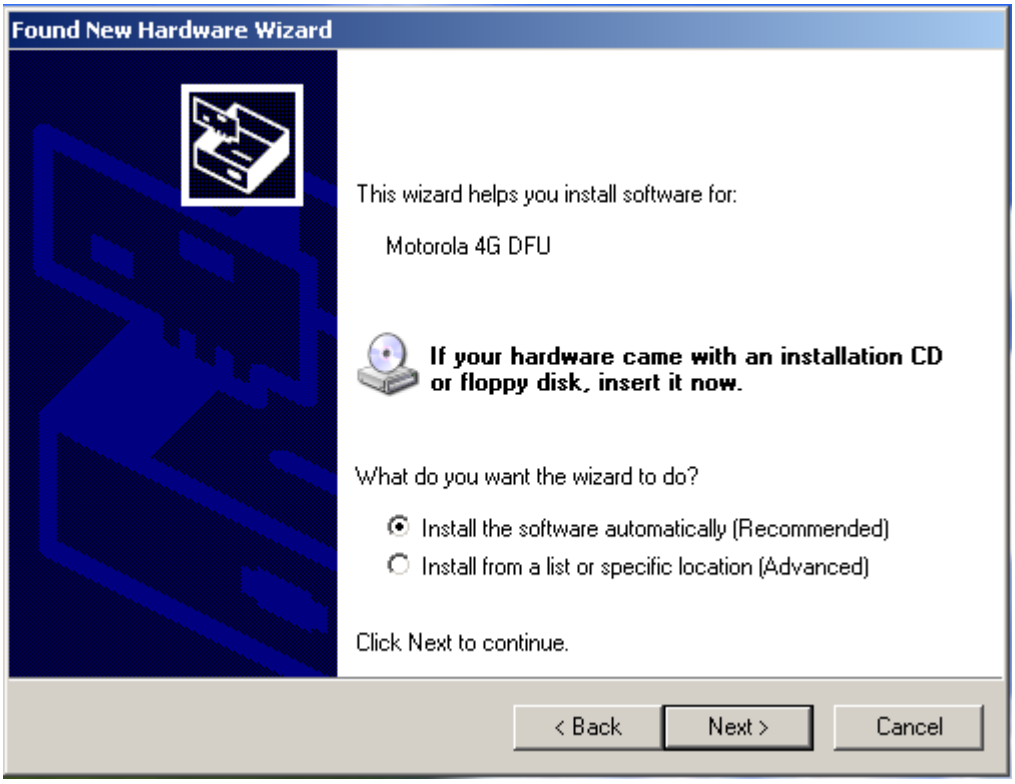
3	The WTM1100 must be pushed down and securely fastened in the MINI-PCIe V2 slot by the means provided by the laptop vendor (screw or clip) as shown in Figure 3-14. **Figure 3-14 Proper Orientation of WTM1100 Inside Laptop** 
4	Connect the provided laptop antennas to the UFL connectors on the WTM1100 card. The UFL connectors will snap down when properly connected to the WTM1100. In the Figure 3-15 below, the blue antenna lead is for the MAIN antenna and the white is for the AUX antenna. **Figure 3-15 Connecting Internal Antennas to the WTM1100 Card.** 

5	The first time the PC is booted with the WTM1100 card, a message will be displayed indicating that the WTM1100 card has been found. The Windows *Found New Hardware Wizard* for the WTM1100 will start as shown in Figure 3-16. Select "No, not this time" to prevent Windows from searching externally for the WTM1100 DFU driver, and then click on the **Next** button.

Figure 3-16 Found New Hardware Wizard – Serial PC Card

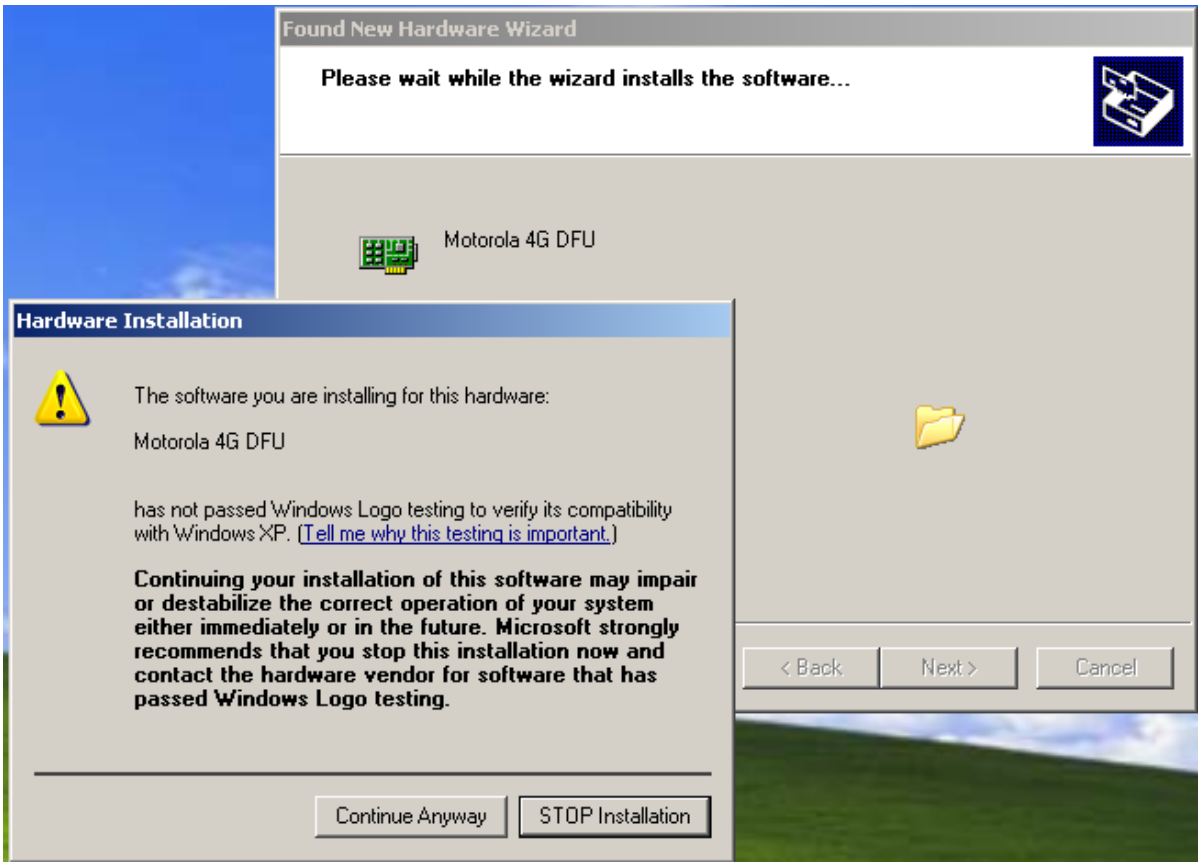
6	The *Found New Hardware* dialog will display a window to help install the WTM1100 DFU software. Verify that the "Install the software automatically (Recommended)" radio button is selected, and then click on the **Next** button.

Figure 3-17 Found New Hardware Wizard - Loading Files



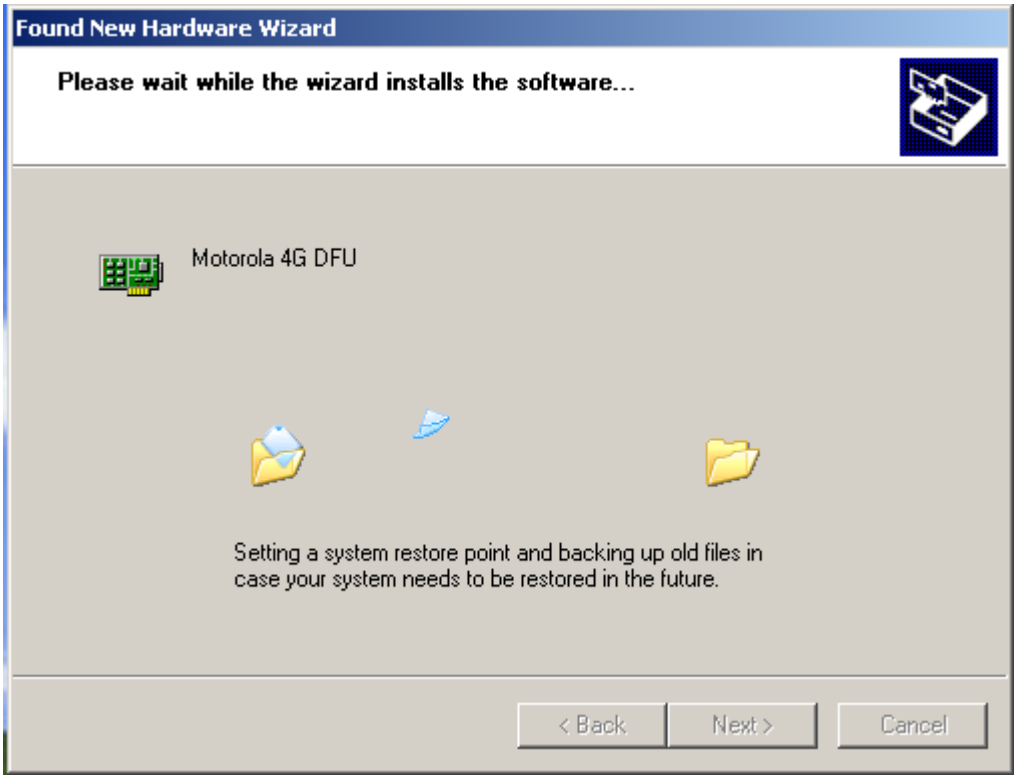
7	As soon as the above step is complete, the *Hardware Installation* dialog box shown in **Figure 3-18** will be displayed. Click on the **Continue Anyway** button in the *Hardware Installation* dialog box.

Figure 3-18 Hardware Installation Dialog Box



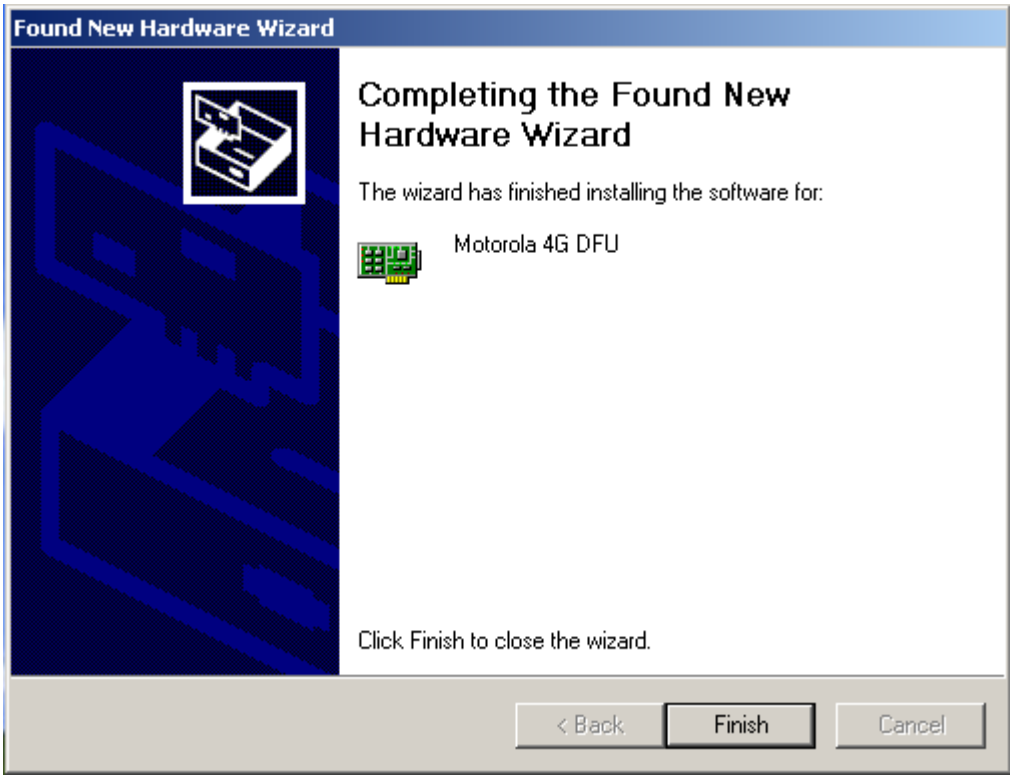
8	The Found New Hardware Wizard will begin installing the WTM1100 DFU installation files and display the progress information for establishing the restore point and backing up of old files as shown in **Figure 3-19**. Wait for this step to complete.

Figure 3-19 Found New Hardware Wizard – Installing Software



9	After successfully loading the WTM1100 DFU driver, the Found New Hardware Wizard will complete. Click on the **Finish** button

Figure 3-20 Found New Hardware Wizard – Complete

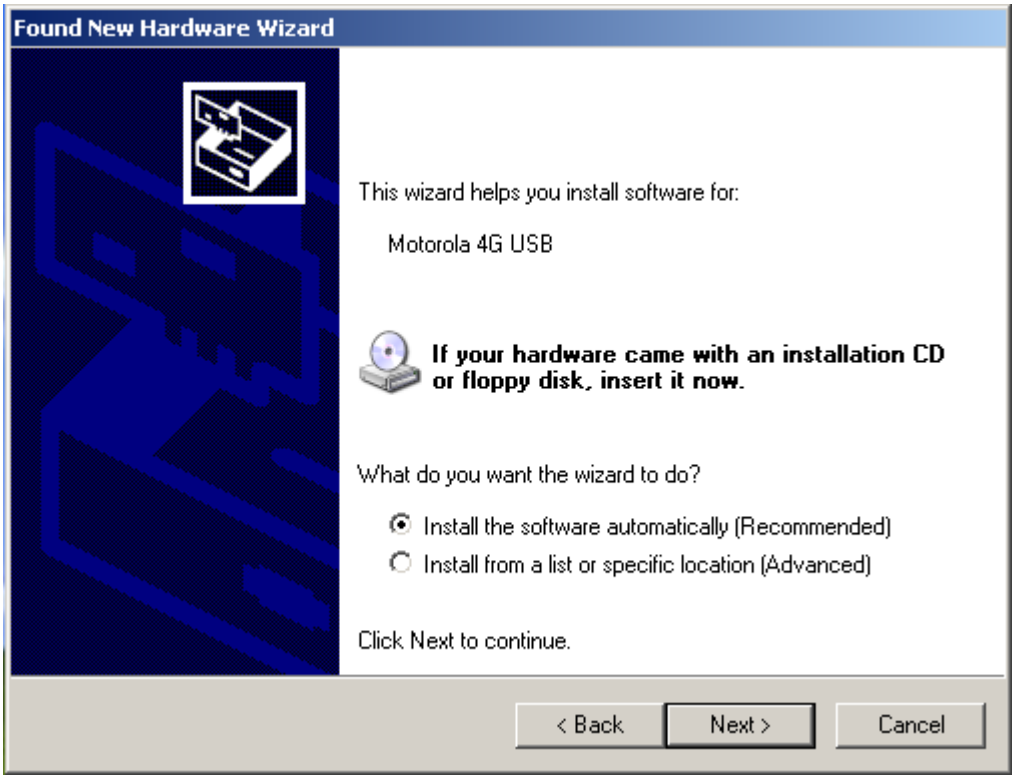


10	An additional Found New Hardware Wizard will be displayed as shown in Figure 3-21. Select "No, not this time" to prevent Windows from searching externally for the WTM1100 USB driver, and then click on the **Next** button.

Figure 3-21 Found New Hardware Wizard

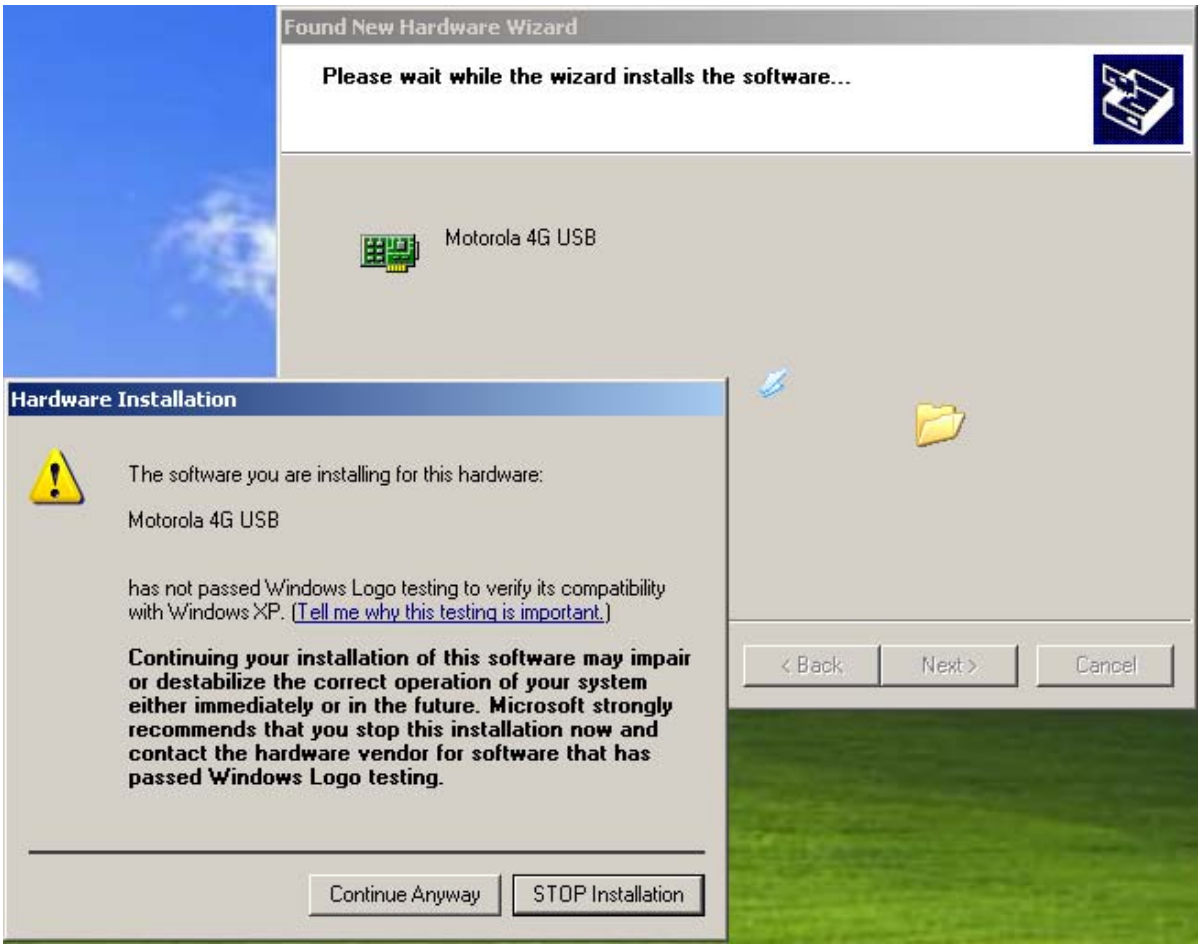
11	The *Found New Hardware* dialog will display a window to help install the WTM1100 USB software. Verify that the "Install the software automatically (Recommended)" radio button is selected, and then click on the **Next** button.

Figure 3-22 Found New Hardware Wizard - Loading Files



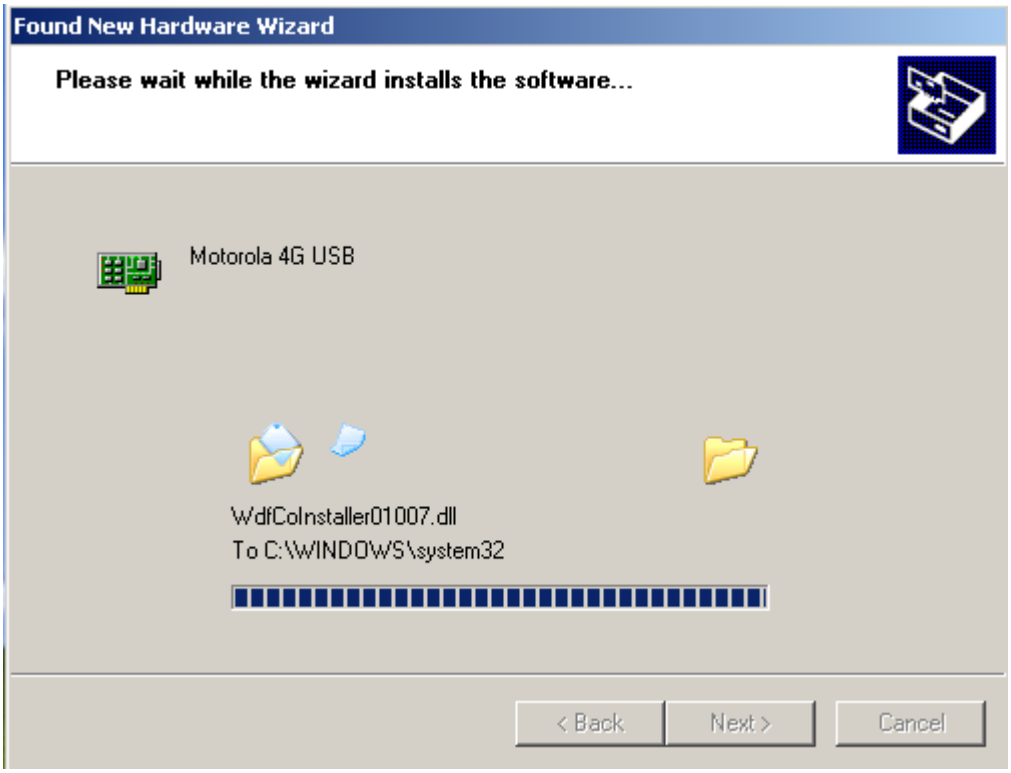
12	As soon as the above step is complete, the *Hardware Installation* dialog box shown in **Figure 3-23** will be displayed. Click on the **Continue Anyway** button in the *Hardware Installation* dialog box.

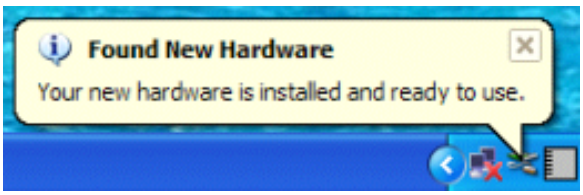
Figure 3-23 Hardware Installation Dialog Box



13	The Found New Hardware Wizard will begin installing the WTM1100 USB installation files as shown in **Figure 3-24**. Wait for this step to complete.

Figure 3-24 Found New Hardware Wizard Loading Files



14	After successfully loading the WTM1100 USB driver, the Found New Hardware Wizard will complete. Click on the **Finish** button. **Figure 3-25 Hardware Installation Dialog Box** 
15	The *Found New Hardware* pop-up window in the system tray will appear confirming that the driver installation is complete and the hardware is ready to use. **Figure 3-26 Found New Hardware - Wizard Complete** 

Removing the WTM1100

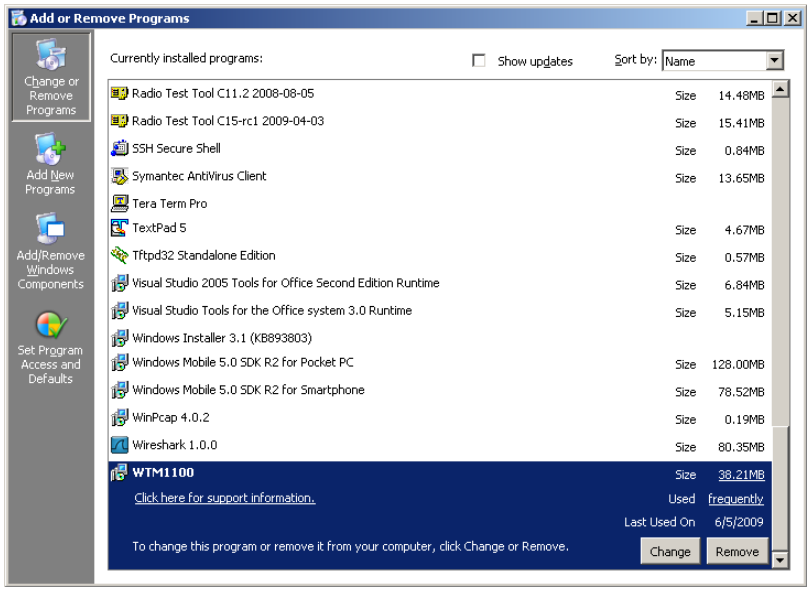
This section details specific WTM1100 card removal instruction to ensure that power to the card is disabled prior to removal.

Complete the following procedure prior to ejecting the Wireless Modem Card from the computer.

Procedure 3-5 Removing the WTM1100 Card

1	Power down or Shutdown the PC. Remove the card slot cover, disconnect the antennas, unscrew the Mini-PCIe fastener and remove the WTM1100 card as shown in Figure 3-27.

Figure 3-27 Unplug or Eject Hardware Icon

2	Replace the card slot cover and power up the PC. Wait for a message that indicates that the device may be safely removed from the system as shown in Figure 3-28. **Figure 3-28 Safe to Remove Hardware - WTM1100 Card** 
3	Power up the PC. For Windows: Remove the WTM1100 software from the Windows Control Panel – Add/Remove Programs as shown in Figure 3-28. Highlight WTM1100 and click on the **Remove** button. **Figure 3-29 Removing the WTM1100 Software**  For Ubuntu 8.04: From a terminal window type: dpkg –r **Catawba**

Chapter

4

Chapter 4: Radio Statistics

Radio Statistics ™ is a status and configuration application that reports vital and statistical information about the WTM1100 Wireless Modem Card. Because Radio Statistics is a polling application, it only runs when initiated by the user.

In this chapter you will learn about the available Radio Statistics features and the different ways to start Radio Statistics.

Starting Radio Statistics

During the software installation process, you can choose to run Radio Statistics immediately upon completion of the installation process.

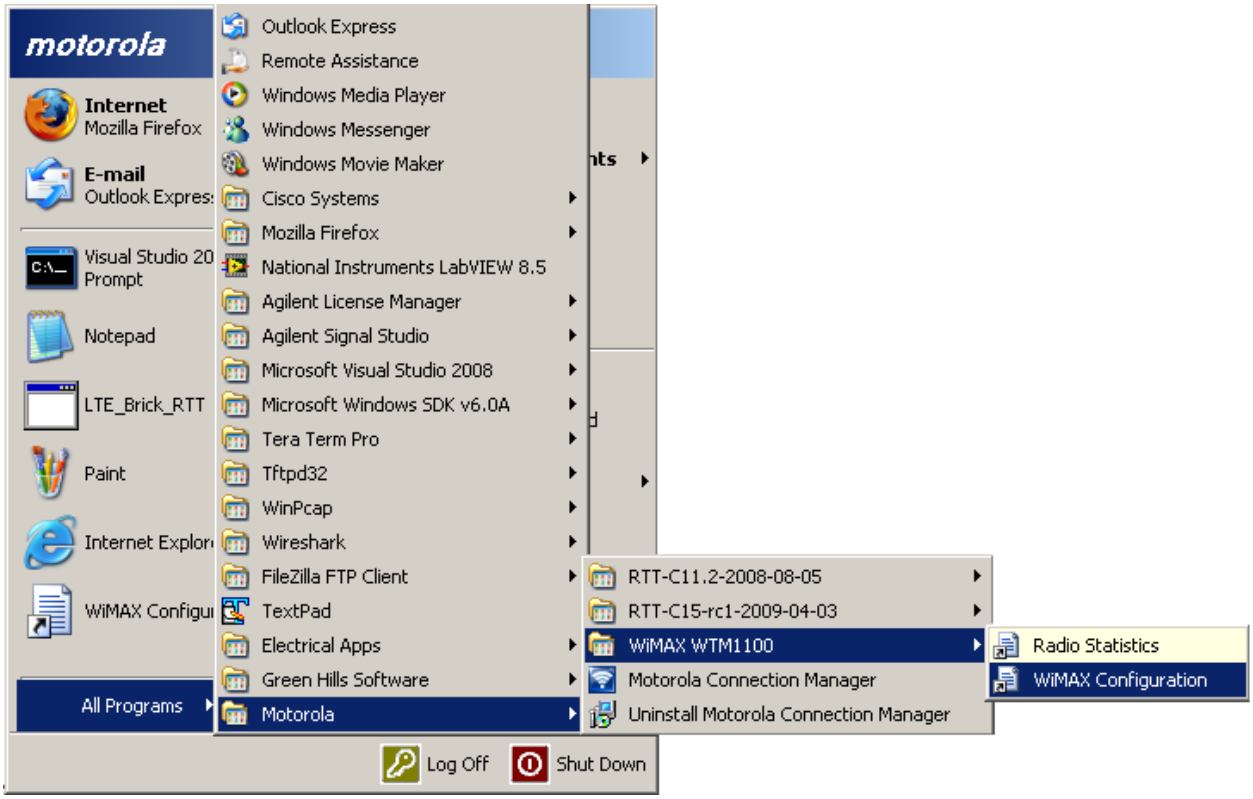
Procedure 4-6 Starting Radio Statistics

1	To start the Radio Statistics application, double-click on the Radio Statistics icon located on the desktop. The icon will be available on the desktop only if the election to place it on the desktop has been selected at the time of Radio Statistics installation.

2 As an alternative to the above step, you can also:

Click on **Start | Programs | Motorola | WiMAX WTM1100 | Radio Statistics**

Figure 4-30 Starting Radio Statistics



Radio Statistics Tab Contents

The following sections will describe the contents of all the available tabs within the Radio Statistics application, and their respective functionality.

Link Tab

Figure 4-31 Radio Statistics Link Tab

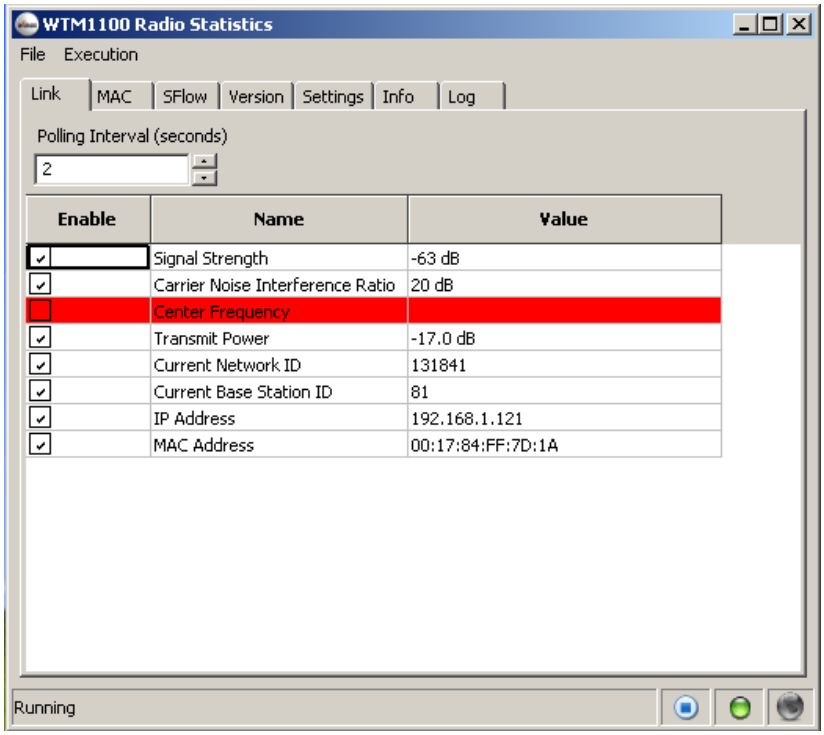


Table 4-3 Link Tab – Radio Statistics Information Section

Status Tab Item	Explanation
Polling Interval	Indicates how often the modem is polled.
Signal Strength	Displays the receive signal strength of the attached WiMAX network.
Carrier Noise Interference Ratio	Displays the CINR of the receive frequency.
Center Frequency	N/A.
Transmit Power	Transmit power of the WTM1100 modem card.
Current Network ID	Network ID of the attached WiMAX network.
Current Base Station ID	ID of the Base station the WTM1100 modem card is attached to.
IP Address	The IP address being used by the WTM1100 modem card.
MAC Address	The MAC address being used by the WTM1100 modem card.

MAC Tab

Figure 4-32 Radio Statistics MAC Tab

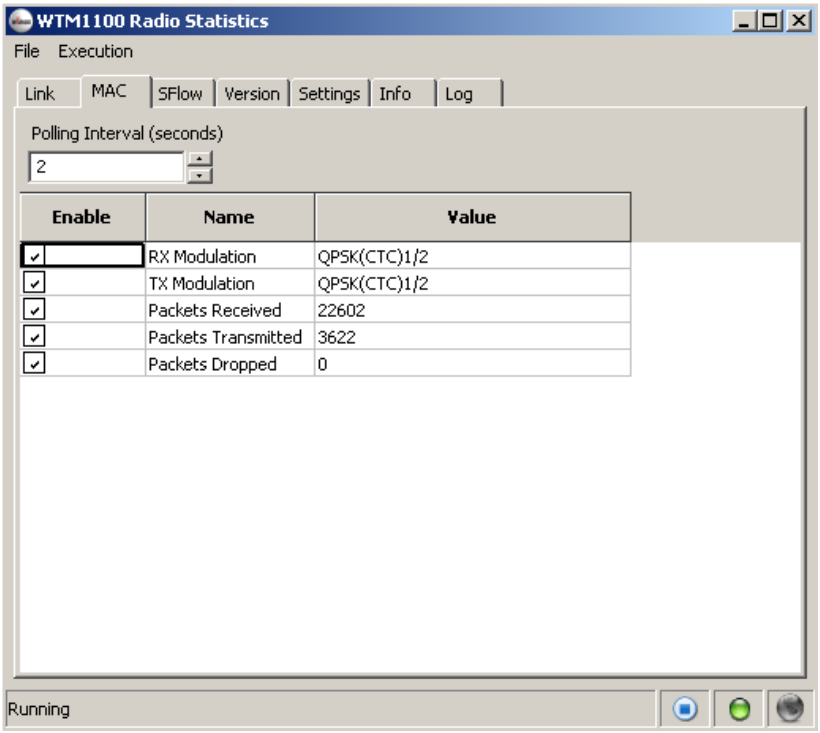


Table 4-4 MAC Tab – Radio Statistics Information Section

Status Tab Item	Explanation
Polling Interval	Indicates how often the modem is polled.
RX Modulation	Indicates the modulation used by the receiver(s).
TX Modulation	Indicates the modulation used by the transmitter.
Packets Received	Displays the number of packets received.
Packets Transmitted	Displays the number of packets transmitted.
Packets Dropped	Displays the number of packets dropped by the network.

SFlow Tab

Figure 4-33 Radio Statistics SFlow Tab

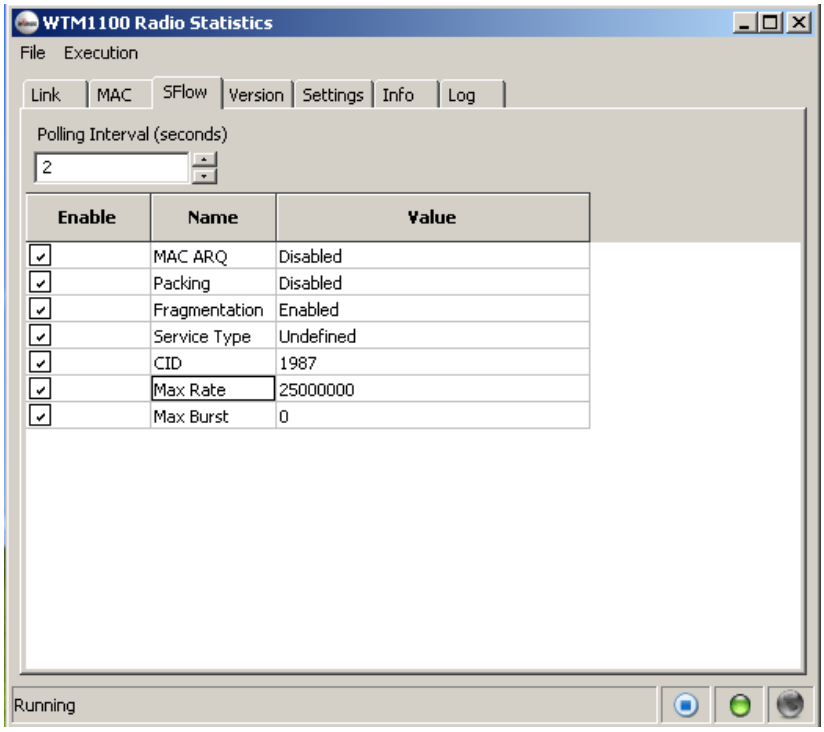


Table 4-5 SFlow Tab – Radio Statistics Information Section

Status Tab Item	Explanation
Polling Interval	Indicates how often the modem is polled.
MAC ARQ	Displays the status of MAC Automatic Repeat-reQuest algorithm on the WiMAX network.
Packing	
Fragmentation	
Service Type	
CID	
Max Rate	
Max Burst	

Version Tab

Figure 4-34 Radio Statistics Version Tab

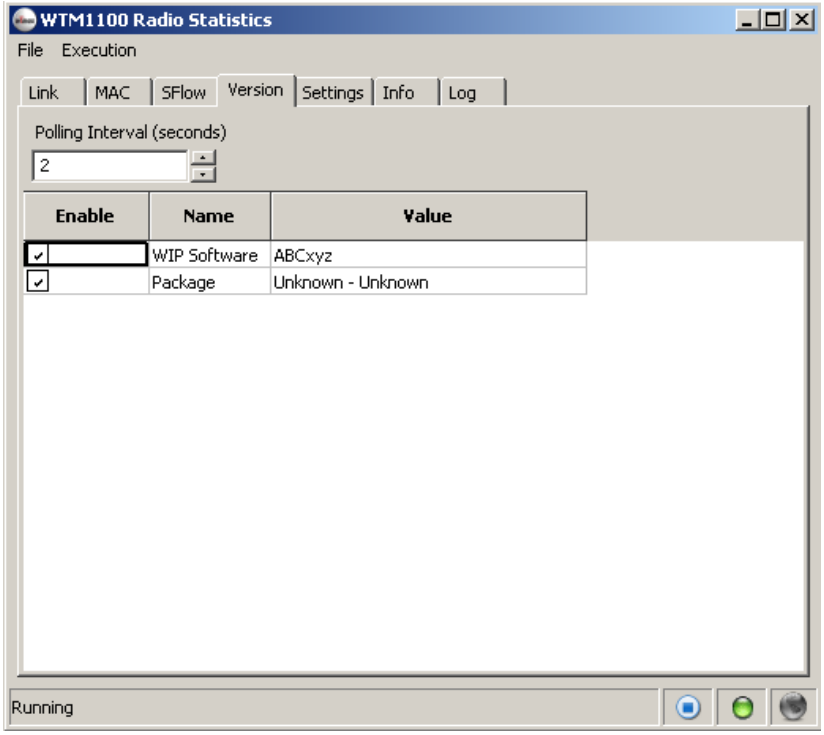


Table 4-6 Version Tab – Radio Statistics Information Section

Status Tab Item	Explanation
Polling Interval	Indicates how often the modem is polled.
WIP Software	Displays the version of the WIP software.
Package	Displays the version of the package software.

Settings Tab

Figure 4-35 Radio Statistics Settings Tab

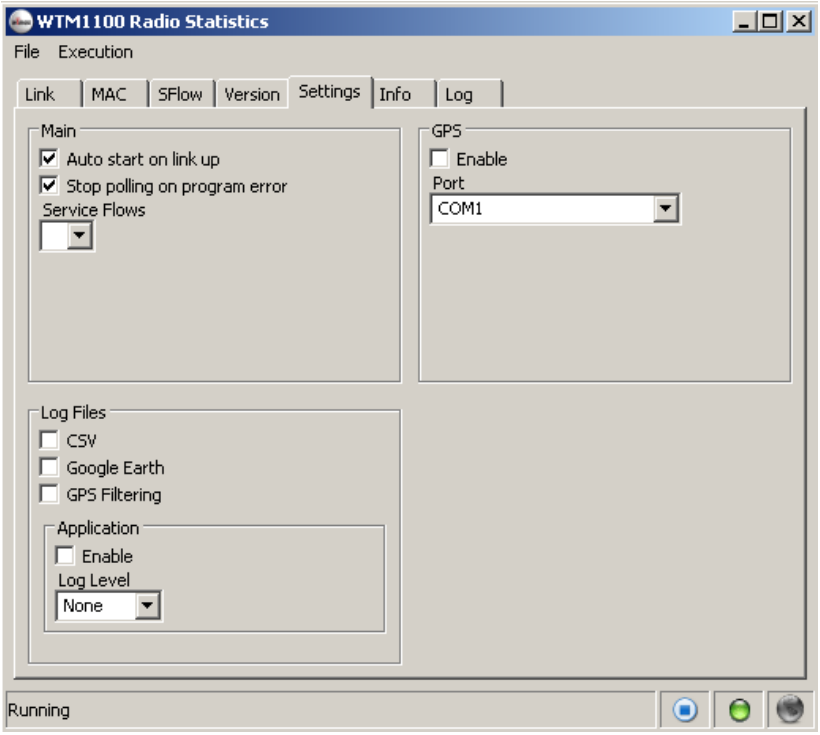


Table 4-7 Settings Tab – Radio Statistics Information Section

Status Tab Item	Explanation
Main - Auto Start on link up	Enable or disable Auto Start on link up
Main - Stop polling on program error	Enable or disable stop polling on program error
Main - Service Flows	Service Flow Format IDs
Log Files - CSV	Export log file as CSV
Log Files – Google Earth	Export log file as CSV
Log Files – Application Enable	Enable Application Logs
Log Files – Application Log Level	Set Log level “Normal” or “Verbose”
GPS - Enable	Enable GPS polling
GPS - Port	Com port for attached GPS device

Info Tab

Figure 4-36 Radio Statistics Info Tab

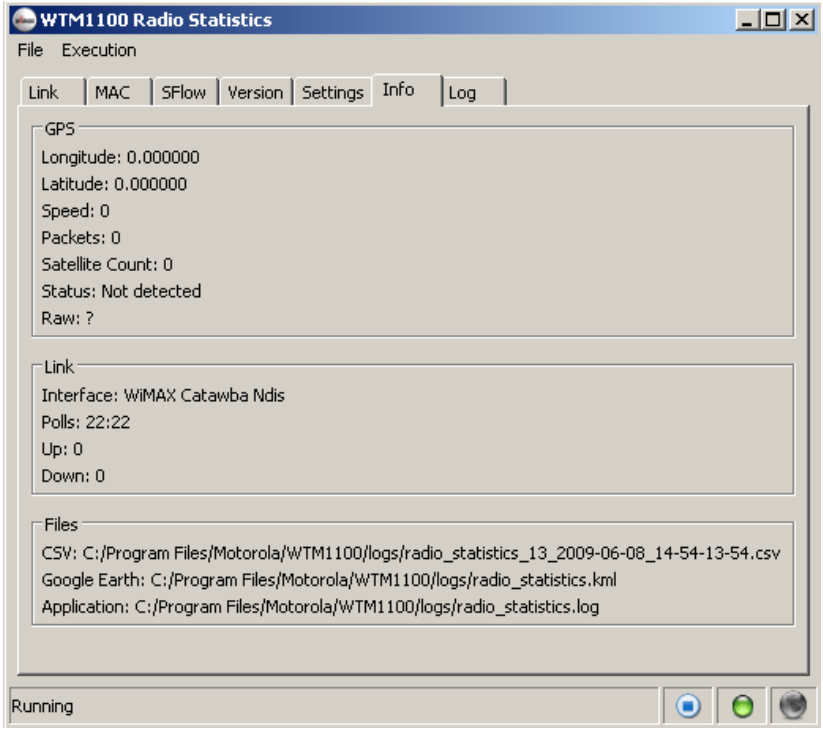


Table 4-8 Info Tab – Radio Statistics Information Section

Status Tab Item	Explanation
GPS	GPS information
Link	Displays link information on the NDIS interface
Files	Displays the location of the logging files for various formats.

Log Tab

Figure 4-37 Radio Statistics Log Tab

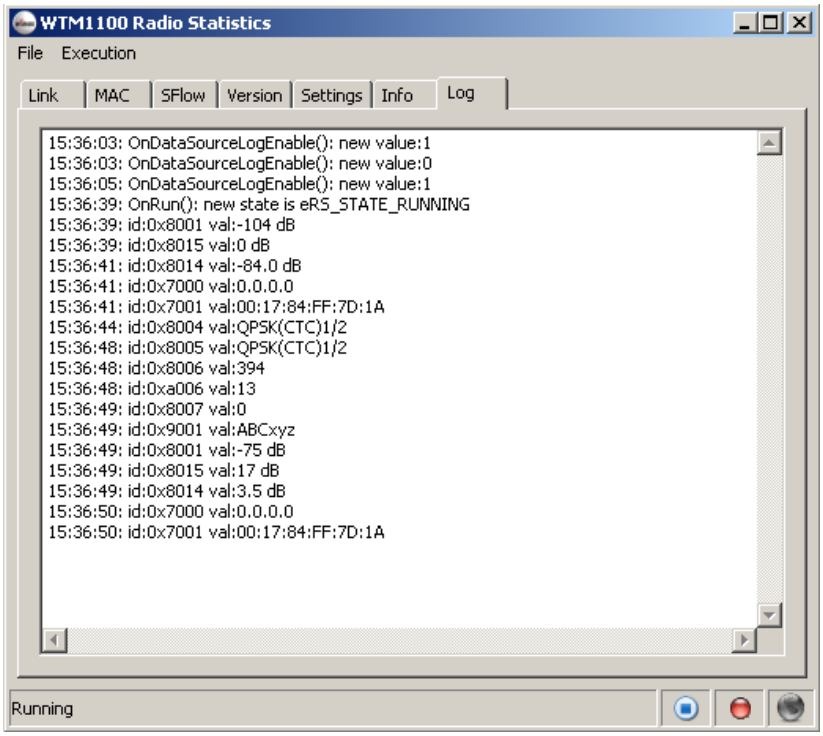


Table 4-9 Log Tab – Radio Statistics Information Section

Status Tab Item	Explanation
Log Window	If logging is enabled, log messages will be displayed.

Chapter

5

Chapter 5: WTM1100 Configuration Tool

WTM1100 Configuration™ tool is a status and configuration application that reports vital and statistical information about the WTM1100 Wireless Modem Card.

In this chapter you will learn about the available WTM1100 Configuration tool features and the different ways to start WTM1100 Configuration.

The following sections will describe the contents of all the available tabs within the WTM1100 Configuration tool. This application can be used to configure various WiMAX components of the WTM1100 modem card. The following sections provide details on how to configure and use the application. The WiMAX Configuration application is segmented into five separate tabs.

- smeTest – connection control commands
- MIB init – add or remove entries from the mib_init.xml file
- Configuration – specify frequency/spectrum range
- Environment – mode selection
- Messages – displays contents of /var/log/messages fileRadio Statistics application, and their respective functionality.

smeTest Tab

Figure 5-38 WTM1100 Configuration smeTest Tab

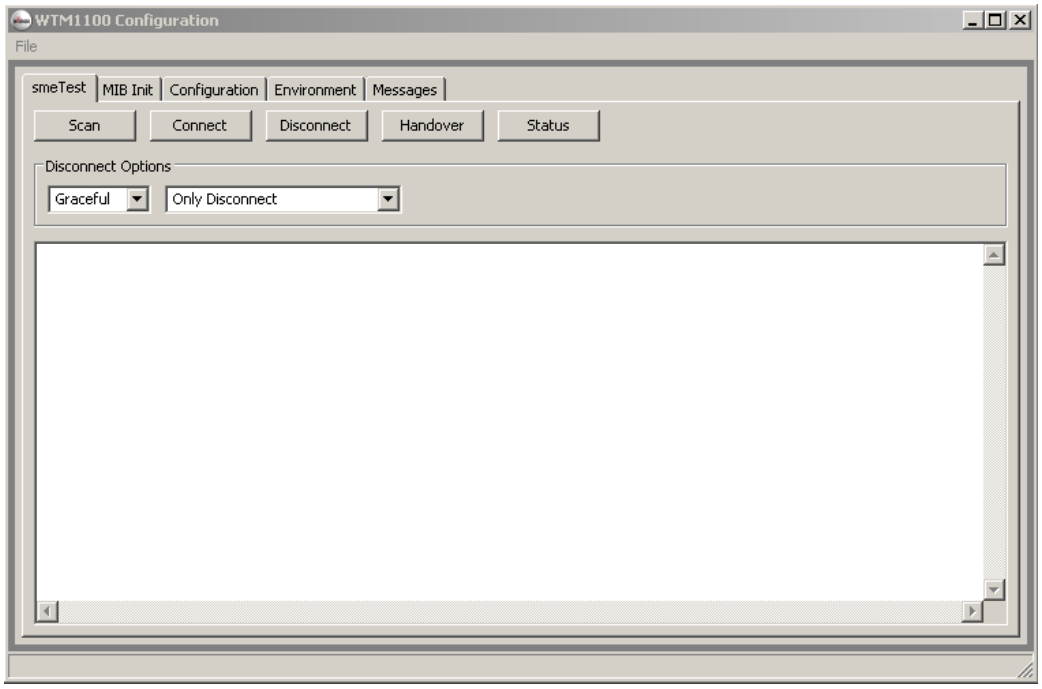


Table 5-10 smeTest Tab – smeTe3st Information Section

Status Tab Item	Explanation
Scan	Commands the WTM1100 to Scan for networks.
Connect	Commands the WTM1100 to Connect to a network.
Disconnect	Commands the WTM1100 to Disconnect from a network. Use with the Disconnect Options drop box.
Handover	Command the WMT1100 to request a Handover from the network or perform a mobile initiated handover.
Status	Command the WTM11000 to report the status of its current state.
Disconnect Options	Use with the Disconnect button. Options include Graceful or not, Disconnect with DHCP Release or not, etc.

MIB Init Tab

Figure 5-39 WTM1100 Configuration MIB Init Tab

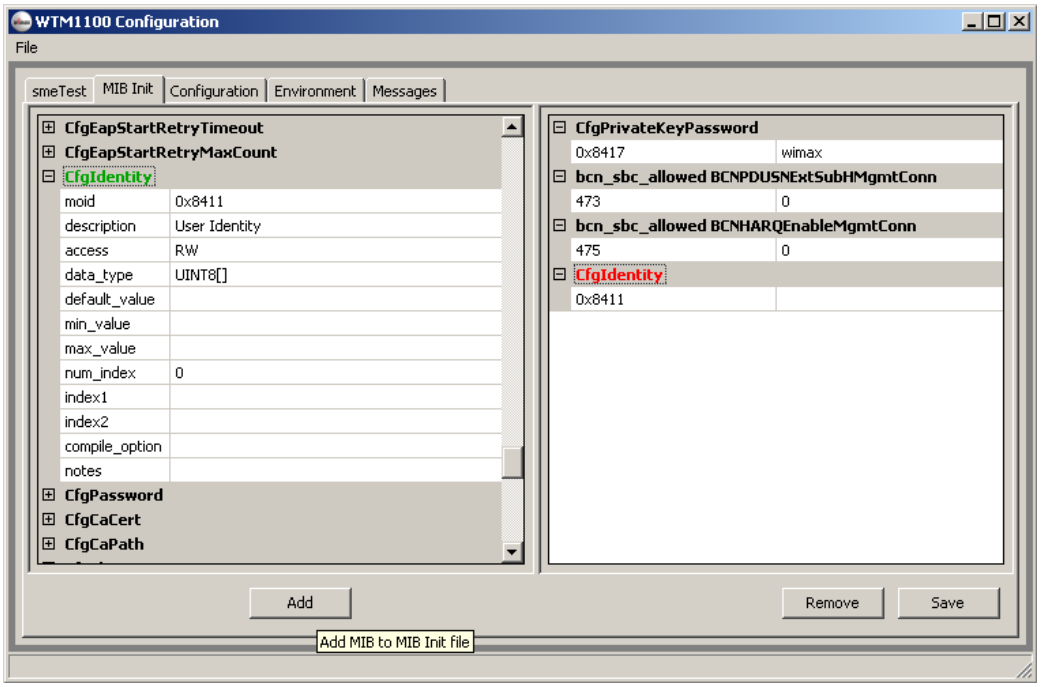


Table 5-11 MIB Init Tab – MIB Init Information Section

Status Tab Item	Explanation
Left Hand Text Box	Lists all MOIDs available for use with the WTM1100. When a MIB description is selected, it will highlight "GREEN" and can be expanded by clicking the "+" symbol. Once the MIB value is highlighted, the "Add" button below will become active and if selected will add the MIB to the Text Box on the right.
Right Hand Text Box	Displays all the MIBS currently statically active for the WTM1100. These are loaded to the WTM1100 every time the device is powered up. Click the MIB variable number to the right of the MIB identifier and the field can be edited. Click the "Save" button below once editing is complete. Alternatively a MIB can be removed by selecting the MIB description (highlight RED) and click "Remove".

Configuration Tab

Figure 5-40 WTM1100 Configuration Tab

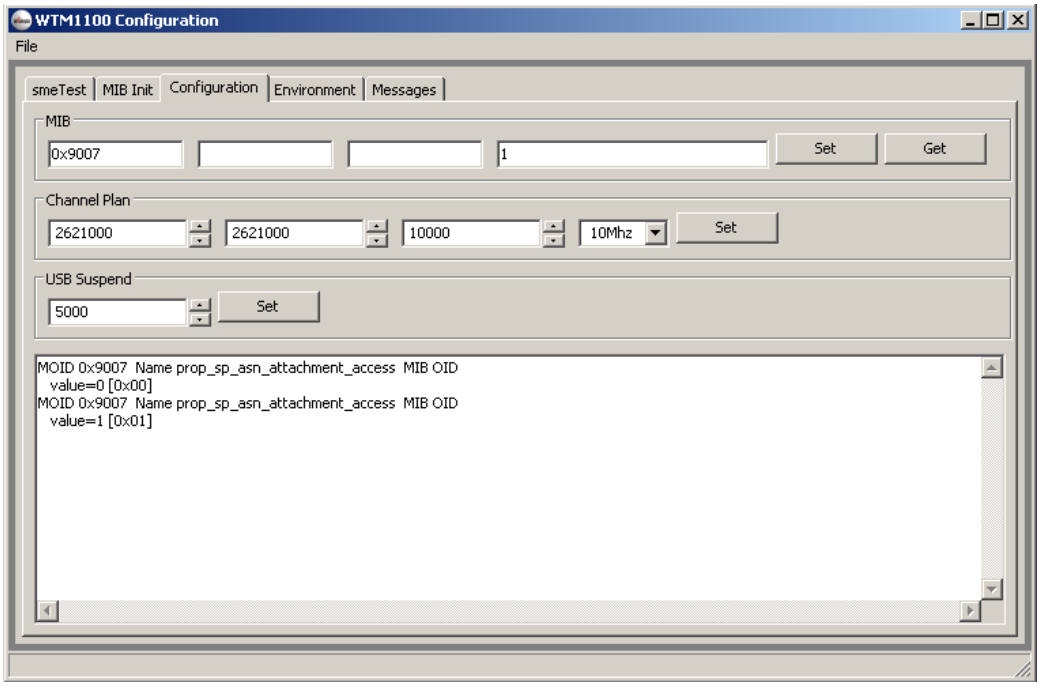


Table 5-12 Configuration Tab – Radio Statistics Information Section

Status Tab Item	Explanation
MIB	Fields are used to query (GET) or assign (SET) MOID values
Channel Plan	Fields are used to set the channel plan (lower freq, upper freq, step size, and bandwidth)
USB suspend	Used to test USB suspend feature
Text Box	Display results from MOID queries or assignments

Channel Plan Configuration

There are many channels available in the 2.5GHz and 3.5Ghz bands for WiMAX network communications. The Channel Plan section is used to set the spectrum range in the WiMAX_SP_profile.xml file. When the application starts, this information is read from that file and the values are used to populate the WTM1100 Configuration Channel Plan controls. To set new values, simply update the Channel Plan controls and select the Set button. The Set action will update the values in the WiMAX_SP_profile.xml file. The card must be restart or the PC must be rebooted in order for the changes to take effect.

Environment Tab

Figure 5-41 WTM1100 Configuration Environment Tab

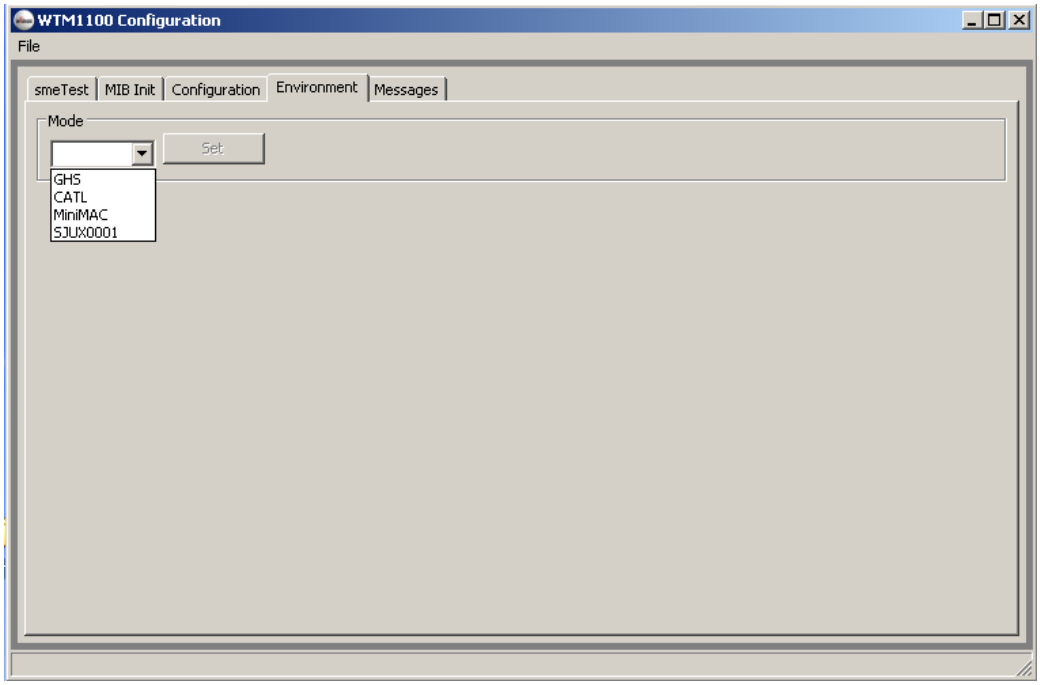


Table 5-13 Link Tab – Radio Statistics Information Section

Status Tab Item	Explanation
Mode	Selects the type of SREC to be downloaded to the modem when it initializes (GHS, CATL, MiniMAC, SJUX00001)

Messages Tab

Figure 5-42 WTM1100 Configuration Messages Tab

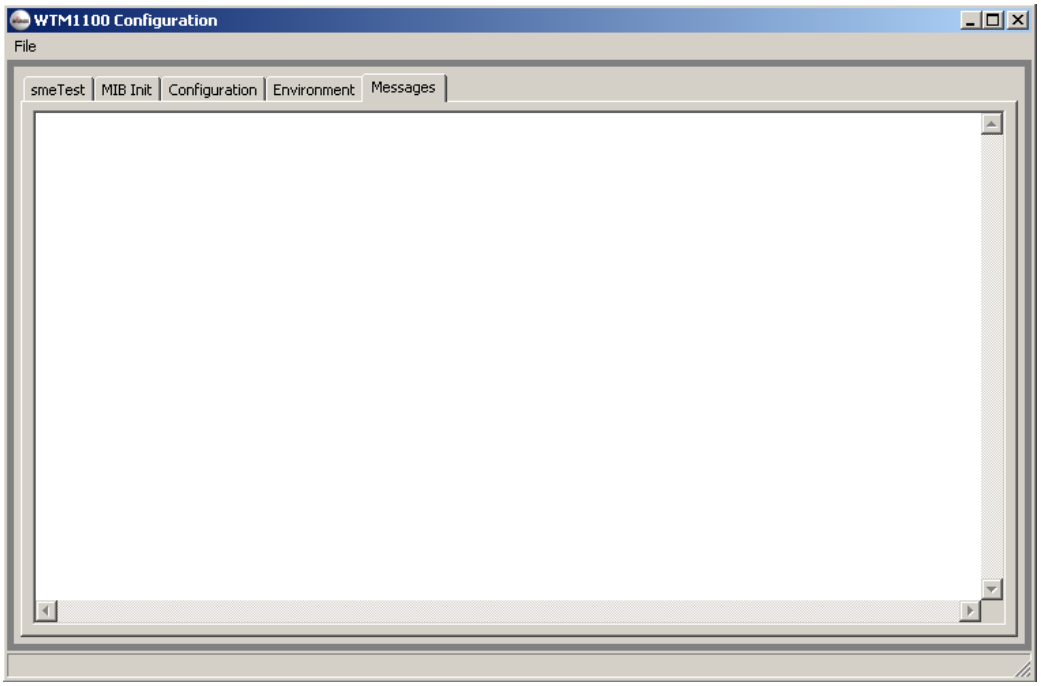


Table 5-14 Link Tab – Radio Statistics Information Section

Status Tab Item	Explanation
Text Box	Only used by Linux to display kernel level messages reported by the OS.

Chapter

6

Chapter 6: Network Settings

Using DHCP

By default the WTM1100 is configured to use dynamically assigned IP addresses issued by the network. If a DHCP server is not available on your network, you could choose to provide a viable static IP address given by the network provider.

Some vendors WiMAX networks only support DHCP to devices. In these cases, Static IP assignments will not work as expected.

Secure Network Configuration

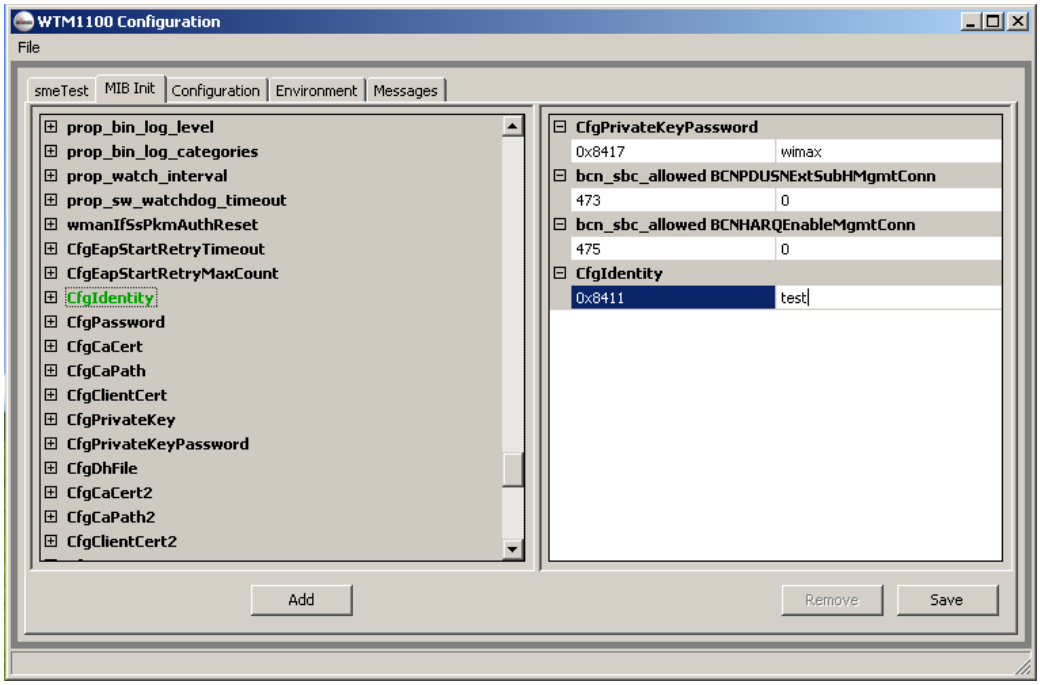
If your WTM1100 Wireless Modem Card is going to be used on a secure network, the following MIB objects need to be set.

The following objects need to be specified to gain network entry on a secure network:

- “CfgIdentity” - 8411 User Identity
- “CfgPassword” - 8412 Password
- “CfgPrivateKeyPassword” - 8417 Private Key Password
- “CfgAnonymousIdentity” - 8422 Anonymous Identity
- “EAP Methods” – 841F EAP Type: TLS or TTLS (default)

These values can be added to the device’s configuration file using the WTM1100 Configuration tool as show in Figure 6-43.

Figure 6-43 Setting Secure Variables in WTM1100 Configuration Tool



Chapter

7

Chapter 7: Troubleshooting

FDA Version

By default the WTM1000 is calibrated with the latest version of Factory Data Area (FDA). During the factory build, the FDA is written with calibration values and stored in a SEEPROM image file residing on the WTM1100 Wireless Modem Card. The FDA data is used during normal operation to serve as input to PHY control algorithms like Transmit Power Control (TPC), Automatic Gain Control (AGC) and XTAL tuning.

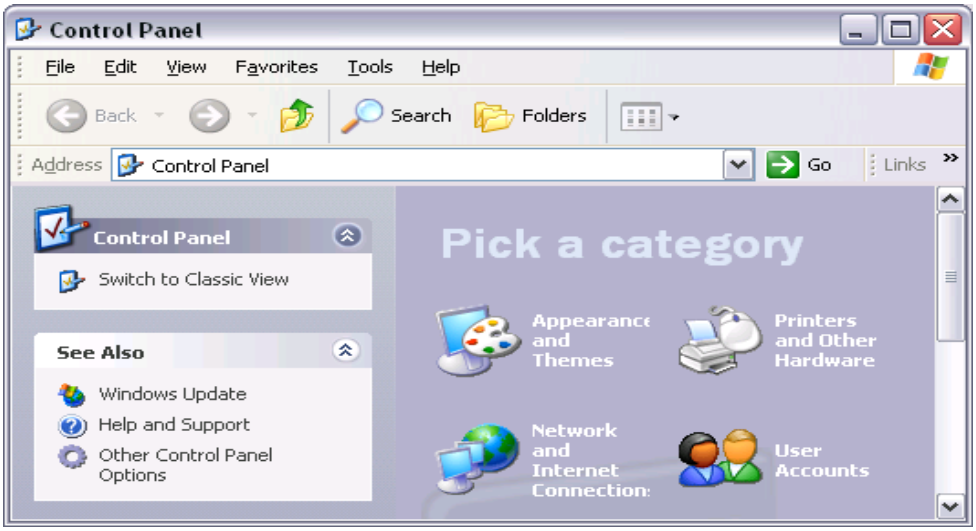
When new WTM1100 firmware and drivers are released, the format of the FDA data may change. If installation issues are encountered after a new WTM1100 software load is used, the FDA version may need to be updated. Contact Motorola Technical Support for assistance

Driver Installation Verification

After installation of the WTM1100 software, check to see that both WTM1100 service and WTM1100 hardware are properly installed and running.

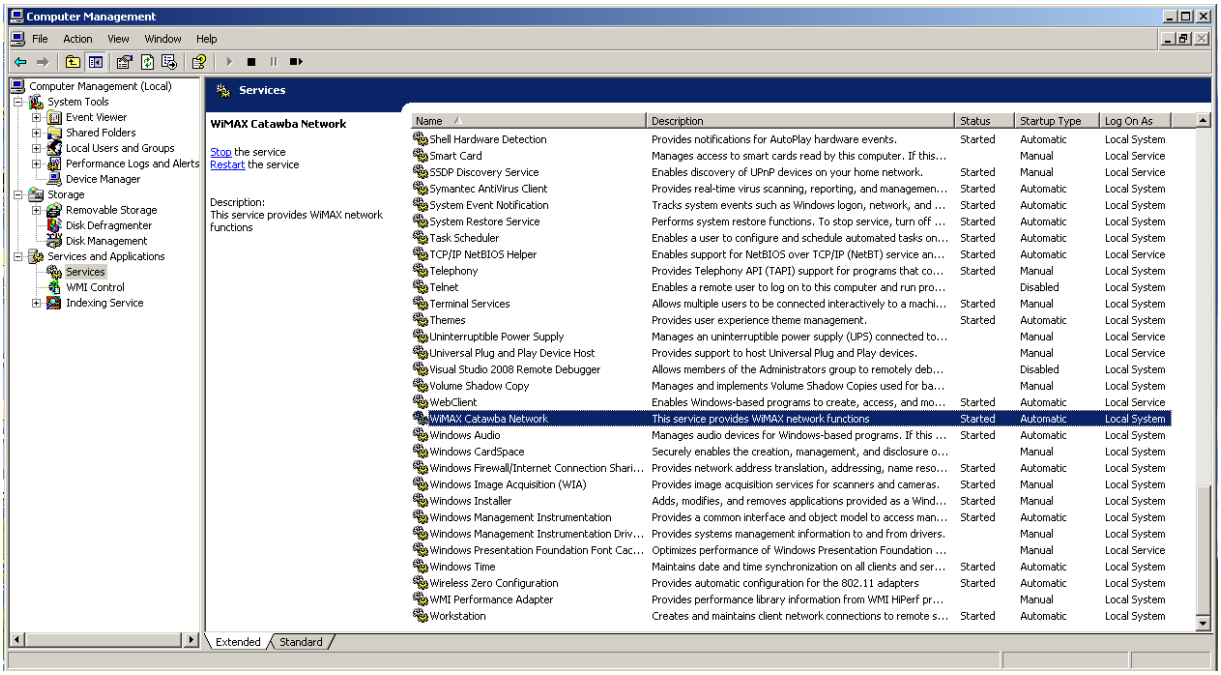
Procedure 7-7 Driver Installation Verification

1	From the **Start** menu, select ***Settings*** → ***Control Panel*** → ***Administrative Tools***. Double click on the *Computer Management* icon. **Figure 7-44 Control Panel – Computer Management Icon**



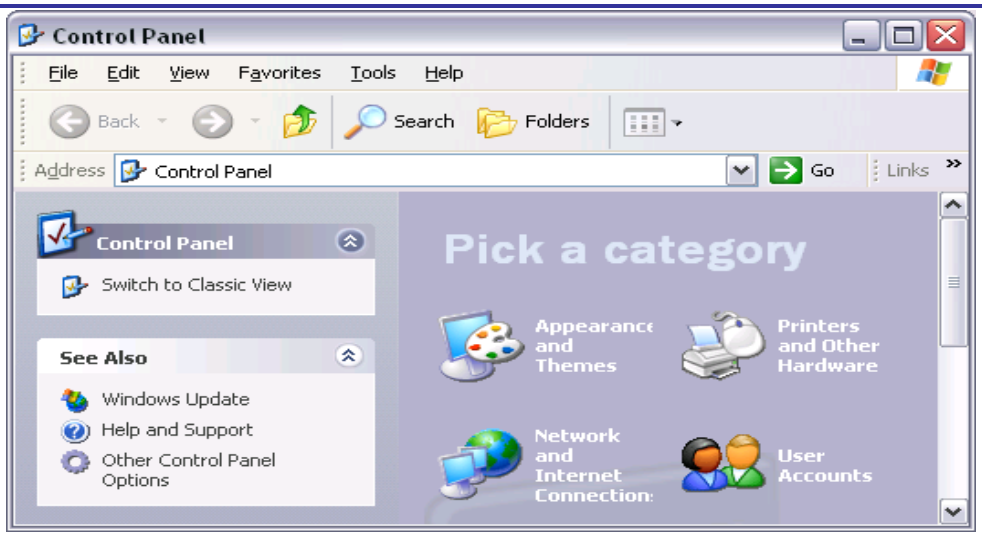
2 The *Computer Management* window will be displayed. On the right side, expand the **Services and Applications icon** and click on the **Services** icon. Scroll down the list on the left side and verify that the "WiMAX WTM1100" service is started and running.

Figure 7-45 Windows Services Window



3 From the **Start** menu, select ***Settings → Control Panel → Administrative Tools***. Double click on the *Computer Management* icon.

Figure 7-46 Local Area Connection Properties Dialog Box

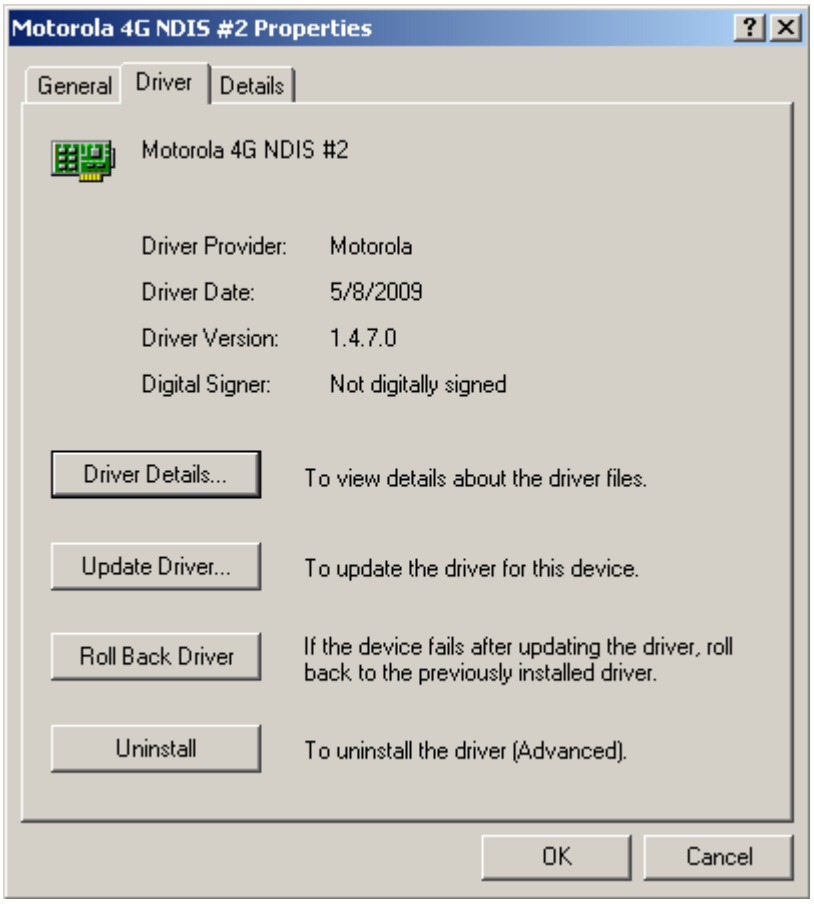


4 The *Computer Management* window will be displayed. On the right side, click on the **Device Manager** icon. Scroll down the list on the left side and verify that the "WiMAX WTM1100 NDIS" and "WiMAX WTM1100 USB" are listed and enabled under **Network Adapters**.

Figure 7-47 Windows Services Window

5 The WTM1100 driver version can be found by double clicking the *Motorola 4G NDIS* device and selecting the *Driver* tab in the "Motorola 4G NDIS Properties" window.

Figure 7-48 WTM1100 Driver Version



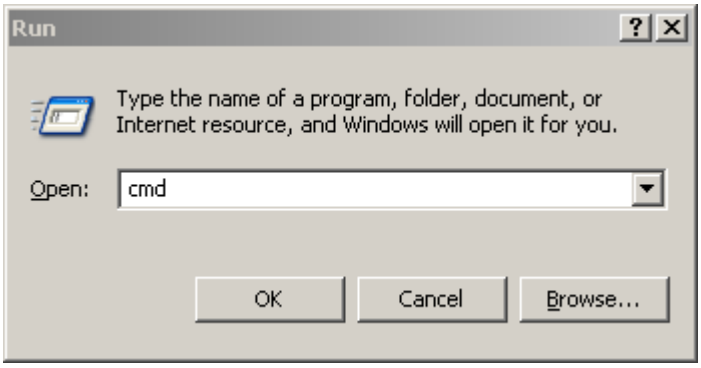
Verify Network Connection Established

After installation of the WTM1100 software, check to see if the WTM1100 adapter has been assigned an IP address by the network.

Procedure 7-2 Network Connection Established Verification

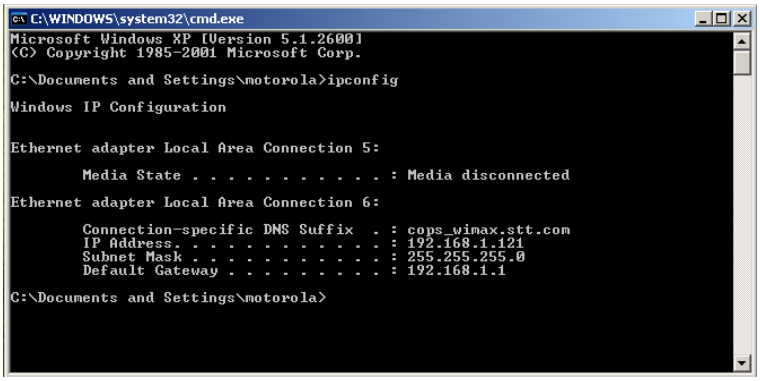
1	From the **Start** menu, select ***RUN*** and type "**cmd**". This will open a command window.

Figure 7-49 Control Panel – Computer Management Icon



2 From the *Command Window*, type "**ipconfig**". Verify that the WiMAX network has given the WTM1100 Wireless Modem Card an IP address.

Figure 7-50 IPCONFIG Window



Verify PEM files mapping to Specific Names

When using third party Privacy-enhanced Electronic Mail (PEM) files, rename them to match the file names the WTM1100 driver is looking for in WTM1100 installation directory (default is **C:\Program Files\Motorola\WTM1100** directory).

WTM1100 PEM File Names:

- Commercial_device.pem --> ServerCert.pem
- Commercial_prv_key.pem --> ServerPrivateKey.pem
- EMEA_Trials_ServerRootCert.der --> TrustCA.pem

Authentication Settings

To use Tunneled Transport Layer Security (TTLS) authentication protocols several certificates may be required depending on the network infrastructure settings.

For WTM1100 TTLS authentication:

- The ServerCert and ServerPrivateKey certificates may not be required by the WTM1100.
- The TrustCA is required to verify a AAA server certificate.

On the Network Infrastructure Side:

In the Motorola NECB.xml file, grep for "CapCfg" and the value 2 (auth on) should change to 0 (auth off).

There are separate lines in the NECB for the CapcAuth and for the MAC message integrity checking per sector, both need to be changed when authentication is disabled.

Authentication off:

- <SWI:wmanIfBsCapCfgAuthPolicyControl>00000000</SWI:wmanIfBsCapCfgAuthPolicyControl>

- <SWF:wmanIfBsCapCfgMacMsgAuth>0</SWF:wmanIfBsCapCfgMacMsgAuth>

Authentication on:

- <SWI:wmanIfBsCapCfgAuthPolicyControl>00000002</SWI:wmanIfBsCapCfgAuthPolicyControl>
- <SWF:wmanIfBsCapCfgMacMsgAuth>9</SWF:wmanIfBsCapCfgMacMsgAuth>

From an EMS, DAP/Configuration/SubscriberRestrictions Settings:

- Auth Policy = NONE (or EAP for auth)
- MAC Message ... = NONE (or CMAC0_AND_CMAC for auth)

Chapter

8

Chapter 8: Customer Information

This chapter lists the relevant Certification and Product Safety Information for the WTM1100 devices described in this manual.

Customer Service Information

If you have read this document and made every effort to resolve installation or operation issues yourself and still require help, please contact Motorola Global Support Center (GSC) using the following contact information:

Hours of Operation

8AM to 5PM M-F Central US

Technical Support:	512-427-7256 (USA)
Website:	http://www.motorola.com/

Obtaining Support

Motorola provides technical support services for your system and recommends that you coordinate warranty and repair activities through the Motorola Global Support Center. When you consult the Motorola GSC, you increase the likelihood that problems are rectified in a timely fashion and that warranty requirements are satisfied. Check your contract for specific warranty and service information.

System Information

To be provided with the best possible opportunity for support, collect the following system information and have it available when obtaining support.

- Location of the system

- Date the system was put into service
- Software or firmware version information for components of your system
- Serial number(s) of the device(s) or component(s) requiring support
- A written description of the symptom or observation of the problem:

  - When did it first appear?

  - Can it be reproduced?

  - What is the step-by-step procedure to cause it?
- Do other circumstances contribute to the problem? For example, changes in weather or other conditions?
- Maintenance action preceding problem:

  - Upgrade of software or equipment

  - Change in the hardware or software configuration

  - Software reload - from backup or from CD-ROM (note the version and date)

Return Material Request

After collecting system information, contact the Motorola Global Support Center for assistance or to obtain a Return Material Authorization (RMA) number for faulty Field Replaceable Entities (FREs):

North America: 512-427-7256 (USA)

Returning System Components to Motorola

Motorola's service philosophy is based on field replaceable entities (FREs). FREs are system components identified by Motorola to be returned to Motorola for repair. In turn, Motorola sends you a replacement FRE component to help you maintain maximum operating performance for your system.

Returning FREs

Return faulty FREs to Motorola for repair. When you return an assembly for service, follow these best practices:

- Place any assembly containing CMOS devices in a static-proof bag or container for shipment.
- Obtain a return authorization (RA) number from the Motorola System Support Center.
- Include the warranty, model, kit numbers, and serial numbers on the job ticket, as necessary.
- If the warranty is out of date, you must have a purchase order.
- Print the return address clearly, in block letters.
- Provide a phone number where your repair technician can be reached.
- Include the contact person's name for return.

- Pack the assembly tightly and securely, preferably in its original shipping container.

Antenna Installation

The "main" antenna installation must provide a minimum separation distance of 20 cm from users and nearby persons and must not be co-located or operating in conjunction with any other antenna or transmitter. The combined cable loss and antenna gain must not exceed +9.9 dBi and total system output must not exceed 2.0W EIRP in the 2501 - 2687.5 MHz band in order to comply with the FCC EIRP limit. OEM installers must be provided with antenna installation instruction and transmitter operating conditions for satisfying RF exposure compliance. For system integrations requiring higher antenna gain, or a "main" antenna position closer than 20cm from the body, SAR compliance testing of the completed product will be required. It is strongly recommended that the system integrator seeks the advice of a suitably accredited test laboratory to develop a test plan and carry out necessary testing.

Chapter

9

Chapter 9: Certification and Safety Information

This chapter lists the relevant FCC Certification and Product Safety Information for the WTM1100 devices described in this manual.

FCC and CE Regulatory Information

FCC and CE Information

For 2.5GHz operation, the WTM1100 device complies with Part 27, of the FCC Rules. For 3.5GHz operation, the WTM1100 device complies with CE (EN302 326-2, EN301 489-4). 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 RF 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 20 cm between the radiator and your body.

This device is to be used only for mobile and fixed applications. Users and installer must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance. This device is approved as a module to be installed in other devices.

Safety Information for the WTM1100 Product

The Federal Communications Commission (FCC) with its action in ET Docket 96-8 has adopted a safety standard for human exposure to radio frequency (RF) electromagnetic energy emitted by FCC certified equipment. Motorola WTM1100 products meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. Proper operation of this radio according to the instructions found in this manual and the hardware and software guides on the WTM1100 CD will result in user exposure that is substantially below the FCC recommended limits.

- Do not touch or move the antenna(s) while the unit is transmitting or receiving.
- Do not hold any component containing a radio such that the antenna is very close to or touching any exposed parts of the body, especially the face or eyes, while transmitting.
- Do not operate a portable transmitter near unshielded blasting caps or in an explosive environment unless it is a type especially qualified for such use.
- Do not operate the radio or attempt to transmit data unless the antenna is connected; otherwise, the radio may be damaged.

General Safety Information

- Do not allow children to play with the WTM1100 device.
- Do not use cellular devices while driving a vehicle.
- Do not use the WTM1100 in health care facilities.
- Do not use the WTM1100 in the air aboard an aircraft.
- Do not use the WTM1100 in “blasting area” zones.
- Do not use the WTM1100 in potentially explosive atmospheres.

Safety Certification

- 2.5GHz WTM1100 complies with UL 60950
- 3.5GHz WTM1100 complies with CE EN 60950

FCC Notice to Users

The following statement applies to all products that have received FCC approval. Applicable products bear the FCC logo, and/or an FCC ID in the format FCC-ID:xxxxxx on the product label.

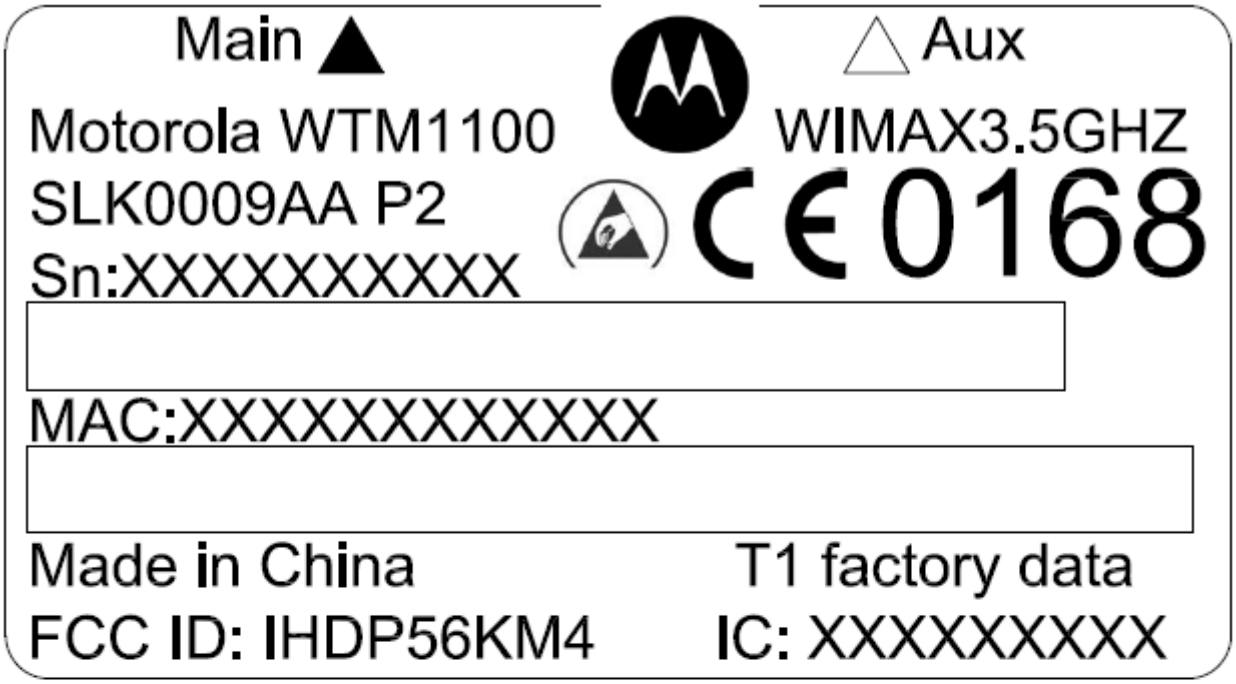
Motorola has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user’s authority to operate the equipment. See 47 CFR Sec. 15.21.

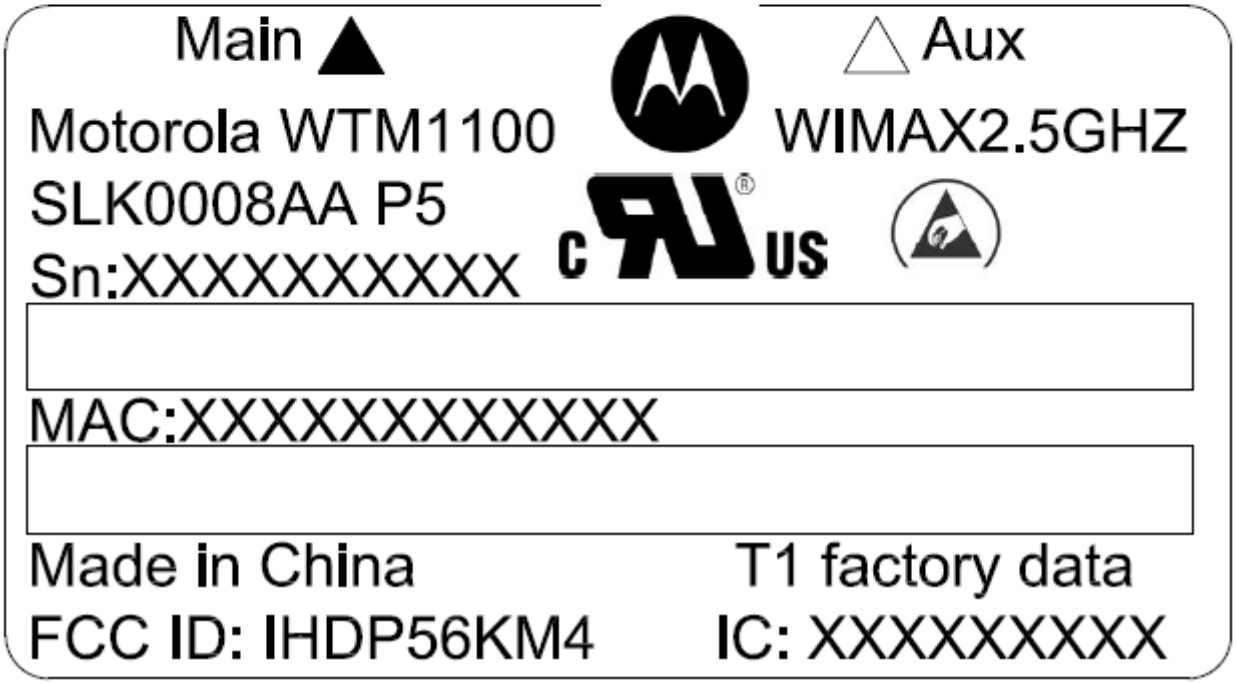
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. See 47 CFR Sec. 15.19(3).

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 or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to 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.

WTM1100 Product Label Example





Glossary

FDA – Factory Data Area

HMC – Half Mini-PCIe Card

FWMT – Future Wireless Modem Technologies

PEM – Privacy-enhanced Electronic Mail

SBC – Single Board Computer

SD – Subscriber Device, a general description to a device type that is usually a WMC or a laptop device.

WMC – Wireless Modem Card, can apply to any model number