



ThinkPad Wireless Display Adapter Deployment Guide

Note: Before using this information and the product it supports, read the general information in Appendix A “Notices” on page 15.

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Preface

This deployment guide is intended for IT administrators, or those who are responsible for deploying or managing the ThinkPad® Wireless Display Adapter (hereafter called the wireless display adapter) in their organization. The purpose of this guide is to provide the information required for configuring and managing the wireless display adapter remotely.

Chapter 1. Overview

Note: It is recommended that you read the *ThinkPad Wireless Display Adapter User Guide* first before reading this guide. The most up-to-date *ThinkPad Wireless Display Adapter User Guide* always is available for download at:

<http://www.lenovo.com/support/WDA>

The wireless display adapter is a Miracast-certified device that enables you to connect your notebook computer to a monitor or a projector using wireless connection. The wireless display adapter is also a fourth-generation Intel® Wireless Display (Intel WiDi) enterprise adapter that supports the remote management defined by the Intel Corporation.

Before installing the wireless display adapter, ensure that your notebook computer has one of the following operating systems installed:

- Microsoft® Windows® 7 (32-bit or 64-bit)
- Microsoft Windows 8 (32-bit or 64-bit)
- Microsoft Windows 8.1 (32-bit or 64-bit)

The hardware or software requirements for the wireless display adapter vary by operating system. Before installing the wireless display adapter, ensure that your notebook computer meets the specific hardware or software requirements for the operating system installed.

- **For Windows 7:** Ensure that your notebook computer has one of the following items available:
 - Intel WiDi version 4.2.24 or later
 - Lenovo QuickDisplay (supported only on certain models)
 - A VGA connector
- **For Windows 8:** Ensure that your notebook computer has one of the following items available:
 - Intel WiDi version 4.2.24 or later
 - A VGA connector
- **For Windows 8.1:**
 - If your Windows 8.1 operating system is preinstalled, there is no hardware or software requirements for the use of the wireless display adapter.
 - If the Windows 8.1 operating system is updated from the Windows 8 operating system, you might not be able to use the wireless display adapter. One possible reason is that your notebook computer does not include the Miracast driver. Contact the Lenovo Support to see if the problem can be fixed by installing the Miracast driver onto your notebook computer.

The functionality of wireless connection is affected by the version of the drivers and software. If your notebook computer meets the system requirements, it is important to ensure that the following software or drivers also are up-to-date before using the wireless display adapter:

- Lenovo QuickDisplay
- Intel Graphics Driver
- Intel Wireless Driver
- Intel WiDi software

Note: It is recommended that you update the Basic Input/Output System (BIOS) on your notebook computer to the latest version to avoid any potential issue.

Chapter 2. Configuring the wireless display adapter through your Web browser

You can configure the settings of the wireless display adapter in either of the following modes through your Web browser:

- The ManageAP mode (recommended)
- The Recovery mode (an alternative method in case that you fail to configure settings in ManageAP mode)

The ManageAP mode

To configure the settings of the wireless display adapter in the ManageAP mode, do the following:

1. Connect your notebook computer to the wireless display adapter through Wi-Fi connection. The wireless display adapter is identified with the ManageAP service set identifier (SSID) name displayed at the bottom-right corner on the monitor screen. No password is needed.
2. Open the Web browser and then type 192.168.16.1 into the address bar. The Web page for setting the wireless display adapter is displayed.
3. Type the account name and password, and then click **OK**. By default, both the account name and password are admin.
4. Configure the settings of the wireless display adapter according to your needs.

The Recovery mode

To configure the settings of the wireless display adapter in the Recovery mode, do the following:

1. Press and hold the Mode/WPS button, and then turn on the wireless display adapter. Keep pressing the Mode/WPS button during the boot process until the splash screen is displayed on the monitor.
2. Connect your notebook computer to the wireless display adapter through Wi-Fi connection. You can identify the wireless display adapter by the ManageAP SSID name displayed on the monitor screen. No password is needed.
3. Open the Web browser and then type 192.168.16.1 into the address bar. The Web page for setting the wireless display adapter is displayed.
4. Type the account name and password, and then click **OK**. By default, both the account name and password are admin.
5. Configure the settings of the wireless display adapter according to your needs.

Configuring settings from the management Web page

After the Web page for setting the wireless display adapter is displayed, click the **Basic** tab and perform the following configurations:

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Basic Wireless Firmware

OS Version: 0.0.8a
MAC Address: F8:35:DD:62:C4:CA

Miracast/WiDi Mode: GON
Miracast and DLNA Concurrent: Enabled
Disabled (Turn on HDCP only for HDMI Monitor)

HDCP Version: V2.0
V2.1

Language: English

Default VGA format: 640x480 @ 60Hz 4:3

Display off seconds: 300

Apply Cancel Restore Defaults Reboot

Table 1. Configuring the basic settings from the management Web page

Settings	Description
OS Version	This setting displays the version number of the firmware currently installed.
MAC Address	This setting displays the Media Access Control (MAC) address of the wireless display adapter.
Miracast/WiDi Mode	Set the setting to GON .
Miracast and DLNA concurrent	This setting has the following two options: <ul style="list-style-type: none"> • Enabled: You can use the Digital Living Network Alliance (DLNA) function. • Disabled: You cannot use the DLNA function.
HDCP Version	For the monitor with the Video graphics array (VGA) connector, set the setting to Disabled (Turn on HDCP only for HDMI Monitor) . For the monitor with the High-Definition Multimedia Interface (HDMI) connector, set the setting to V2.0 .
Language	Select the language of the wireless display adapter.
Default VGA format	For the monitor that does not support extended display identification data(EDID), you can select the default VGA resolution.
Display off seconds	This setting specifies the time (in seconds) after which the wireless display adapter screen is dimmed if it is not connected to your notebook computer.

After you finish configuring the basic settings, click **Apply** to make your configuration take effect.

Click the **Wireless** tab and perform the following configurations:

Network Name (SSID):	prefix	Lenovo	postfix: bytes of the mac address	2
802.11 Band:		5 GHz		
Discovery Channel:		Auto		
Operating Channel:		44		
Force Operating Channel:		No		
WPS Auto PBC:		PIN and Auto PBC		
Allowable MAC:	Address Range Start	00:00:00:00:00:02	End	EE:FF:FF:FF:FF:FF
Concurrent Mode:	<div style="border: 1px solid black; padding: 2px;"> P2P-SOFTAP P2P-STA P2P-ONLY </div>			
P2P-SOFTAP				

Table 2. Configuring wireless settings from the management Web page

Settings	Description
Network Name (SSID)	Each wireless device has a factory-default wireless SSID name. The default value is Lenovo_XXXX. Note: In “Lenovo_XXXX”, XXXX are the last four digits of the MAC address.
802.11 Band	If you turn on Force Operating Channel , select a value for this setting. The system will use the selected band.
Discovery Channel	Select the peer-to-peer (P2P) discovery channel.
Operating Channel	Select the P2P operating channel.
Force Operating Channel	When this option is enabled, you must set Operating Channel and use the specified operating channel no matter what device is connected to the wireless display adapter.
WPS Auto PBC	This setting is to enable or disable the automatic Push Button Configuration (auto PBC) function for Wi-Fi Protected Setup (WPS). You have the following three options: <ul style="list-style-type: none"> • PIN and PBC • PIN and Auto PBC • PIN only Note: When you select PIN and Auto PBC , you do not have to press the Mode/WPS button for the first time that you connect your notebook computer to the wireless display adapter. In this situation, also ensure that you do not press the Mode/WPS button.
Allowable MAC	This setting is to filter packets from machines in a local areanetwork (LAN) with the specified MAC addresses. The MAC address format is xx:xx:xx:xx:xx:xx.
Concurrent Mode	This setting has the following three options: <ul style="list-style-type: none"> • P2P SOFTAP • P2P STA • P2P-Only

When you select **P2P SOFTAP** for **Concurrent Mode**, the wireless display adapter works as a Software enabled Access Point (SoftAP). You can connect to the wireless display adapter directly and perform the following configurations:

P2P-SOFTAP

Network Name (SSID):

SoftAP Channel:

IP Address:

WPA-PSK:

WPA passphrase:

[Click here to display](#)

Table 3. Configuring settings when you select **P2P SOFTAP** for **Concurrent Mode**

Settings	Description
Network Name (SSID)	Type the SSID of the SoftAP.
SoftAP Channel	Set the SoftAP channel.
IP Address	Type the InternetProtocol (IP) address for Wireless Distribution System (WDS).
WPA-PSK	Enable or disable this setting to protect data transmitted over a wireless network.
WPA passphrase	Enter a passphrase that consists of 8 to 63 characters.

When you select **P2P STA** for **Concurrent Mode**, the wireless display adapter works as a client. In this situation, you must connect the wireless display adapter to a router. Set the SSID and the wireless security mode so that you connect the wireless display adapter to a router and log in to the wireless display adapter. Perform the following configurations:

P2P-STA

SSID for Enterprise AP:

Association Timeout(sec):

Protocol:

Static IP:

Subnet Mask:

Default Gateway:

WPA-PSK:

WPA/WPA2 PSK Encryption:

WPA passphrase:

WEP Encryption:

WiFi Authentication:

Network Key:

[Click here to display](#)

[Click here to display](#)

Note: The wireless display adapter does not support 802.1x authentication. For users under 802.1x network environment, MAC Authentication Bypass(MAB) is a workable solution to connect the wireless display adapter to 802.1x network. Consult your 802.1x authentication solution provider for the MAB solution that is often used in the office environment.

Table 4. Configuring settings when you select **P2P STA** for **Concurrent Mode**

Settings	Description
SSID for Enterprise AP	Set the SSID of the SoftAP that the wireless display adapter is connected to.
Association Timeout (sec)	Set the P2P STA connection time-out value (in seconds). If the wireless display adapter cannot be connected to the SSID of the SoftAP, the P2P STA mode will switch to the P2P SOFTAP mode.
Protocol	Set the protocol as DHCP or Static .
Static IP	If you select Static for Protocol , you must configure the following three settings: <ul style="list-style-type: none"> • IP Address: Type the IP address of the wireless display adapter. • Subnet Mask: Type the subnet mask of the SoftAP. • Default Gateway: Type the gateway IP address.
WPA-PSK	Keep the same configuration as your router. This setting has the following three options: <ul style="list-style-type: none"> • Disabled • WPA-PSK • WPA2-PSK
WPA/WPA2 PSK Encryption	Wi-Fi Protected Access (WPA) supports two encryption methods: TemporalKeyIntegrityProtocol (TKIP) and AdvancedEncryptionStandard (AES) with dynamic encryption keys. The default setting is TKIP .
WPA passphrase	Enter a passphrase that consists of 8 to 63 characters.
WEP Encryption	Enable this feature if your router supports the Wired Equivalent Privacy (WEP) key.
WiFi Authentication	To configure WiFi Authentication , enable WEP Encryption . If you enable WEP Encryption , the WiFi Authentication setting enables you to authenticate with either open authentication or shared key authentication. The default setting is Open .
Network Key	Type five AmericanStandardCodeforInformationInterchange (ASCII) characters or ten hexadecimal digits for a 64-bit key. Type 13 ASCII characters or 26 hexadecimal digits for a 128-bit key.

When you select **P2P-Only** for **Concurrent Mode**, you can only use WiDi connection to connect the wireless display adapter to a notebook computer. Perform the following configurations:



Table 5. Configuring the following setting when you select **P2P-Only** for **Concurrent Mode**

Settings	Description
P2P using single address	Set the setting to Enabled .

After you finish configuring all settings, click **Apply** to make your configuration take effect.

Chapter 3. Managing the wireless display adapter remotely

The wireless display adapter is a fourth-generation Intel WiDi enterprise adapter that supports the remote management defined by the Intel Corporation. Without being connected to a notebook computer, the wireless display adapter can be managed remotely after being connected to one of the following networks:

- Connect to a non-802.1x network

For information about how to connect the wireless display adapter to a non-802.1x network, see P2P STA.

- Connect to a 802.1x network

The wireless display adapter does not support 802.1x authentication. For users under 802.1x network environment, MAC Authentication Bypass(MAB) is a workable solution to connect the wireless display adapter to 802.1x network. Consult your 802.1x authentication solution provider for the MAB solution that is often used in the office environment.

Remote management by the Web browser

To access the Web page for setting the wireless display adapter, open the Web browser on your computer. Type the default IP address of your router and port 8000 into the address bar, for example, `http://ipaddress:8000`, and then press Enter. The Web page is displayed. The default user name and password are both admin.

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WiDi Enterprise
This page allows you to configure the WiDi Enterprise

UserName

Password

Login

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Configure the following settings after you enter the Settings window.

Table 6. Configuring the settings in the Settings window

Settings	Description
Device Name	Set the SSID for WiDi connection.
Device Name Change	The setting specifies whether to change the device name in the Settings window.
Administrator Username	Set the login user name.
Administrator Password	Set the login password.
Enable Low Bandwidth Mode	When this option is enabled, the system uses the low bandwidth when connecting to the WiDi device.
Always require PIN	When this option is enabled, the Personal Identification Number (PIN) is always required when establishing a WiDi connection. Note: To enable Always require PIN , click Restore Defaults under the Basic tab to restore the wireless display adapter first. Then select PIN only for the WPS Auto PBC setting under the Wireless tab.
Firmware Version	This setting displays the version number of the firmware currently installed.
Firmware Update	Enable or disable the firmware update.

Table 6. Configuring the settings in the Settings window (continued)

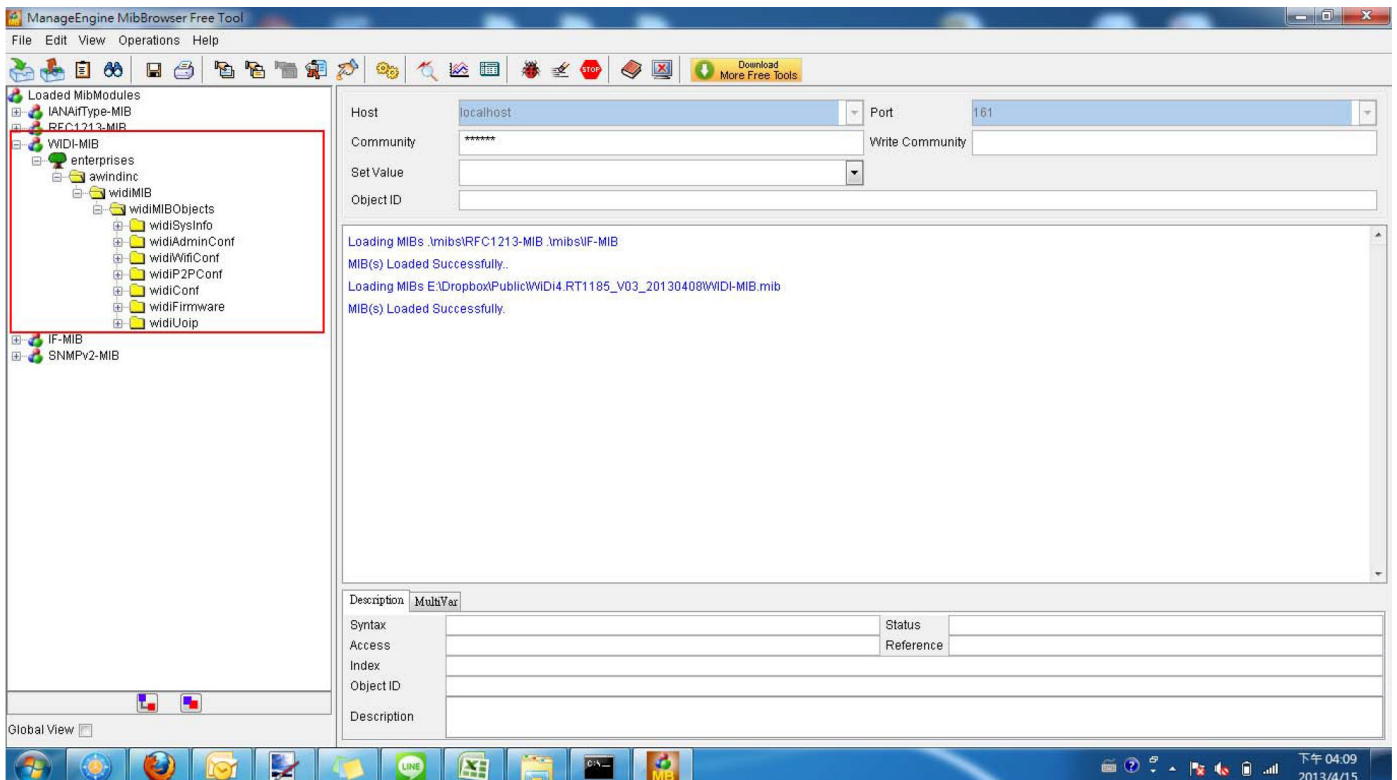
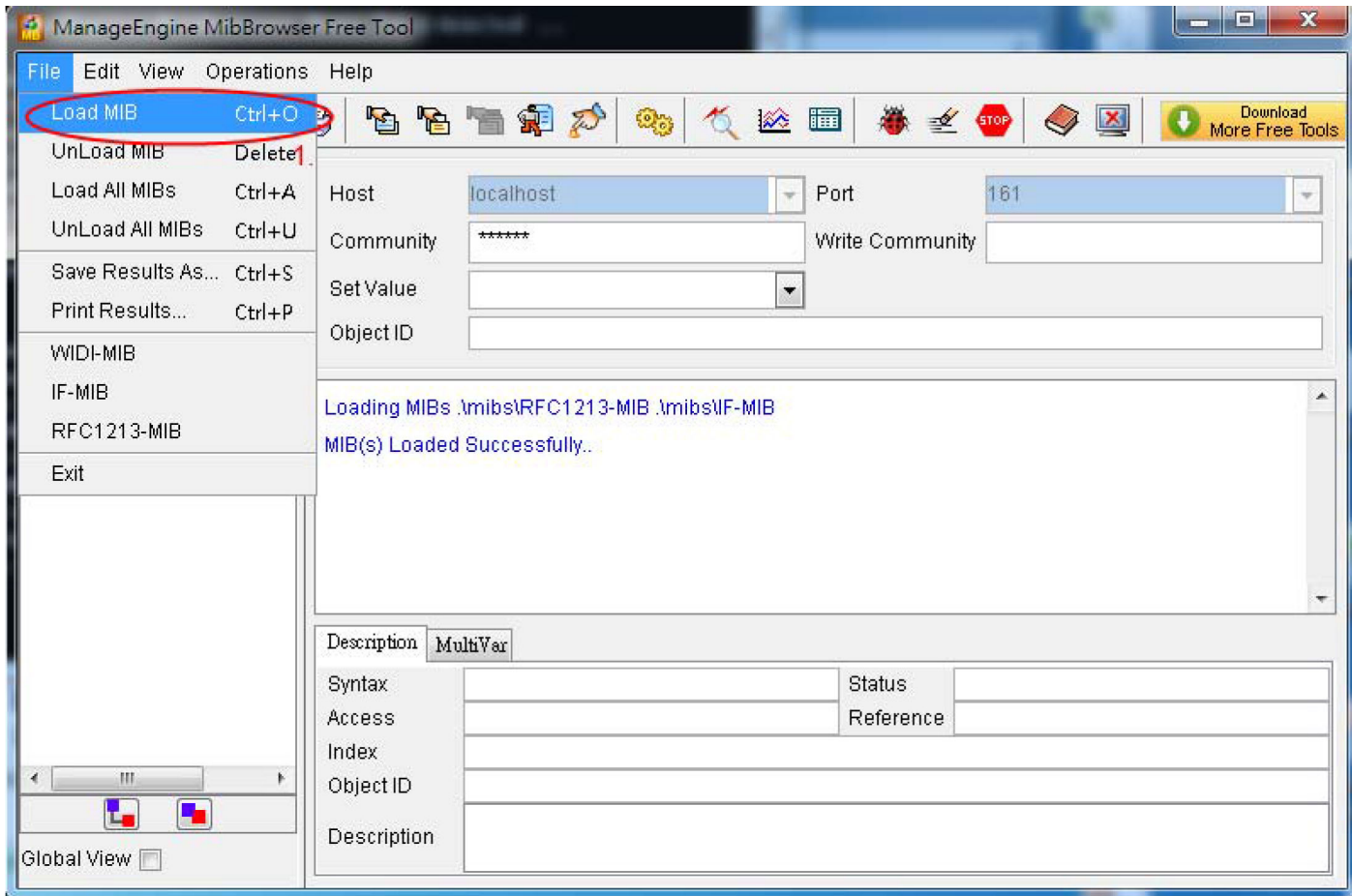
Settings	Description
Firmware Update Status	If the firmware failed to upgrade, the firmware update status automatically changes to Fail .
Firmware Update From URL	To update the firmware, the IT administrator must set the Firmware Update option of all wireless display adapters to Enable , and then type the location of the firmware image in the Firmware Update URL field. Note: After restarting the wireless display adapter, the IT administrator must ensure that Firmware Update is set to Enable . If yes, the wireless display adapter retrieves the image.img file from the specified firmware update location.
Display Output Off Seconds	This setting specifies the time (in seconds) after which the wireless display adapter screen is dimmed if it is not connected to your notebook computer. To wake up the wireless display adapter screen, do one of the following: <ul style="list-style-type: none"> • Press the Mode button. • Establish the WiDi connection. • Connect the wireless display adapter to a SoftAP.

Remote management by an SNMP Manager

Simple Network Management Protocol (SNMP) is an Internet-standard protocol for managing devices on IP networks. In typical SNMP use cases, one or more administrative computers, called managers, have the task of monitoring or managing a group of hosts or devices on a computer network.

To manage the wireless display adapter remotely by an SNMP Manager, do the following:

1. Download and install an SNMP Manager that can support SNMPv3 from the Web site at: <http://www.manageengine.com/products/mibbrowser-free-tool/>
2. Download the following files that are available from the Lenovo Support Web site at <http://www.lenovo.com/support/WDA> and put the files into the same folder. Import the WIDI-MIB.mib file and then you can find the WiDi tree available on the screen.
 - WIDI-MIB.mib
 - WIDI-MIB.cmi
 - WIDI-MIB.cds



- Follow the on-screen instructions and refer to the information in the following table to configure the destination IP, target IP, SNMP version, security level, account, and password.

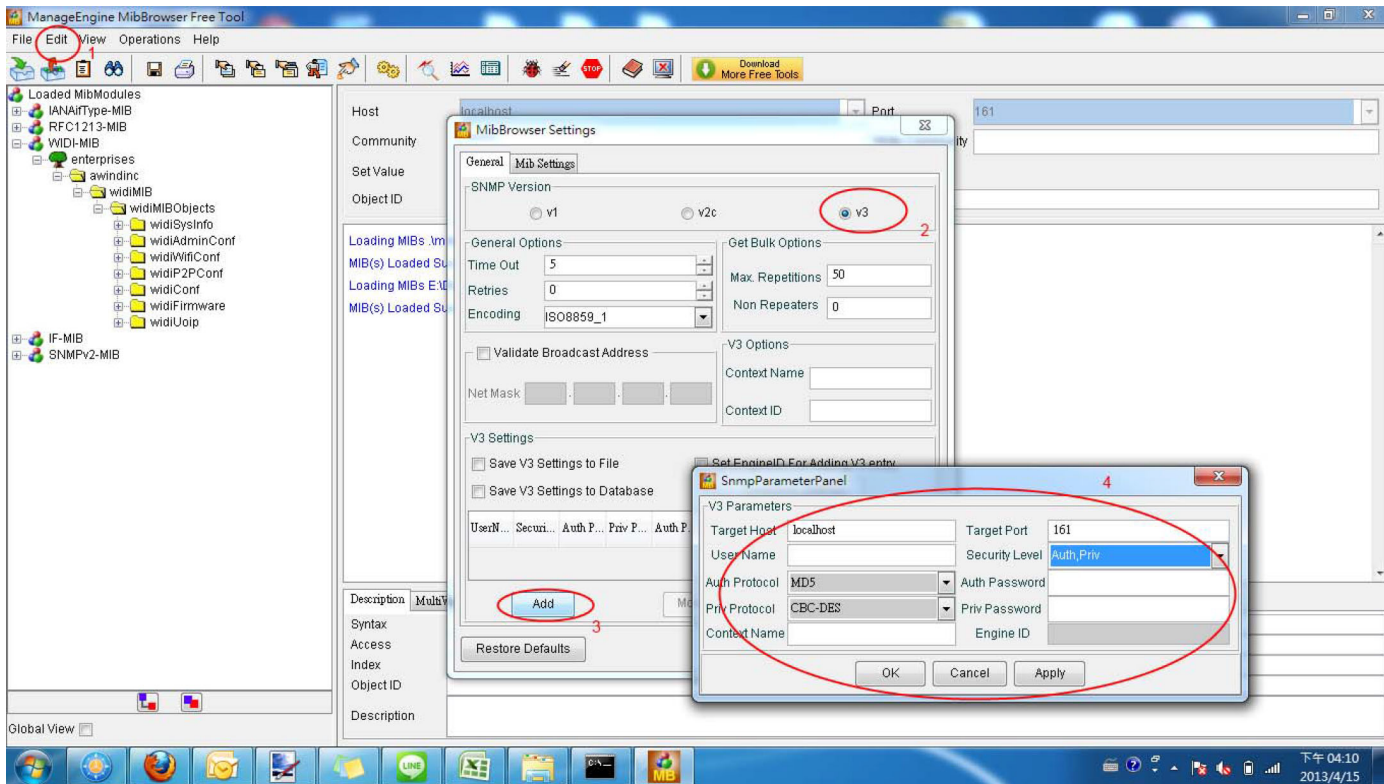
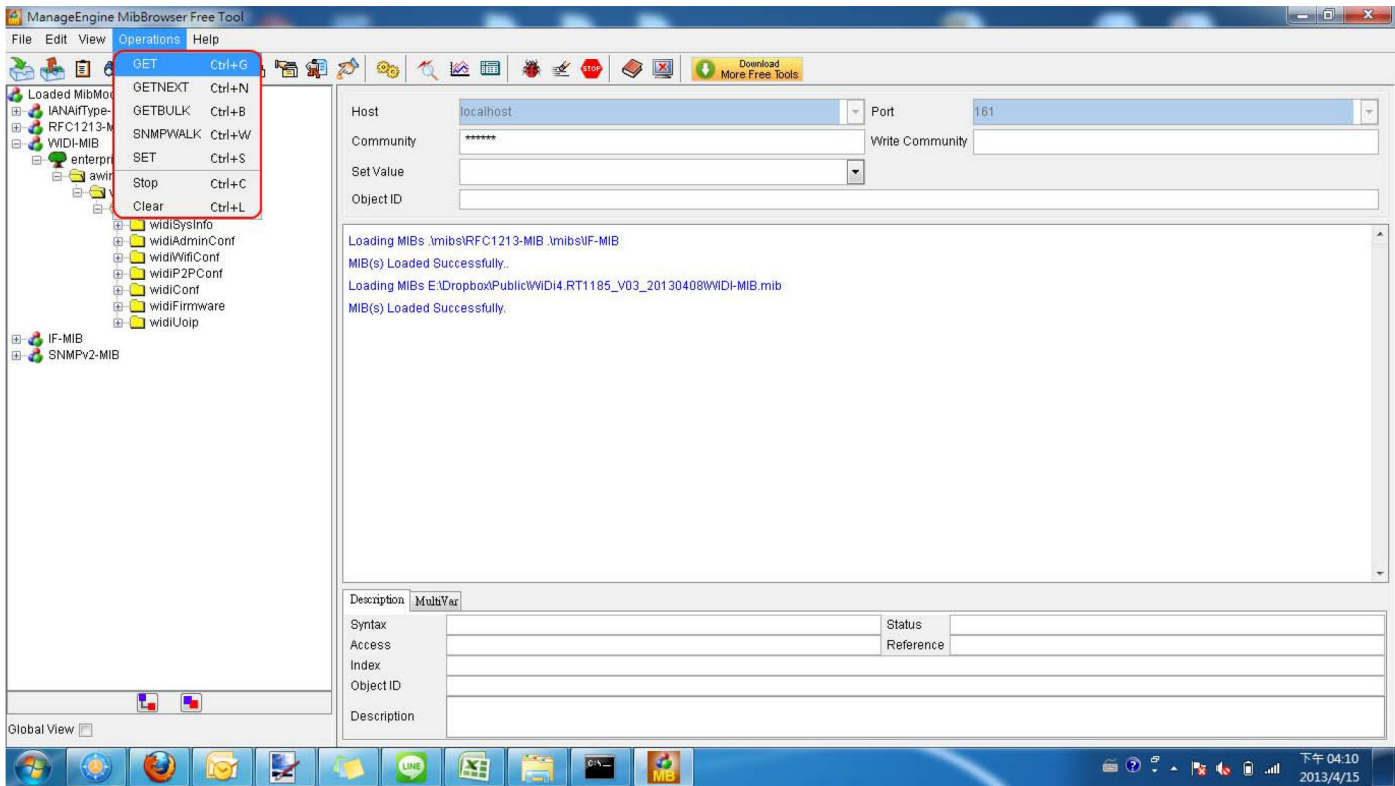


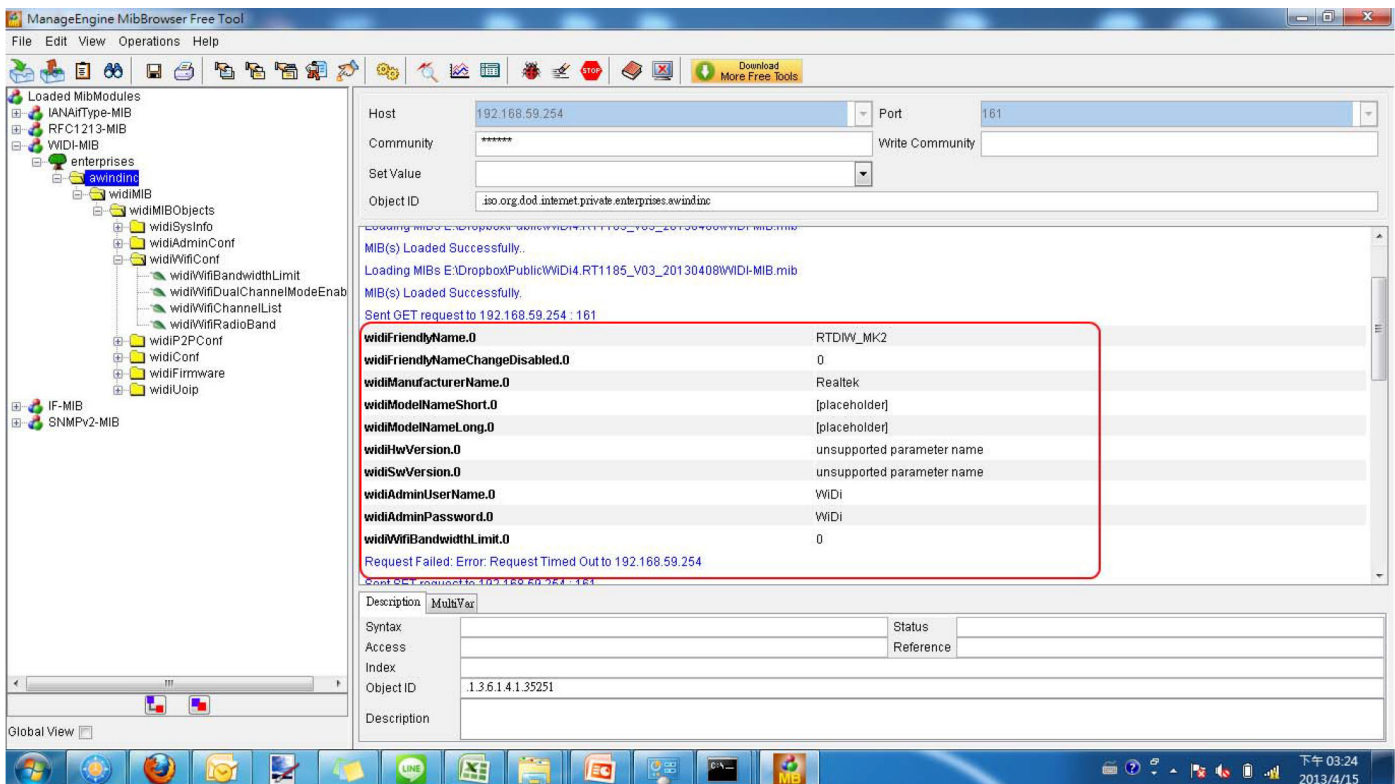
Table 7. Configure the settings for the SNMP Manager

Settings	Default value
Target Host	The IP address of your wireless display adapter
User Name	admin
Security Level	Auth, Priv
Auth Password	WiDiAwind
Priv Password	WiDiAwind

4. Use the SNMP Manager to get and set WiDi configurations.



5. Use the SNMP command to get and set configurations for each parameter.



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