

Figure 3-20. Sounds for Events

Software Upgrade

The About page displays information about the software version the WCM utility.

The About WCM screen and Check for Update option is also available from the Help menu.



Figure 3-21. About WCM Information

Click the Upgrade button to check for available WCM software updates. A pop-up window indicates if a new version of software is available. Click the Download button download the software file, then click the Install button to upgrade the WCM utility.

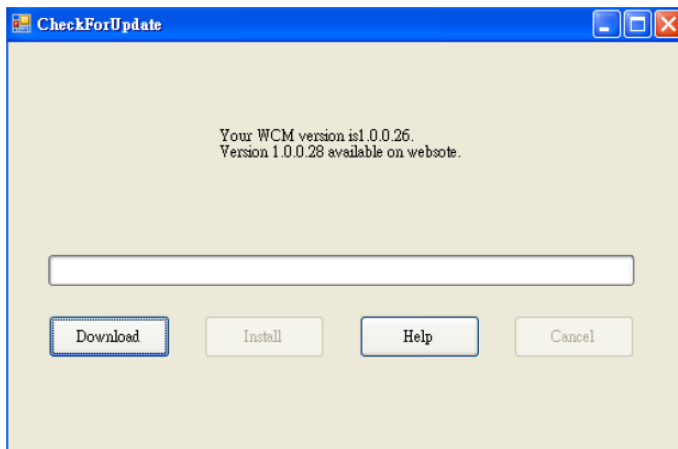


Figure 3-22. Upgrade File Download

Configuration

Chapter 4: Administrator Mode

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

Note: 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).

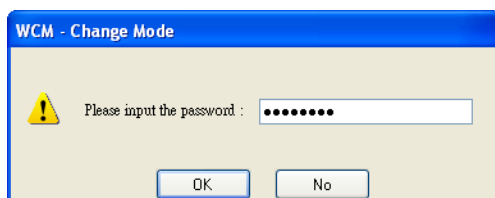


Figure 4-1. WCM Change Mode

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 4-2. 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.”

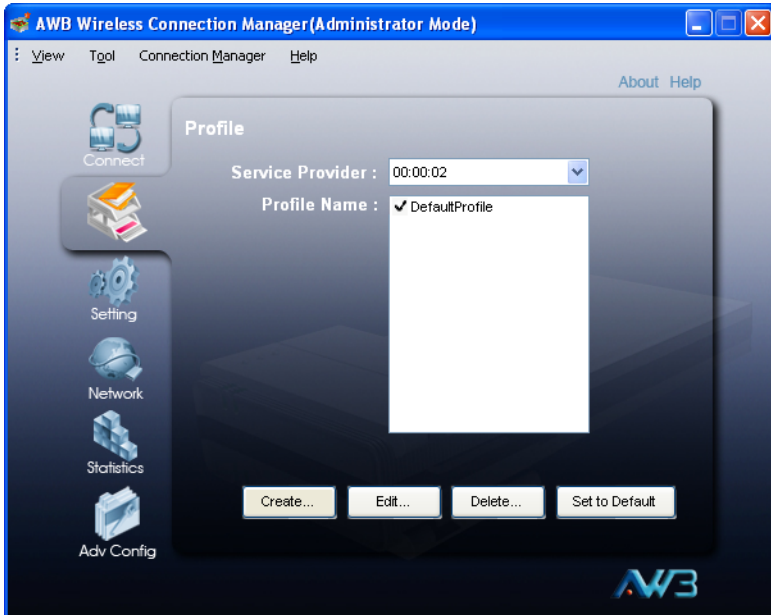


Figure 4-3. Setting Profiles

Adding a New Profile

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

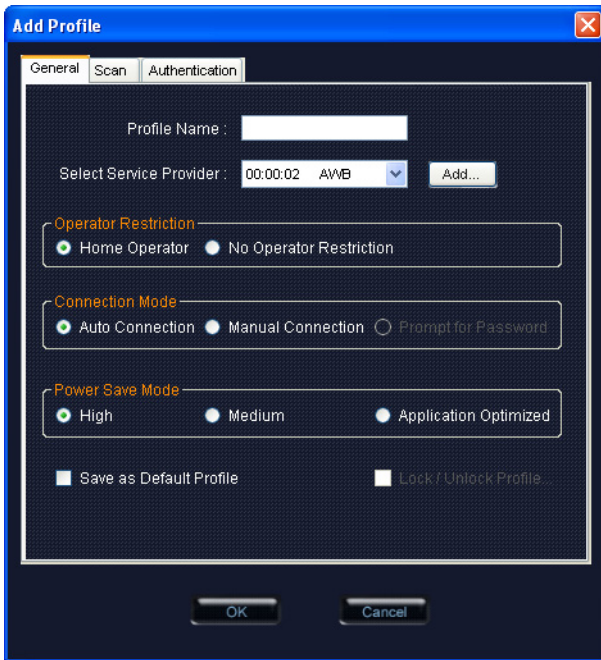


Figure 4-4. Add Profile Screen - General Tab

The General tab on this screen displays the following items:

Profile Name — A name used to identify the new profile (up to 20 characters; the characters \|\|'?"@#\$\$%^&*()<>., are not permitted).

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.

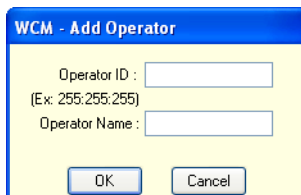


Figure 4-5. Add Operator

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.

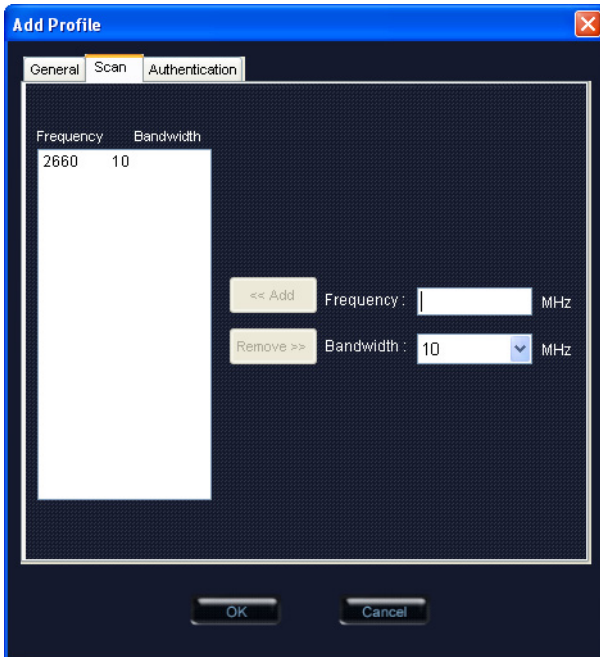


Figure 4-6. Add Profile Screen - Scan Tab

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.

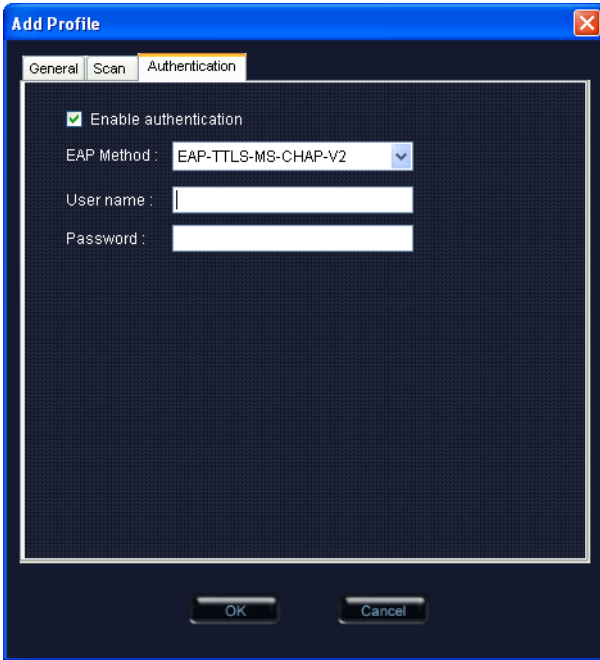


Figure 4-7. Add Profile Screen - TTLS Authentication

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; \|"'?@#\$\$%^&*();;<>.,)
 - **User name:** A text string used by the authentication server to identify the user.
 - **Password:** A password used by the authentication server to protect identity.

- **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.
- **MAC Address @ domain:** An identity that is used to authenticate the WiMAX subscriber device itself. It consists of the MAC address of the PC200 specified in the format xx:xx:xx:xx:xx:xx @ the domain URL of the service provider. For example; 1f:20:30:10:4d:50@service-telecom.

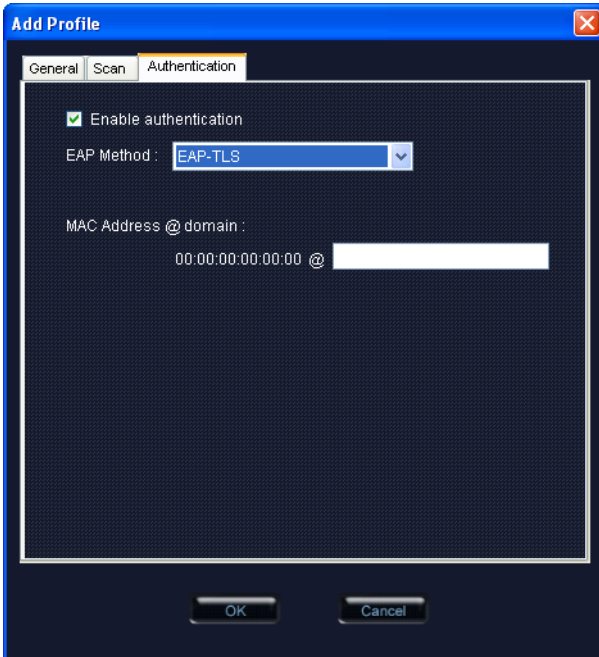


Figure 4-8. Add Profile Screen - TLS Authentication

Advanced Configuration

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



Figure 4-9. 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 card. 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.

Appendix A: Troubleshooting

Diagnosing LED Indicators

Troubleshooting Chart		
LED Status	Probable Cause	Action
Green LED is Off	The CardBus card is not receiving power	<ul style="list-style-type: none">• Remove the CardBus card and reinsert it in the slot. Be sure the card is securely seated in the slot.• Try the card in another CardBus slot. If this also fails, test your PC with another card that is known to operate correctly.• Check the CardBus card and slot connectors for any physical damage.• Try the card in another PC's slot that is known to operate correctly.• If you cannot resolve the problem, contact your local dealer for assistance.
Red LED is Off	The CardBus card cannot detect a WiMAX network	<ul style="list-style-type: none">• 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 logs in the Debug Monitor (see "Card Settings" on page 3-9) and contact your service provider.

Uninstalling the WCM Software

If you are having problems with the WiMAX CardBus Card or the WCM software, you may need to uninstall the card driver and software from the Windows system.

Follow these steps:

1. From the Windows Start menu, go to the Windows Control Panel and click on “Add or Remove Programs.”
2. Find the WCM entry in the list and click the Change/Remove button.

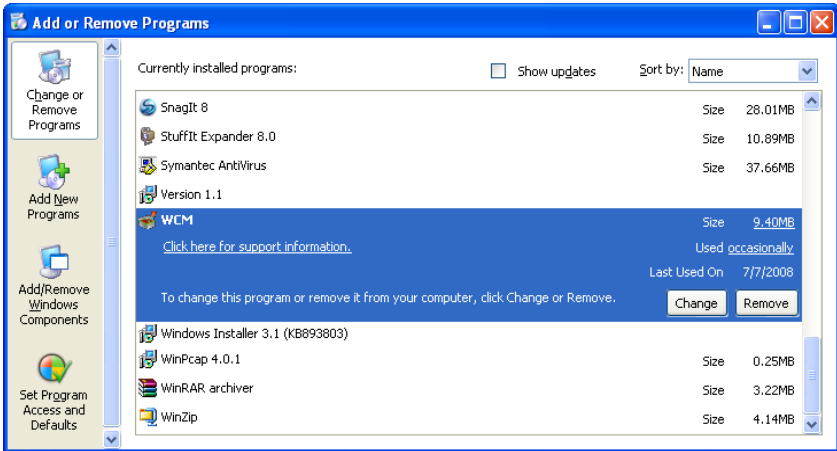


Figure A-1. WCM Entry in Add or Remove Programs

3. Select "Remove," then click the Next button to start the uninstall process.

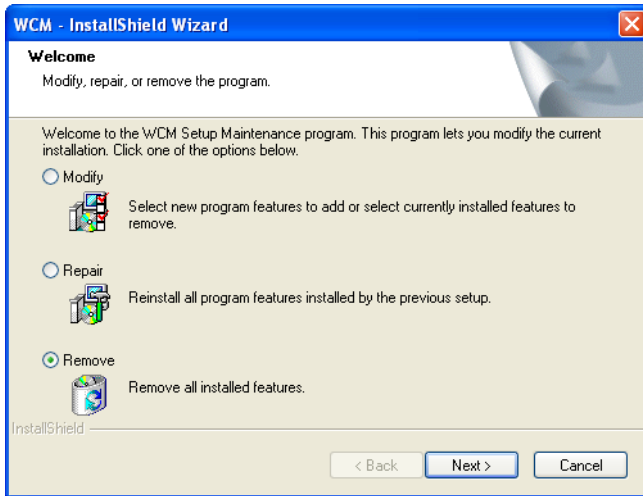


Figure A-2. InstallShield Wizard

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

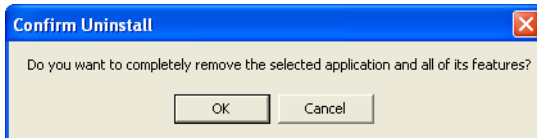


Figure A-3. Confirm Uninstall

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

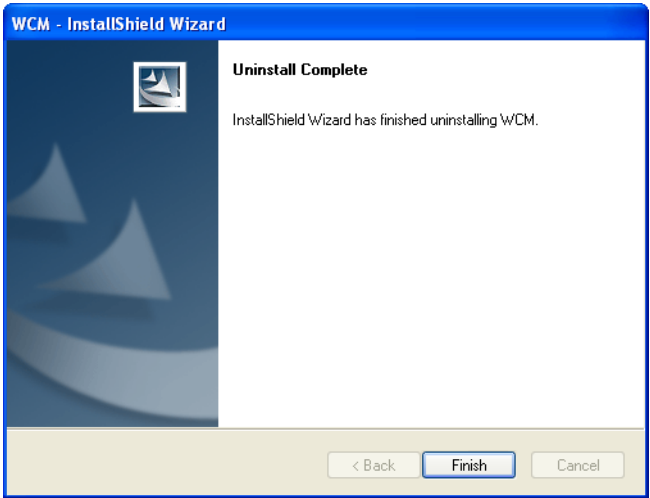


Figure A-4. Uninstall Complete

Appendix B: Specifications

Host Interface

CardBus, 33 MHz, 32-bit interface, 3.3 volt

Antennas

Built-in dual dipole antennas

Transmit: Single antenna

Receive: Two antennas using Maximal-Ratio Combining (MRC)

Gain: 2 dBi

Pattern: Omnidirectional

Impedance: 50 Ohm

LED Indicators

Power, Link

Power Consumption

2.25 W maximum

Physical Size

132 x 57.5 x 13.1 mm (5.2 x 2.26 x 0.52 in.)

Weight

38 g (1.34 oz)

Operating Frequency

FCC-2.3: 2305-2320 MHz, 2345-2360 MHz

FCC-2.5: 2496-2690 MHz

Taiwan NCC: 2500-2690 MHz

Support for Full Scan and Partial Scan

Bandwidth Allocation

5, 7, 8.75, or 10 MHz depending on model (software configurable)

2.3 GHz Model: 8.75 MHz

2.5 GHz Model: 5 and 10 MHz

3.5 GHz Model: 5, 7, and 10 MHz

OFDMA Modulation

Scaleable OFDMA employing Time-Division Duplex (TDD) mechanism

Deploys both distributed and adjacent subcarrier permutation scheme

Fast Fourier Transform (FFT) Size: 512 and 1024 points (depending on bandwidth)

Modulation Scheme

PRBS subcarrier randomization

Contains pilot, preamble, and ranging modulation

Modulation and Coding Types

Down Link

QPSK 1/2 CTC & CC

QPSK 3/4 CTC & CC

16 QAM 1/2 CTC & CC

Specifications

16 QAM 3/4 CTC & CC
64 QAM 1/2 CTC & CC
64 QAM 2/3 CTC & CC
64 QAM 3/4 CTC & CC
64 QAM 5/6 CTC & CC

Up Link

QPSK 1/2 CTC & CC
QPSK 3/4 CTC & CC
16 QAM 1/2 CTC & CC
16 QAM 3/4 CTC & CC

Maximum Throughput (64 byte package, 10 MHz bandwidth)

Up link: > 7 Mbps

Down link: > 20 Mbps

Transmit Power Level

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

Temperature

Operating: -5 to 45 °C (23 to 113 °F)

Storage: -40 to 70 °C (-40 to 158 °F)

Humidity

20% to 85% (non-condensing)

Emissions Compliance

CFR 47 Part 15 Class B

EN 55022 class B

EN 301 489-1/-17

Radio Signal Certification

US: 2.3 GHz - CFR 47 Part 27D; 2.5 GHz - CFR 47 Part 27M

Europe (3.5 GHz): Draft EN 302 544 (not published)

Specific Absorption Rate (SAR)

US: Part2.1093

Europe: EN 50392

Safety

US/C TUV+TUV/SUD

TUV/SUD CB Report+LVD

Standards

IEEE 802.16e-2005 Wave 2

Software Drivers

Windows XP SP2 and Windows Vista

NDIS 5.0 PnP ETH 802.3 device driver specification

WHQL certified

Specifications

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.

CardBus

A 32-bit, 33 MHz PCI bus in the PC Card (originally Personal Computer Memory Card International Association, or PCMCIA Card) form factor. Most recent notebook PCs include slots that are compatible with both CardBus and the original 16-bit PC Card standards.

Carrier-to-Interference-Plus-Noise Ratio (CINR)

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.

Domain Name System (DNS)

A system used for translating host names for network nodes into IP addresses.

Dynamic Host Configuration Protocol (DHCP)

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 eavesdropping.

Extensible Authentication Protocol (EAP)

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.

Local Area Network (LAN)

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.

PC Card

A standard form factor and peripheral interface designed for notebook PCs. Originally Personal Computer Memory Card International Association (PCMCIA), the term PC Card is used for all devices compatible with PCMCIA 2.0 to PCMCIA 5.0 (CardBus) or later.

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.

Receive Signal Strength Indicator (RSSI)

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*.

Scalable Orthogonal Frequency Division Multiple Access (SOFDMA)

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*.

Subscriber Identity Module (SIM)

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.

Transmission Control Protocol/Internet Protocol (TCP/IP)

Protocol suite that includes TCP as the primary transport protocol, and IP as the network layer protocol.

Transport Layer Security (TLS)

An standard defined in RFC 5246, EAP-TLS is an authentication protocol that provides strong security through the use of client-side certificates.

Tunneled Transport Layer Security (TTLS)

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.

Universal Subscriber Identity Module (USIM)

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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