4 ADMINISTRATOR MODE

The WiMAX USB Adapter has an Administrator Mode for configuring profiles and accessing the Advanced Configuration settings.

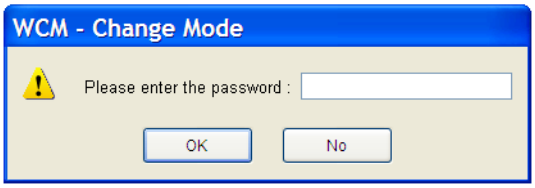
Administrator Mode is intended for qualified service personnel only.

ACCESSING ADMINISTRATOR MODE

Administrator Mode is accessed through the key sequence "Alt + t," which prompts for a password.

The password for Administrator Mode is "wimax123" (case sensitive).

Figure 30: WCM Change Mode



Once in Administrator Mode, the user can create, edit, and delete profiles, configure authentication settings, and access the Advance Configuration screen.

Using the key sequence "Alt + t" a second time exits Administrator Mode.

Figure 31: Administrator Mode

SETTING PROFILES

The WCM profiles allow a user to set their specific details for connecting to various WiMAX networks. The WCM utility must have at least one profile configured and set as the Default Profile" to be able to connect to a WiMAX service.

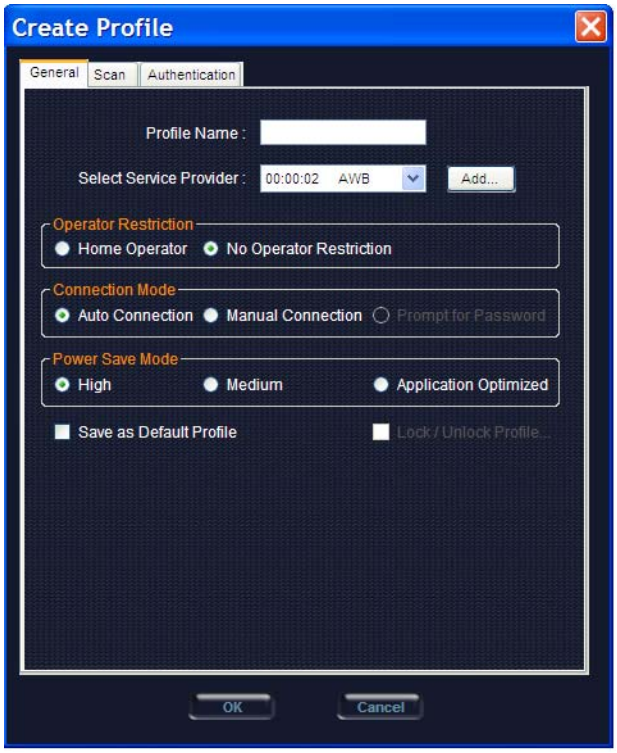
The WCM allows up to ten profiles to be configured. You can create, edit, and delete profiles in the list. One profile must be set as the "Default Profile."

Figure 32: Setting Profiles

CREATING A NEW PROFILE

Clicking the Create button on the Profile screen displays the Create Profile window.

Figure 33: Create Profile Screen - General Tab

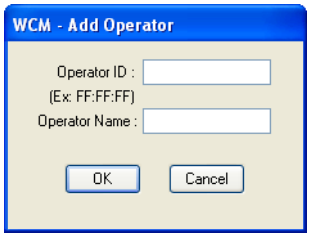


The General tab on this screen displays the following items:

Profile Name — A name used to identify the new profile (up to 20 characters).

Select Service Provider — The ID number and name of the WiMAX network operator for this profile. You can click the Add button to add other operator names and IDs.

Figure 34: Add Operator



Operator Restriction — When set to "Home Operator," the user can only connect to the service provider specified in the profile. When set to "No Operator Restriction," the operator specified in the profile is used when the network is detected, otherwise the user can roam to other networks.

Connection Mode — When set to "Auto Connection" the utility will use the profile settings to automatically scan and connect to a WiMAX network.

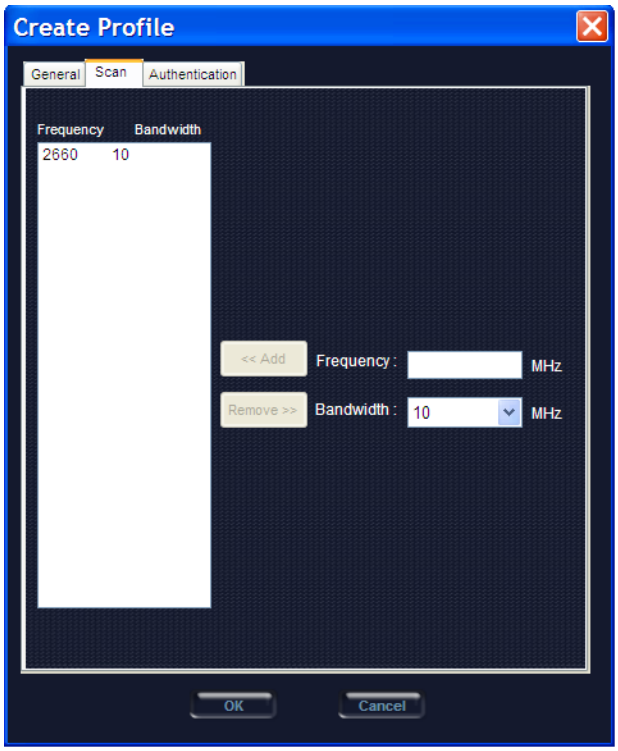
Power Save Mode — To save power, the card can operate in one of three modes:

- **High:** The card will go to sleep and idle whenever it can.
- **Medium:** The card will go to sleep and idle only after a predefined time.
- **Application Optimized:** The card will go to sleep and idle only when the PC operating system allows it.

Save as Default Profile — Saves the profiles settings and sets it as the default.

Clicking the Scan tab on the Add Profile screen displays the profile frequency and bandwidth settings.

Figure 35: Create Profile Screen - Scan Tab



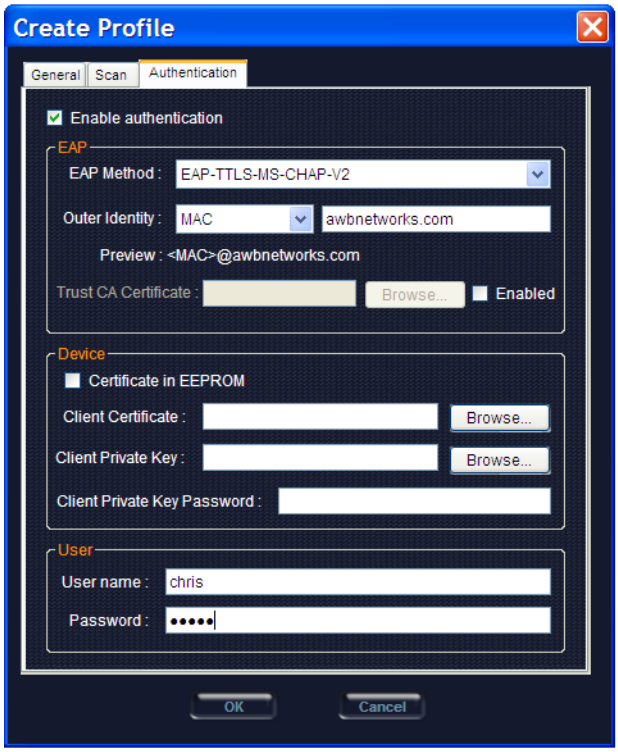
The Scan tab on the Add Profile screen displays the following items:

Frequency — Specifies a center frequency to scan.

Bandwidth — Specifies the bandwidth of the channel; 5, 7, 8.75, or 10 MHz.

Clicking the Authentication tab on the Add Profile screen displays the user authentication settings.

Figure 36: Create Profile Screen - TTLS Authentication



The Authentication tab on the Add Profile screen displays the following items:

Enable Authentication — Enables user authentication for connection to the network.

EAP Method — Selects the Extensible Authentication Protocol (EAP) method to use for authentication. When EAP-TTLS or EAP-TLS is selected, the appropriate parameters need to be configured.

- **EAP-TTLS-MSCHAPV2** — Tunneled Transport Layer Security with Microsoft's version 2 of CHAP (Challenge-Handshake Authentication Protocol). This security method provides for certificate-based, mutual authentication of the client and network through an encrypted channel. Unlike EAP-TLS, EAP-TTLS requires only server-side certificates. The MS-CHAP protocol requires a user name and password to be configured. The user name and password can be up to 50 characters. (The following characters are not permitted; /\|"?@#$%^&*():;<>,.)

- **EAP-TLS** — Transport Layer Security. Provides for certificate-based and mutual authentication of the client and the network. It relies on client-side and server-side certificates to perform authentication and can be used to dynamically generate user-based and session-based encryption keys to secure subsequent communications between the user and the network.

Outer Identity — The Network Access Identifier (NAI) text string that is used to identify the home authentication realm for device authentication during roaming. The NAI string (defined in RFC 4282) is used to proxy an authentication request to another remote server. The authentication is then performed using the unique X.509 authentication certificate included with the device. The string can be defined by three methods:

- **MAC:** Uses the device MAC address as part of the identity.
- **RANDOM:** Uses a generated random number of 26 hexadecimal digits.
- **CUSTOMIZE:** Allows the whole string to be defined as required.

Trust CA Certificate — The security certificate issued by a recognized certification authority (CA) that is used for mutual authentication with the authentication server when EAP-TLS is used. The browse button can be used to locate the file on the host PC.

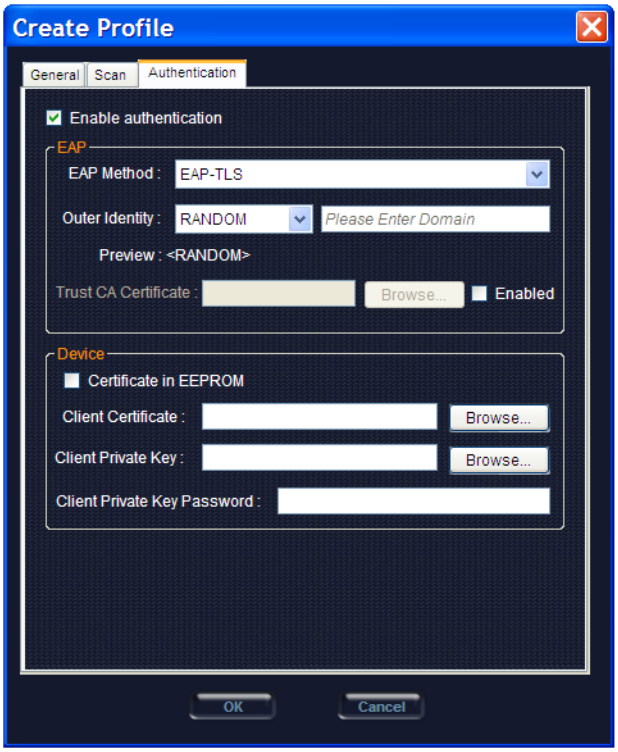
Certificate in EEPROM — Indicates if the device certificate, key, and password is included in memory on the device. If the certificate files are not in EEPROM, they can be located or specified using the following fields.

- **Client Certificate** — The name of the file on the host PC that contains the device security certificate. The browse button can be used to locate the file.
- **Client Private Key** — The name of the file on the host PC that contains the encryption key for use with the security certificate.
- **Client Private Key Password** — The required password for the private key.

User name — A text string used by EAP-TTLS-MSCHAPV2 to identify the user to the authentication server.

Password — The password used by EAP-TTLS-MSCHAPV2 to confirm the identity of the user to the authentication server.

Figure 37: Create Profile Screen - TLS Authentication



ADVANCED CONFIGURATION

The Advanced Configuration screen allows you to configure extended features for the WiMAX connection.

Figure 38: Advanced Configuration

The displayed items on this screen can be described as follows:

Center Frequency — Displays the center frequency used by the WiMAX service.

Bandwidth — Displays the channel bandwidth.

Customize — Displays a value used for compatibility with different base stations.

Radio Parameter — Selects the supported WiMAX radio band.

PKMv2 Enable — PKMv2 (Privacy Key Management version 2) is the standard security solution for WiMAX networks. The security protocol provides mutual authentication of the subscriber station and base station, as well as distributing traffic encryption keys. It is also used to transport EAP (Extensible Authentication Protocol) messages.

ARQ Enable — The ARQ (Automatic Repeat reQuest) mechanism is an optional part of the WiMAX MAC layer and a protocol for error control in data transmission. When a packet error is detected, the transmitter is automatically requested to resend the packet.

Idle Mode Enable — Idle mode enables power savings for the WiMAX adapter. The feature can turn off the MS and not be registered with any base station, and yet receive downlink broadcast traffic.

Invert MSK — Inverts the Master Session Key used in the EAP process.

Handoff Enable — Enable handoffs when moving between base stations.

Auto Sync Up — Enable automatic synchronization with the base station signal.

Auto Linkup by Firmware — Enable automatic connection to the base station.

A TROUBLESHOOTING

DIAGNOSING LED INDICATORS

Table 2: LED Indicators

LED Status	Probable Cause	Action
Blue LED is Off	The USB adapter is not receiving power	◆ Remove the USB adapter and reinsert it in the slot. Be sure the card is securely seated in the port. ◆ Try the USB adapter in another USB port. If this also fails, test your PC with another USB adapter that is known to operate correctly. ◆ Check the USB adapter and port connectors for any physical damage. ◆ Try the USB adapter in another PC's port that is known to operate correctly. ◆ If you cannot resolve the problem, contact your local dealer for assistance.
Green/Orange LED is Off	The USB adapter cannot detect a WiMAX base station	◆ Verify the area covered by your WiMAX service provider. ◆ Move to another location within the WiMAX service area.

NETWORK CONNECTION PROBLEMS

If you cannot access the Internet from the PC, check the following:

- Make sure the WCM software and driver is correctly installed on your system. If necessary, try uninstalling and reinstalling the software.
- If you cannot access the Internet, be sure your Windows system is correctly configured for TCP/IP. The IP settings should be set to "obtain an IP address automatically."
- You may have moved out of the service area of the WiMAX network. The WCM main screen should indicate that there is no connection. Call the service provider for service coverage information.
- The service provider's profile may not be configured correctly. Check that the Authentication Mode settings are correct.

- If you cannot resolve the problem, check the error logs from the WCM Status screen and contact your service provider.

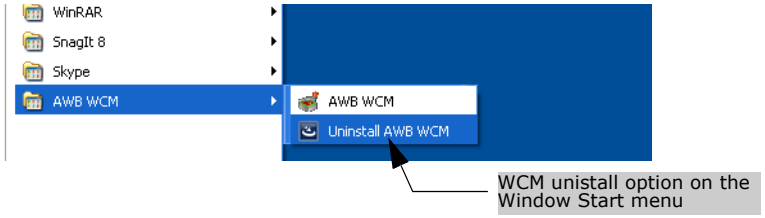
UNINSTALLING THE WCM SOFTWARE

If you are having problems with the WiMAX USB Adapter or the WCM software, you may need to uninstall the USB adapter driver and software from the Windows system.

Follow these steps:

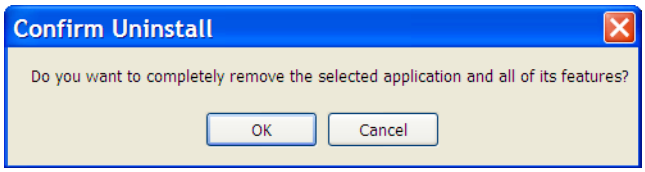
1. From the Windows Start menu, go to the WCM software entry.
2. Click the Uninstall WCM option on the menu.

Figure 39: Uninstall WCM



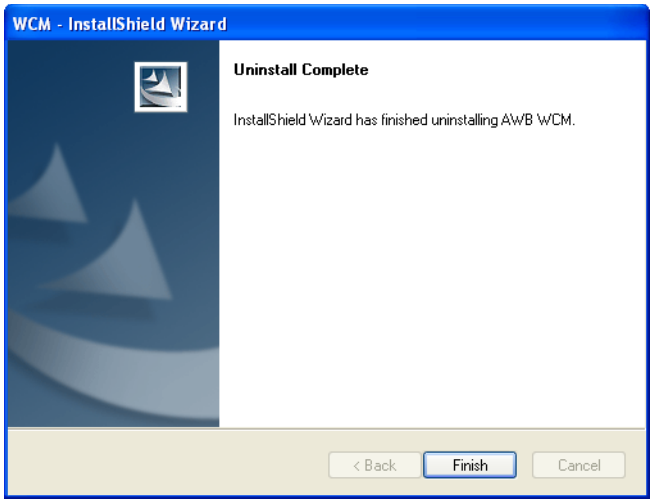
3. Click the OK button to confirm the uninstall process.

Figure 40: Confirm Uninstall



4. When the uninstall is complete, click Finish to exit.

Figure 41: Uninstall Complete



B SPECIFICATIONS

HOST INTERFACE USB 2.0 specification

STANDARD COMPLIANT IEEE 802.16e-2005 Wave 2

AIR INTERFACE Scaleable OFDMA

DUPLEX MODE TDD/5ms frame

ANTENNA iMAT
Transmit: Single antenna
Receive: Two antennas using Maximal-Ratio Combining (MRC)
Gain: 2 dBi
Pattern: Omnidirectional
Impedance: 50 Ohm

POWER CONSUMPTION 2.4 W maximum

PHYSICAL SIZE 25 x 89 x 16 mm (0.98 x 3.50 x 0.62 in.)

WEIGHT 23 g (0.81 oz)

OPERATING FREQUENCY

Frequency Band	CE	FCC	NCC
2.3G		2305-2320 2345-2360	
2.5G	2500-2690	2496-2690	2500-2690
3.5G	3400-3600	3650-3700	

BANDWIDTH ALLOCATION

	2.3G	2.5G	3.5G
Bandwidth Allocation	8.75 MHz	5 MHz 10 MHz	5 MHz 7 MHz 10 MHz

3.5 GHZ MODEL: 5,7, AND 10 MHZ MODULATION SCHEME

PRBS subcarrier randomization
Contains pilot, preamble, and ranging modulation

MODULATION AND CODING TYPES

Down Link
QPSK 1/2 CTC
QPSK 3/4 CTC
16 QAM 1/2 CTC
16 QAM 3/4 CTC
64 QAM 1/2 CTC
64 QAM 2/3 CTC
64 QAM 3/4 CTC
64 QAM 5/6 CTC
Up Link
QPSK 1/2 CTC
QPSK 3/4 CTC
16 QAM 1/2 CTC
16 QAM 3/4 CTC

MAXIMUM THROUGHPUT

Downlink Peak Rate: > 20 Mbps
Uplink Peak Rate: > 7 Mbps

TRANSMIT POWER

Maximum Power class less than +23 dBm

RECEIVE SENSITIVITY

QPSK 1/2 CTC: -94 dBm
16-QAM 3/4 CTC: -85 dBm
64-QAM 3/4 CTC: -75 dBm

SECURITY/ENCRYPTION

PKMv2 with 128 bit AES/CCM, EAP-TLS, EAP-TTLS

QOS MECHANISM

Dynamic Service Flow Creation, Change, Deletion
Scheduling: UGS, RT-VR, NRT-VR, ERT-VR and BE

OPERATING TEMPERATURE

Operating: 0 °C to 40 °C (32 to 113 °F)

HUMIDITY

Operation: 10% to 90% (non-condensing)
Maximum Storage: 90%

EMMISSIONS COMPLIANCE

FCC 47 CFR Part 15 Class B
EN 55022 class B
EN 301 489-1/-4

SAFETY

EN60950-1
CNS14336

RADIO SIGNAL CERTIFICATION

US: 2.3 GHz - CFR 47 Part 27D; 2.5 GHz - CFR 47 Part 27M
Europe (3.5GHz): EN 302 326-1/-2/-3

SPECIFIC ABSORPTION RATE (SAR)

US: Part 2.1093
Europe: EN62311

SOFTWARE DRIVERS

Windows XP SP2,Windows Vista and Windows 7
NDIS 5.0 PnP ETH 802.3 device driver specification
WHQL certified

LED	Status	Description
Power	On Blue	The USB adapter is correctly installed in a USB port and is receiving power.
Link/Activity	On Green	The USB adapter is searching for a WiMAX base station.
	On Orange	The USB adapter has an established link with a base station and is transmitting or receiving data.

GLOSSARY

AUTHENTICATION The process to verify the identity of a subscriber requesting network access.

BANDWIDTH The difference between the highest and lowest frequencies available for network signals. Also synonymous with network speed, the actual speed of data transmission through a medium.

BASE STATION A WIMAX service provider's equipment that is installed at a fixed location to provide network connectivity for subscriber stations within a defined service area.

CINR Carrier-to-Interference-Plus-Noise-Ration: A measurement of the channel quality in a WiMAX link. Subscriber stations measure the received CINR and send the information back to the base station. The base station can then adjust modulation and coding for the link to optimize throughput.

CENTER FREQUENCY The radio frequency at the center of a WiMAX channel. WiMAX channels can be of different widths (the channel bandwidth) and the transmitted radio signal is spread across the full width of the channel.

CHANNEL BANDWIDTH The range of frequencies occupied by a WiMAX radio signal. The amount of information that can be transmitted in a radio signal is related to the channel bandwidth, which is measured in Megahertz (MHz). WiMAX supports a range of channel bandwidths that can be defined by the service operator depending on performance requirements, operating preferences, and regulatory constraints.

CPE Customer-Premises Equipment: Terminal equipment provided by a service provider that is located at a subscriber's premises and supports a communication channel between a customer and the service provider.

CPU Central Processing Unit: The CPU, or processor, is the part of a computer where most calculations take place. In most of today's PCs, the CPU is contained on a single chip. The type and speed (in GHz) of a CPU largely defines the processing power of a computer.

DNS Domain Name System: A system used for translating host names for network nodes into IP addresses.

DHCP Dynamic Host Configuration Protocol: Provides a framework for passing configuration information to hosts on a TCP/IP network. DHCP is based on the Bootstrap Protocol (BOOTP), adding the capability of automatic allocation of reusable network addresses and additional configuration options.

ENCRYPTION Data passing between a base station and subscribers uses encryption to protect from interception and evesdropping.

EAP Extensible Authentication Protocol: An authentication protocol used to authenticate subscribers. EAP is used with TLS or TTLS authentication to provide "mutual authentication" between a subscriber and a WiMAX network.

IEEE 802.16E The WiMAX standard that provides mobile broadband wireless access using Scalable Orthogonal Frequency Division Multiple Access (SOFDMA).

INTERNET SERVICE PROVIDER A company that offers an access service that connects customers to the Internet.

IP ADDRESS The Internet Protocol (IP) address is a numerical identification assigned to a device that communicates in a network using the Internet Protocol.

LED Light Emitting Diode: Used for indicating a device or network condition.

LAN Local Area Network: A group of interconnected computers and support devices.

MAC ADDRESS The physical layer address used to uniquely identify network nodes.

MS-CHAPV2 Microsoft's version 2 of the Challenge-Handshake Authentication Protocol. Introduced by Microsoft with Windows 2000, MS-CHAPV2 (defined in RFC 2759) provides mutual authentication between peers using user names and passwords.

NETWORK ADAPTER A hardware device that enables a computer to communicate over a network. The adapter provides physical access to a particular networking medium.

RAM Random Access Memory: The memory in a computer where the operating system, application programs, and other data currently in use are stored. RAM is volatile memory where data is lost when the computer is turned off. Having more RAM in a computer reduces the time the processor takes to read data, which increases overall computer performance.

RSSI Receive Signal Strength Indicator: A measurement of the strength of a received wireless signal. The higher the RSSI value, the stronger the received signal from the antenna.

ROAMING The process where a WiMAX subscriber can move onto another operator's network while maintaining a continuous connection.

RSSI See *Receive Signal Strength Indicator*.

SOFDMA Scalable Orthogonal Frequency Division Multiple Access: The air interface defined for mobile WiMAX. SOFDMA is a multiple access method that allows simultaneous transmissions to and from several users, employing a subchannel structure that scales with bandwidth.

SERVICE PROVIDER See *Internet Service Provider*.

SIM Subscriber Identity Module: A standard for a small removable integrated circuit card that securely stores information used to identify a mobile wireless subscriber.

SUBSCRIBER STATION A general term for a customer's terminal equipment that provides connectivity with a WIMAX network.

TCP/IP Transmission Control Protocol/Internet Protocol: Protocol suite that includes TCP as the primary transport protocol, and IP as the network layer protocol.

TLS Transport Layer Security: An standard defined in RFC 5216, EAP-TLS is an authentication protocol that provides strong security through the use of client-side certificates.

TTLS Tunneled Transport Layer Security: EAP-TTLS is a protocol extension of EAP-TLS. The authentication server is authenticated to the client using its Certification Authority certificate, this establishes a secure "tunnel" through which the client is then authenticated.

USIM Universal Subscriber Identity Module: See *Subscriber Identity Module*.

URL Uniform Resource Locator: An easy-to-read character string that is used to represent a resource available on the Internet. For example, "http://www.url-example.com/."

WiMAX The IEEE 802.16 standard for Worldwide Interoperability for Microwave Access. The IEEE 802.16-2004 standard, known as "fixed WiMAX," supports only point-to-point links and has no support for mobility. The IEEE 802.16e-2005 standard, known as "mobile WiMAX," is an amendment to IEEE 802.16-2004 and supports mobility. Note that mobile WiMAX standard is not backward compatible with the fixed WiMAX standard.

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