WiMAX 2.5GHz Outdoor Mobile CPE (XS-615-25X-XXX)

User Manual

Version 1.5

Nov. 18 , 2008

Microelectronics Technology Inc. Proprietary

WiMAX 2.5GHz Outdoor Mobile CPE User Manual

Doc No.	56-601-0068

Previous History

Revision	Date of Issue	Scope	Author
1.0	Aug.-15-2008	First draft	Ryan K./ Eric H..
1.1	Aug.-20-2008	Modify frequency and channel BW for CE requirements	Patty H.
1.2	Aug.-26-2008	Add File upload and CA certification file upload procedure	Chiyung L.
1.3	Oct -03-2008	Add LED description, Pull-down Box, MAC Address Cloning, Logout	Eric H.
1.4	Oct -06-2008	Modify the model number for both XS-615-25S-XXX and XS-615-25M-XXX	Patty H.
1.5	Nov -18-2008	Remove outlook difference between XS-615-25S-XXX and XS-615-25M-XXX	Patty H.

Preface

The XS-615-25X-XXX, where -XXX is defined as -: "-" or blank and XXX: alphanumbers or blank, and we call it XS-615-25X-XXX here for short, WiMAX 2.5GHz Outdoor Mobile CPE, proudly announced by Microelectronics Technology Inc., is suitable to install in both residential and commercial properties for WiMAX System operation. With the advantages of high performances and low cost, it operates on WiMAX 2.5 GHz band, offering a perfect wireless solution to extend the internet access coverage.

To meet the stringent outdoor application, the XS-615-25X-XXX incorporates a patterned technology to ensure the operation of the radio over the wide temperature. The build-in lightning protectors further ensure the radio and its accessories safety during the operation.

The document is for your information to know more detail about XS-615-25X-XXX outdoor CPE. We will introduce the hardware part and the software configuration. This manual is intended for those people who will operate the XS-615-25X-XXX, WiMAX 2.5GHz Outdoor Mobile CPE.

Table of Contents

Table of Figures

Manual Conventions

Bold	Bold type within paragraph text indicates commands, file names, directory names, paths, output, or returned values.
Italic	Within commands, italics indicate a variable that the user must specify. Titles of manuals or other published documents are also set in italics.
Courier	The courier font indicates output or display.
[]	Within commands, items enclosed in square brackets are optional parameters or values that the user can choose to specify or omit.
{}	Within commands, item enclosed in braces are options from which the user must choose.
		Within commands, the vertical bar separates options.
…	An ellipsis indicates a repetition of preceding parameter.
>	The right angle bracket separates successive menu selection.

NOTE: This message denotes neutral or positive information that calls out important points to the text.   A note provides information that applies only in special cases.

Caution: Cautions call special attention to hazards that can cause system damage or data corruption, to a lesser degree than warnings.

Warnings: Warnings call special attention to hazards that can cause system damage, data corruption, personal injury, or death.

Disclaimer

The MTI WiMAX 2.5GHz Outdoor Mobile CPE (XS-615-25X-XXX) User Manual

Document No.: 56-601-0068 (REV: 1.5), Nov. 18, 2008.

COPYRIGHT © 2008 Microelectronics Technology Inc.

ALL RIGHTS RESERVED

Any part of this publication could not be copied, stored in a retrieval system, or translated into any language or computer language in any form or any means, electronic, magnetic, chemical, manual or otherwise, without the prior written permission of Microelectronics Technology Inc. (MTI). No.1, Innovation RD II, Hsin-Chu Science-Based Industrial Park, Hsin-Chu 300, Taiwan, R.O.C..

Printed in Taiwan

The instructions in this manual have been carefully checked for accuracy and are presumed to be reliable. The accuracy and adequacy of this document are the responsibilities of Microelectronics Technology Inc. Please give us any comments or corrections to Microelectronics Technology Inc.

Product appearance and specifications are subject to change without prior notice.

1 Introduction

WiMAX technology is the ideal solution for last-mile broadband wireless access extending high-speed network connectivity at low installation and operating costs. It is intended to provide total freedom to people who are fixed, nomadic, or highly mobile, allowing them to stay connected with voice, data and video services. By using WiMAX, people could go from their houses to their cars, and then travel to their offices or somewhere else seamlessly.

MTI's WiMAX Outdoor CPE, XS-615-25X-XXX, complies with IEEE Standard 802.16e-2005, state of the art Scalable OFDMA based technology. It operates on 2.5 GHz ~ 2.69 GHz frequency range, and supports different channel bandwidths. The modulation schemes support QPSK, 16QAM, and 64QAM on both uplink and downlink. This WiMAX Outdoor CPE is designed with weather proof function and lightning protectors for operation in harshest outdoor environments. In addition, it provides a user-friendly Web browser for user setup and information sharing.

Figure 1 provides an example of the usage of the WiMAX Outdoor CPE (XS-615-25X-XXX). Connecting Wi-Fi AP or VoIP Switch to the WiMAX Outdoor CPE, it is convenient to allow networked devices to share a high-speed internet connection.
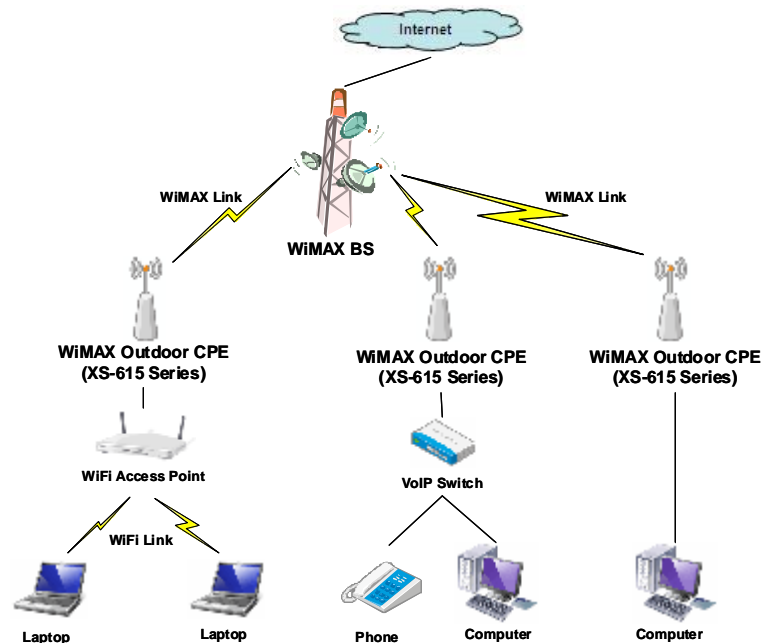
Figure 1   Example for usage of WiMAX outdoor CPE

MICROELECTRONICS TECHNOLOGY INC.

2 Hardware Features

2.1   Product and Accessories

- XS-615-25X-XXX Outdoor CPE x 1

- 2 meters RJ-45 Shield Cable x 1

- AC/DC PoE Adapter x 1

- Power cord x 1

- CD (User manual & Installation guide) x 1

- Installation kits x 1 set

2.2　Outlook and Interface

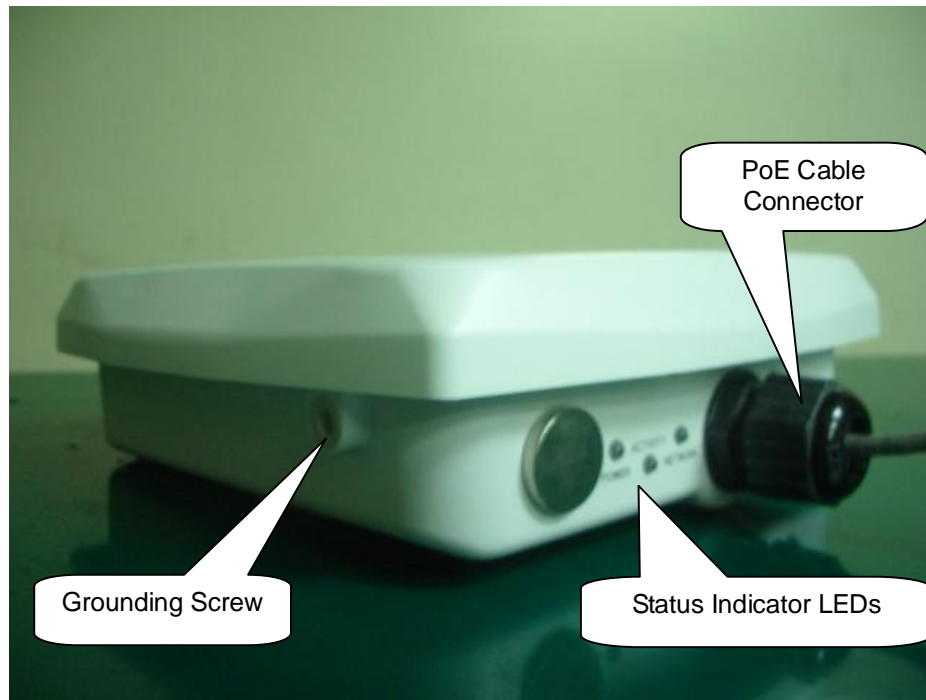### 2.2.1　Power over Ethernet (PoE) Cable Connector

Figure 2　PoE Cable Connector, Grounding Screw, Status Indicator LEDs

2.2.2　Status Indicator LEDs

LED	" ON "	" OFF "
Power	DC power supply connected successfully	DC power supply disconnected
Activity	WiMAX radio link connected successfully	WiMAX radio link disconnected
Network	User network device connected successfully	User network device disconnected

2.2.3 Grounding Screw

    u   For grounding strip connection.

    u   Proper grounding is always for the safety consideration.

Note: Please refer to installation guide for the further setup information.

2.2.4 Ethernet Cable Connection

(1) Crossover Ethernet cable connects to Input port and link to host PC.
(2) Straight Ethernet cable connects to Input port and link to LAN Device (ex. Switch or Hub)
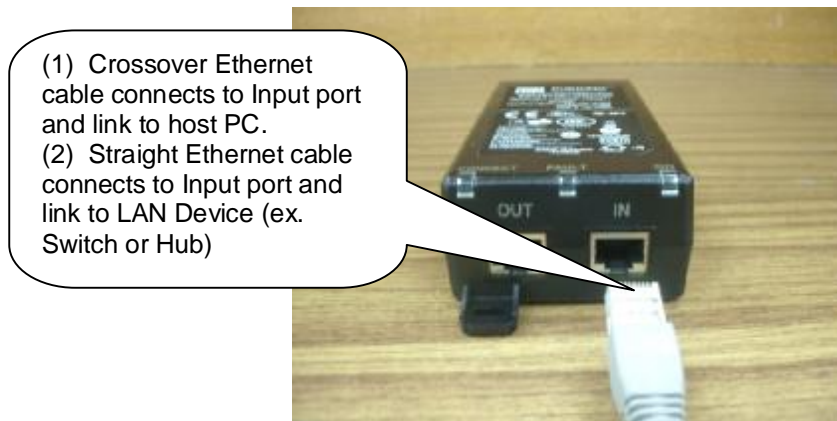
Figure 3   Ethernet Cable Connection to Host PC

PoE Ethernet Cable connect to Output port and link to XS-615-25X-XXX
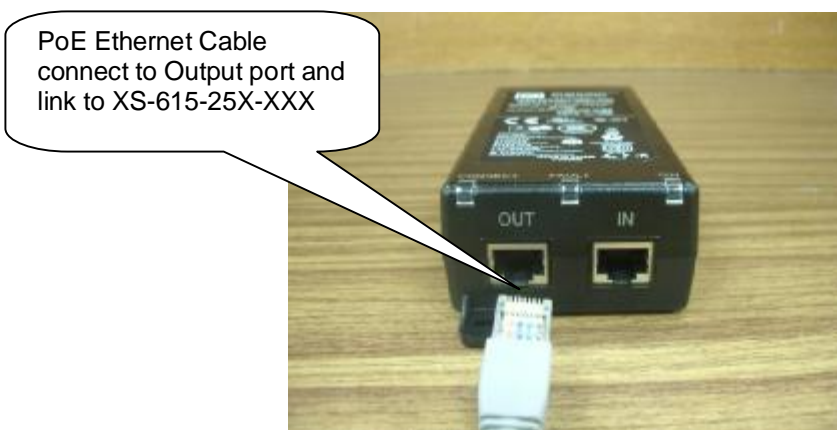
Figure 4   Ethernet Cable Connection to XS-615-25X-XXX

MICROELECTRONICS TECHNOLOGY INC.

2.2.5   Power Cord Connection

Figure 5   Power Cord Connection to PoE

MICROELECTRONICS TECHNOLOGY INC.

2.3   Warranty Limitation

MTI will not provide the warranty if the unit is operated out of the following conditions.

- ☐ **Temperature --** The outdoor CPE is tested for normal operation in the ambient temperatures from -40°C to 60°C. Operating in temperatures outside of this range may cause the unit to fail.

- ☐ **Lightning** -- The outdoor CPE includes its own built-in lightning protection. However, you should make sure that the unit, any supporting structure, and cables are all properly grounded. Additional protection using lightning rods, lightning arrestors, or surge suppressors may also be employed.

- ☐ **Rain** -- The outdoor CPE is weatherproofed against rain and prolonged heavy rain has no significant effect on the radio signal. You may need to use the sealing tape around the Ethernet port connector for extra protection. If moisture enters the connector, it may cause degradation in performance or even a complete failure of the link.

Under normal use condition, it should be at least 25 cm away from the body of the user.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

3 Software Feature

To configure and review status of CPE, please types CPE IP address 192.168.0.100 (default) at URL in web browser. A greeting page will be shown as Figure 6.

Figure 6   Greeting Page

3.1   Login

Click Login at greeting page, then username and password will be asked, shown as Figure 7.
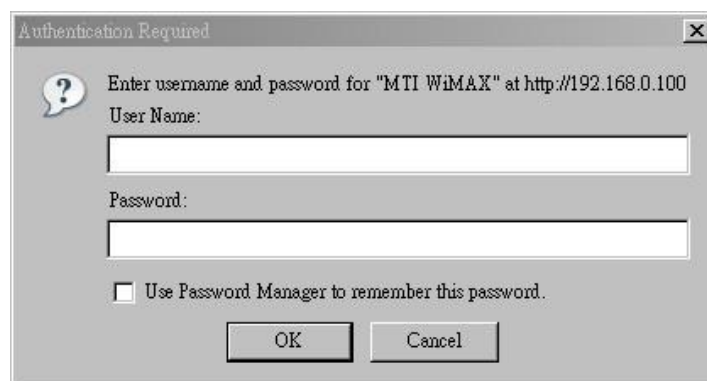
Figure 7   Login

Please type in username and password as following.

- u **Username**: Admin

- u **Password**: 5up

3.2 System Information

System information could be got by clicking "System Information" at left menu, shown as Figure 8.

Figure 8   System Information

- u **Alternative Software**: for BS software selection, please click "SUBMIT" button for activation. CPE uses the alternative image in next boot.

3.3 Subscriber Capability

By clicking "Subscriber Capability" at left menu, subscriber capability information will be shown as Figure 9, including supported capabilities and configured capabilities information.

Figure 9   Subscriber Capability

3.4 Network Setting

To configure network, click "Network Setting" at left menu, configuration will be shown as Figure 10. The network configuration will be effective after reboot CPE.

Figure 10   Network Setting

- ∪ **IP Address**: Local CPE IP address; default IP address is 192.168.0.100

- ∪ **Subnet Mask**: Network subnet mask; default subnet mask is 255.255.255.0

- ∪ **Default Gateway**: Default gateway setting

- ∪ **SUBMIT**: After modification, please click this button for activation

3.5   WiMax Setting

Click "WiMax Setting" at left frame, you can setup MAC address and FFT size, shown as Figure 11.

Figure 11   WiMax Setting

MAC Address Clone provides three options: Disabled (default), Manual and Clone.

ц   **Disable:** Default WiMAX 16e MAC address (on label) will be used without replacement MAC address.

ц   **Manual:** User must provide a MAC address (ex. PC, Access Point, etc…) for connection with BS, CPE uses this MAC address instead of default WiMAX 16e MAC address.

ᴜ Clone:

l   When CPE finds that the link status of <u>Ethernet</u> port is down and up, it will start scanning.

l   CPE scans <u>Ethernet</u> port. Once CPE detects the source MAC address of <u>Ethernet</u> header is not equal to the current WiMAX 16e MAC address, it will capture this MAC address to replace current one.

l   If the captured MAC address is not equal to current one, CPE is going to reboot. After reboot, it will use the captured MAC address instead of current WiMAX 16e MAC address.

l   See Figure 12 for detail information
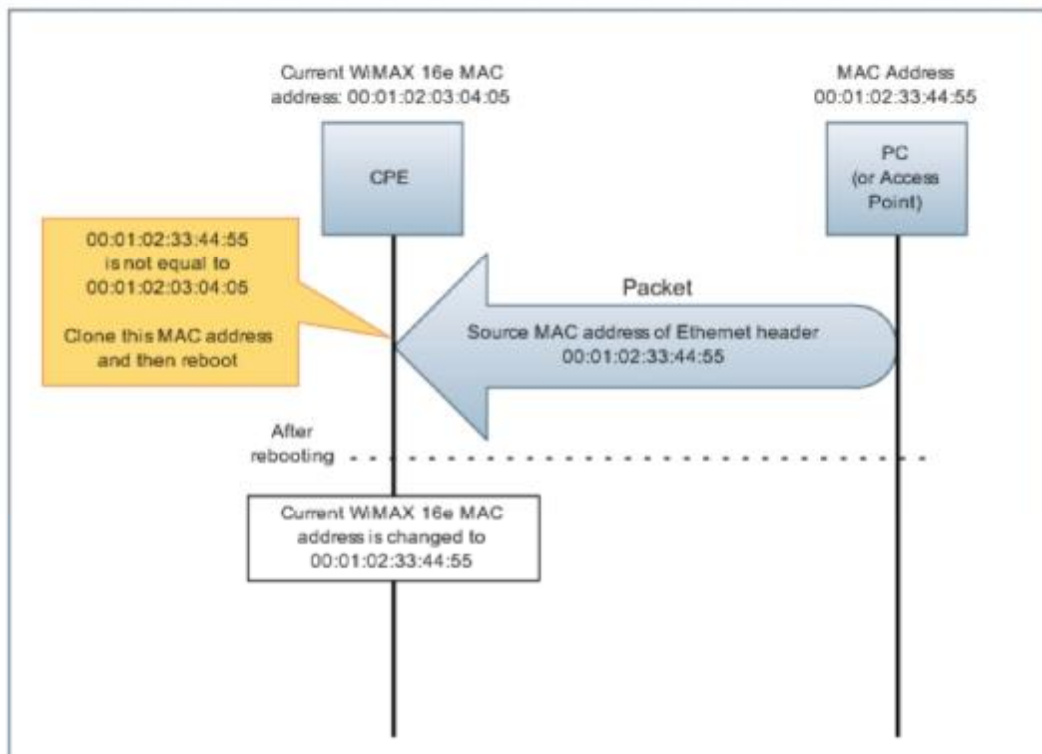
Figure 12   MAC Address Clone

3.6 Channel Setting

To setup WiMax Channel setup, please click "Channel Setting" at left menu, as Figure 13.
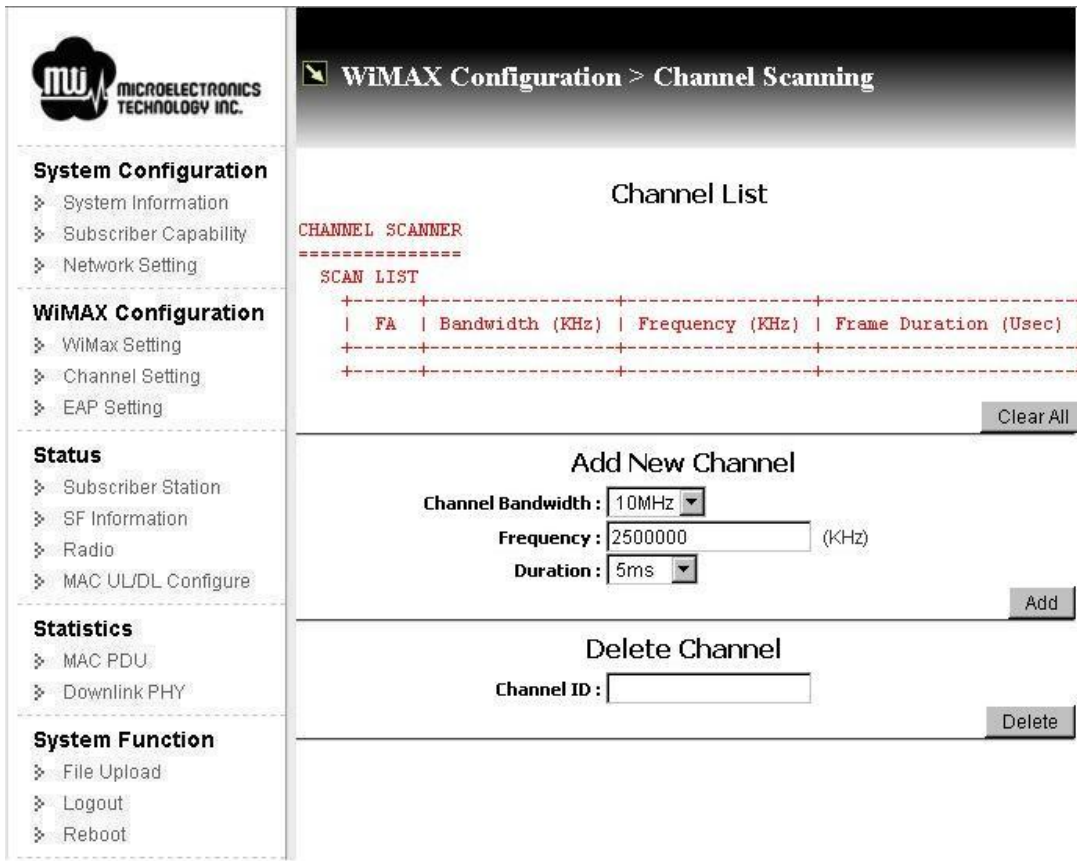
Figure 13   Channel Setting

⚠ **Before channel modification (add or delete channels), to stop connection between CPE and BS is necessary. Please refer to** stop/start **on Chapter 3.8** Subscriber Station **for further information.**

ᵤ   **Channel List**

l   **Channel Scanner**: All setting channel information will be display here, including bandwidth (KHz), Frequency (KHz), and frame duration (ms)

l   **Clear All**: Click this button to delete all channels.

u   **Add New Channel**

     l   **Channel Bandwidth**: Currently, channel bandwidth only supports 5MHz and 10MHz.

     l   **Frequency**: Supporting frequency range is from 2500000 KHz to 2690000 KHz, the unit for this field is "<u>KHz</u>". For example, if desired frequency is 2.5GHz, then enter "2500000" in this field.

     l   **Duration**: Duration supports 5msec.

     l   **Add**: Click this button for adding new channel for your configuration.

⚠️ *After you add new channels, you have to establish connection between CPE and BS to make new channel work. Please refer to stop/start on chapter 3.8 Subscriber Station for detail information.*

u   **Delete Channel**

     l   **Channel ID**: Channel ID could be found at FA field in Scan List Table.

     l   **Delete**: Click this button to delete channel.

3.7 EAP Setting

By clicking "EAP Setting" at left menu, setup Extensible Authentication Protocol (EAP), shown as Figure 14.

Figure 14   EAP Setting

ᴜ **PKM (Privacy and Key Management)**: Select "v2 (EAP)" to enable PKM, or select "None" to disable PKM. Once PKM is disabled, then all the following items will be disabled too.

ᴜ **EAP Method**: Supports TTLS

ᴜ **Outer Identity**: Enter outer identity. Max length for Identity is 200 characters and for Realm is 48 charcters.

u **Inner EAP**: Support MS CHAP V2 and CHAP.

u **User ID**: Subscriber user ID. Max length is 200 characters.

u **User Password**: Subscriber password. Max length is 200 characters.

u **CA File Name**: Certification File Name. MAX length is 20 characters.

u **Use Certificate File**: If you would like to perform EAP procedure with CA file, check this option.

u **Submit**: click this button for activation.

3.8   Subscriber Station

Click "Subscriber Station" to view subscriber station information, and stop / start connection with BS, shown as Figure 15.

Figure 15   Subscriber Information

ч   **Identity**

    l   **State**: Current connecting state between CPE and BS.

    l   **BS ID**: MAC address of connected BS.

ꙍ **Downlink**

    l   **Current fec-code**: Current assigned modulation scheme.

ꙍ **Stop / Start**: Click this button to stop or start connection with BS.

3.9   Service Flow (SF) Information

Click "SF Information" at left menu to view service flow information, as Figure 16.

Figure 16   Service Flows Information

3.10 Radio

Click "Radio" at left menu to view radio information, which includes radio frequency receiver and transmitter configuration, shown as Figure 17.

Figure 17   Radio Information

3.11 MAC Uplink / Downlink configuration

By clicking "MAC UL/DL Configure", you can get MAC Uplink and Downlink configuration information, shown as Figure 18.

Figure 18   MAC Uplink / Downlink Configuration

3.12 MAC Packet Data Unit (PDU)

To view MAC Packet Data Unit (PDU), click "MAC PDU" at left menu. You can view MAC packet data unit statistics from here, shown as Figure 19.

Figure 19 MAC Packet Data Unit

3.13 Downlink Physical (PHY)

Click "Downlink PHY" to view downlink physical statistics, as Figure 20.

Figure 20   Downlink Physical Statistics

3.14 File Upload

Figure 21   File Upload

3.14.1   Software Upgrade

System provides the software upgrade function to upgrade software image or BSP via FTP. The software upgrade feature could be seen by clicking "File Upload" at left menu. The upgrade procedure is as below.

ᴜ   Put the new software image or files on the FTP directory. The software is provided from the CPE vendor.

ᴜ   Click "File Upload" at left menu, and change Host IP Address, Host Username and Host Password based on your FTP Server setting. MAX length for Username and Host Password are 15 characters.

ս   Press "Execute" to perform upgrading procedure. The progress will take 5 ~ 10 minutes depended on how many files you upgrade.

3.14.2   Upload Certification File

System provides the CA file upload via FTP. This feature could be seen by clicking "File Upload" at left menu. The upgrade procedure is as below.

ս   Put the CA file on the FTP directory.

ս   Click "File Upload" at left menu, and change Host IP Address, Host Username and Host Password based on your FTP Server.

ս   Press "Upload" to perform upload procedure.

ս   Click "EAP Setting" at left menu, and change CA File Name.

3.15 Logout

Click "Logout" in the left menu to logout the web page. After logout, web page is re-directed to home page.

3.16 Reboot

To reboot CPE, please click "Reboot" at left menu.