Atop Technologies, Inc.

MW5501C / MW5502C
Industrial Wireless Modbus Gateway

User Manual

V1.1

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1 Preface

1.1 *Purpose of the Manual*

This manual supports you during the installation and configuring of the MW550XC Industrial Wireless Modbus Gateway Series only. It explains some technical options available with the mentioned product. As such, it contains some advanced network management knowledge, instructions, examples, guidelines and general theories designed to help users manage this device and its corresponding software. Some background in general theory is a must while reading it. Please refer to the Glossary for technical terms and abbreviations (if any).

1.2 *Who Should Use This User Manual*

This manual is to be used by qualified network personnel or support technicians who are familiar with network operations. It might be useful for system programmers or network planners as well. This manual also provides helpful and handy information for first time users. For any related problems please contact your local distributor. If they are unable to assist you, please redirect your inquiries to www.atop.com.tw or www.atoponline.com.

1.3 *Supported Platform*

This manual is designed for the MW550XC Industrial Wireless Modbus Gateway Series and that model only.

1.4 *Warranty Period*

We provide a **5-year limited warranty** for MW550XC Industrial Wireless Modbus Gateway Series.

1.5 *Manufacturers Federal Communication Commission Declaration of Conformity Statement*

Model: MW550XC Industrial Wireless Modbus Gateway Series

NOTE: This equipment has been tested and found to comply with the limits for a Class A 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.

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 device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

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.
For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

> ※ This device is restricted to indoor use when operated in the 2.4 GHz frequency range use. FCC requires this product to be used indoors for the frequency range 2.4 to 2.4x GHz to reduce the potential for harmful interference to co-channel mobile satellite systems.

FCC 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 a minimum distance of 20cm between the radiator and human body.

1.6 *European Community, Switzerland, Norway, Iceland, and Liechtenstein*

Model: **MW550XC Industrial Wireless Modbus Gateway Series**

Declaration of Conformity with regard to the R&TTE Directive 1999/5/EC

This equipment is in compliance with the essential requirements and other relevant provisions of 1999/5/EC.
The following standards were applied:

- EMC : EN 301 489-1 v1.9.2 (2011-09), EN 301 489-17 v2.2.2 (Class A)
- Radio : 47 CFR FCC Part 15 Subpart C § 15.247, 47 CFR FCC Part 15 Subpart E § 15.407
- EN30 0 328 v1.8.1 (2012-06), EN301.893 v1.7.1 (2012-06)
- EMF: 47 CFR FCC Pat 2 Subpart J, section 2.1091, EN 62311:2008 and EN50385:2002
- Health & Safety: EN60950-1/CB: 2001; EN60950-1: 2001

The conformity assessment procedure referred to in Article 10.4 and Annex III of Directive 1999/5/EC has been followed. This device also conforms to the EMC requirements of the Medical Devices Directive 93/42/EEC.

Note : This equipment is intended to be used in all EU and EFTA countries. Outdoor use may be restricted to certain frequencies and/or may require a license for operation. For more details, contact Atop Technologies, Inc.

European Union

This system has been evaluated for RF exposure for Humans in reference to the ICNIRP (International Commission on Non-Ionizing Radiation Protection) limits. The evaluation was based on the EN 50385 Product Standard to Demonstrate Compliance of Radio Base Stations and Fixed Terminals for Wireless Telecommunications Systems with basic restrictions or reference levels related to Human Exposure to Radio Frequency Electromagnetic Fields from 300 MHz to 40 GHz. The minimum separation distance from the antenna to general bystander is 20cm (7.9 inches).

1.7 *UL Notice for Power supplier*

The MW550XC Series products are intended to be supplied by a listed power unit marked with “LPS” (Limited Power Source), or “Class 2” and output rate of 9~48 VDC, 0.65 Ampere minimum, or use the recommended power supply listed in Table 2.2 Optional Accessories of Section 2.1.

2 Introduction

2.1 *Product Overview*

The MW550XC Wireless Modbus Gateway is an industrial network device in between Modbus over Serieal Line devices and computer hosts running Modbus/TCP on either Ethernet or Wireless network. Figure 2.1 illustrates a possible network configuration of the MW550XC Series Wireless Modbus Gateway. Fully compliant with Modbus/TCP protocol, the Wireless Modbus gateway offers a convenient solution to connect existing devices or controllers running Modbus serial protocol (Modbus/ASCII or Modbus/RTU) to an Ethernet or a Wireless network. The MW550XC Series are standard Modbus gateways that convert packets between Modbus TCP and Modbus RTU/ASCII protocols.

The MW550XC Series supports 64 simultaneous TCP masters. A total of 247 slave ID can be supported (TCP, COM, and VCOM). Each RS-232/422/485 serial port can be individually configured for Modbus/RTU or Modbus/ASCII operation with different baud rate, allowing both types of networks to be fully integrated with Modbus/TCP within one package.

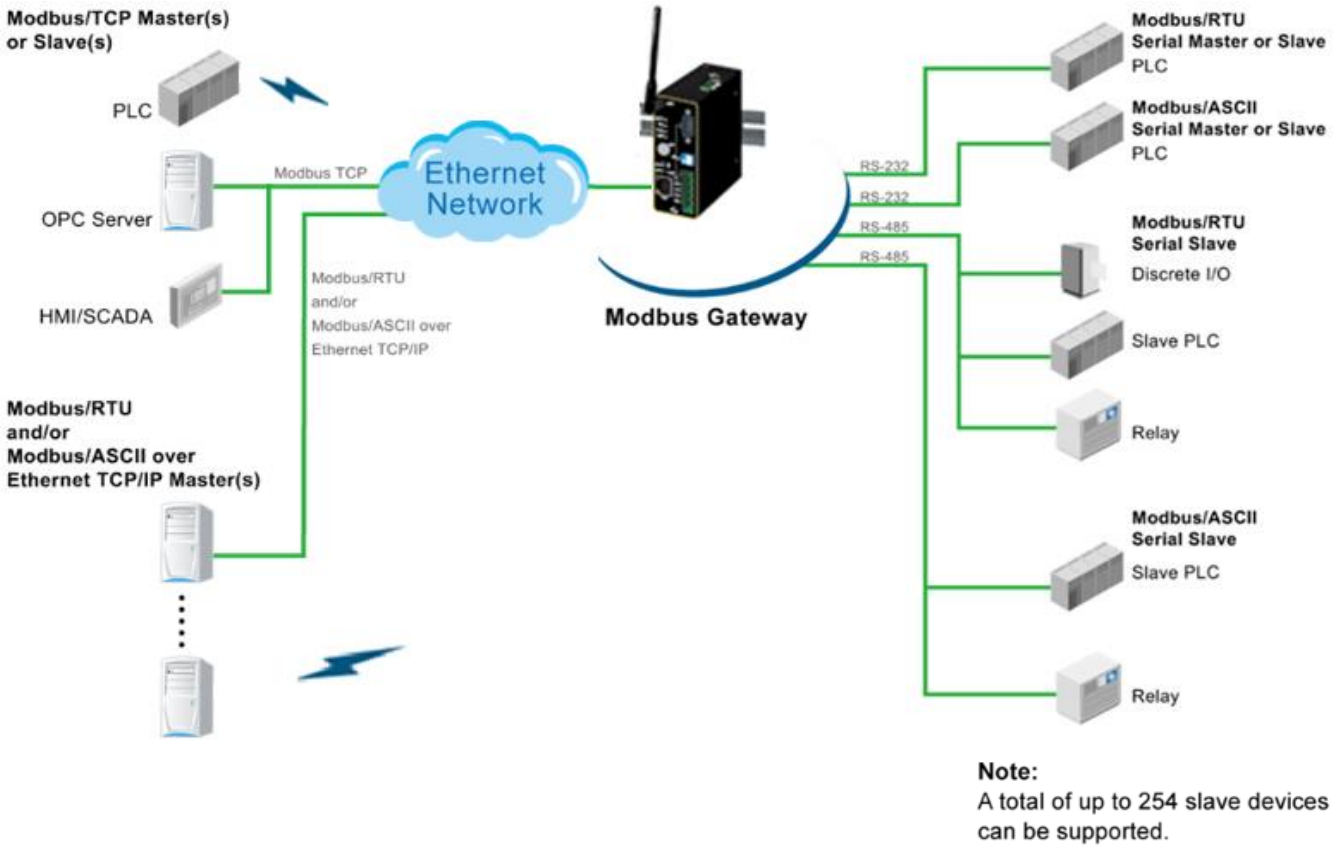


Figure 2.1 Possible Network Configuration of MW550XC Series Wireless Modbus Gateway

Figure 2.2 shows three different use cases of the MW550XC Series Wireless Modbus Gateway:

1) the interface between Modbus RTU/ASCII serial host to Modbus RTU/ASCII serial devices
2) the interface between Modbus/TCP over Ethernet or Wireless network to Modbus RTU/ASCII serial devices
3) the interface between Modbus RTU/ASCII host connected through Serial IP over Ethernet or Wireless (virtual communication port (VCOM)) to Modbus RTU/ASCII serial devices.

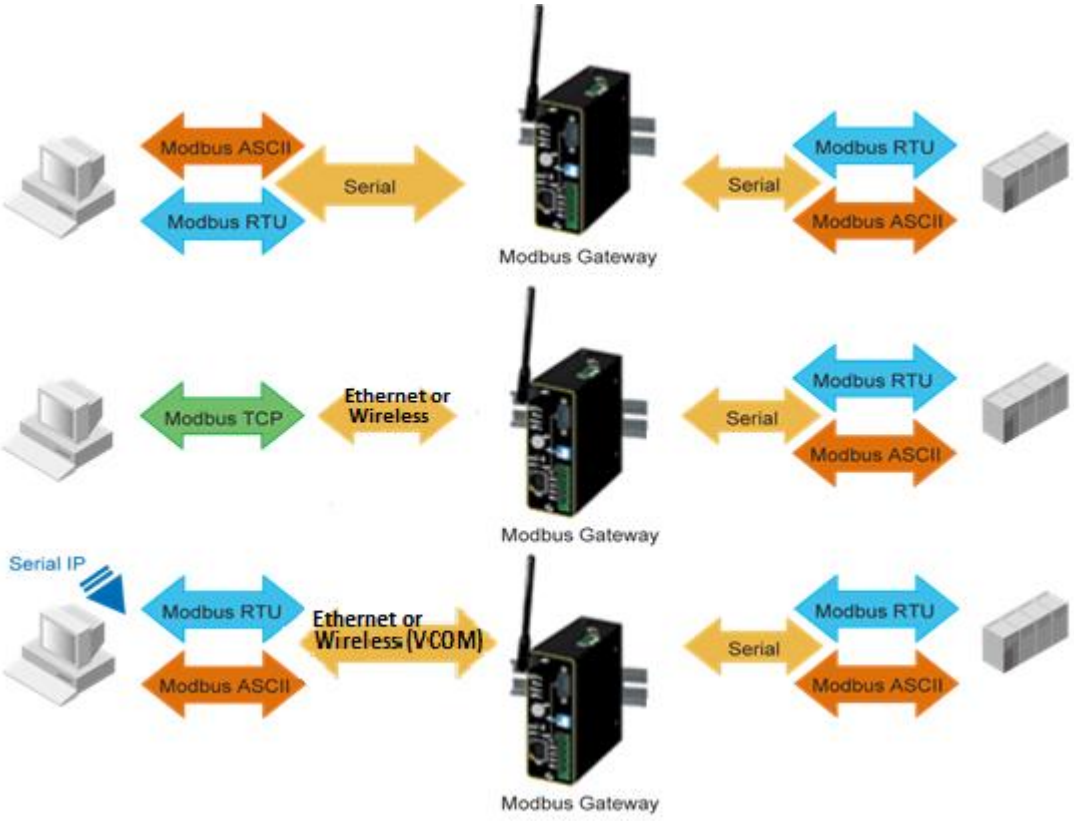


Figure 2.2 Use Cases of the MW550XC Series Wireless Modbus Gateway

2.2 *Features*

The MW550XC Series device is the latest addition to Atop Industrial Wireless Modbus products. Its small size but powerful architecture makes it a perfect choice for industrial/manufacturing needs in which size is a decisive factor. It rewards our customers with superb connectivity withstanding all the harshness in your environment of choice.

The key characteristics of MW550XC are:

- Support of popular wireless local area network standards IEEE 802.11b/g/n
- Connect to with other wireless devices using 2.4 GHz
- Support wired Ethernet through 1x100BaseT(X) RJ45 port
- 1 or 2 software selectable RS-232/485 /422 ports, either D-sub9 or TB combo serial port
- Bi-Directional Modbus TCP/RTU/ASCII conversion from Serial to Ethernet or Wireless and Vice-versa
- Advanced features include Virtual ID remapping, VirtualCOM mode, exception handling and many others
- Support Wi-Fi Direct technology that makes Wi-Fi usage to be an ease-to-use connectivity, and delivers an industry-wide peer-to-peer solution based on broadly deployed Wi-Fi technologies
- The antenna design that offers better wireless coverage and reduces wireless blind spots.
- Certified wireless equipment by FCC (United States) and ETSI (Europe)
- Easy configuration through embedded web server interface or Atop's Windows®-based configuration utility program called **Device Management®**
- Firmware upgradable through embedded web server interface or Atop's **Device Management®**

Caution

From here on, extreme caution must be exercised.

Never install or work on electrical or cabling during periods of lightning activity. Never connect or disconnect power when hazardous gases are present.

WARNING: Disconnect the power and allow unit to cool for 5 minutes before touching.

3 Getting Started

3.1 *Packing List*

Inside the purchased package, you will find the following items:

Table 3.1 Packing List

Item	Quantity	Description
MW550XC Series	1	Industrial Wireless Modbus Gateway
Antenna	1	2.4G gain: 3/5dBi antenna
DB9	1	9-pin plug of the D-Sub connector family
Terminal Block		▪ 5-pin 5.08mm lockable Terminal Block x 1 (MW5501C only) ▪ 5-pin 5.08mm lockable Terminal Block x 2 (MW5502C-TB only)
Documentation	1	Hardware Installation Guide (Warranty Card is included)
Mounting Kit	1	DIN-Rail Kit (Already mounted on the device)
CD (Utilities)	1	Inside you will find: ▪ User's Manual ▪ Installation Guide ▪ Device Management© Utility and its user manual ▪ VirtualCOM Utility (for Windows® V)

Note: Please notify your sales representative if any of the above items is missing or damaged in any form upon delivery. If your sales representative is unable to satisfy your enquiries, please contact us directly.

3.2 *Optional Accessories*

The following table lists optional accessories for MW550XC series.

Table 3.2 Optional Accessories

Item	Description
Power Adapter UN315-1212 (US-Y)	Y-Type power adaptor, 100~240VAC input, 1.25A @ 12VDC output, US plug, LV6; includes a 3-pin Terminal block
Power Adapter UNE315-1212 (EU-Y)	Y-Type power adaptor, 100~240VAC input, 1.25A @ 12VDC output, EU plug, LV6; includes a 3-pin Terminal block
ADP-DB9(F)-TB5	Female DB9 to Female 3.81 TB5 Converter
WMK-454-Black	Black Aluminium Wall Mount Kit

3.3 *Ordering Information*

Please refer to the following product codes to place an order.

Table 3.3 Device Ordering Information

Model Name	P/N	Description
MW5501C	1P1MW5501C0001G	1-port 802.11b/g/n Industrial Wireless Modbus Gateway supporting Wii-Direct, combo TB - DB9 port
MW5502C	1P1MW5502C0001G	2-port 802.11b/g/n Industrial Wireless Modbus Gateway supporting Wifi-Direct, DSub 9 connector
MW5502C-TB	1P1MW5502CTB01G	2-port 802.11b/g/n Industrial Wireless Modbus Gateway supporting Wifi-Direct, Terminal Block

3.4 *Appearance: front-power-side panels*

The **front panels** of different models of MW550XC series are shown in the following figures. Note that the **power panel** and the **rear panel** are the same for all models and depicted in Figure 3.4 and Figure 3.5, respectively. Note that the detailed description of LEDs and DIP switch on the front panel can be found in Chapter 5.1 below.

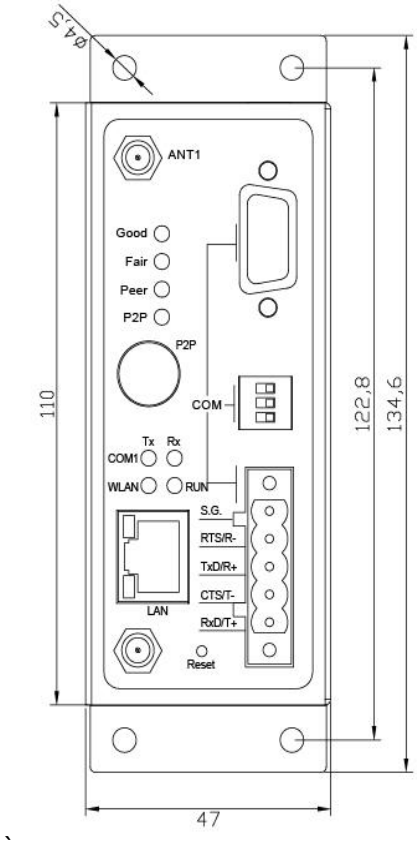


Figure 3.1 Front Panel of MW5501C

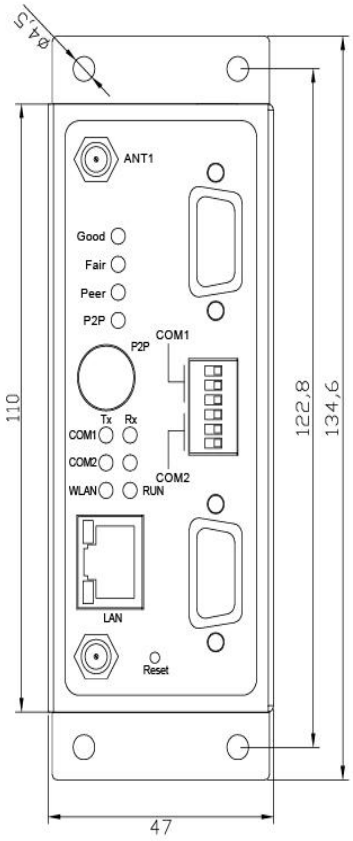


Figure 3.2 Front Panel of MW5502C

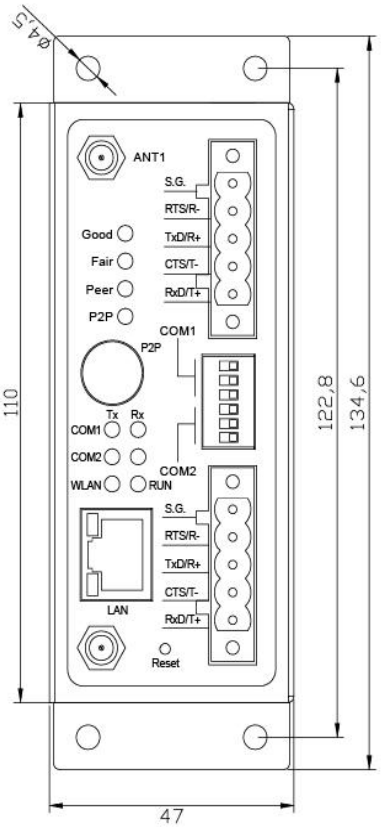


Figure 3.3 Front Panel of MW5502C-TB

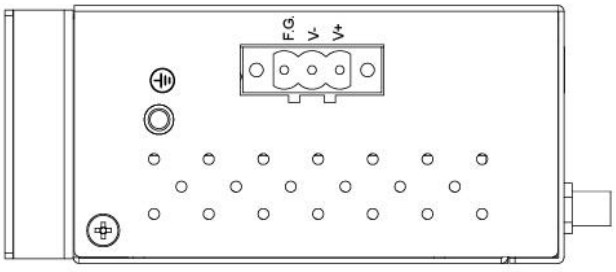


Figure 3.4 Power Panel of all MW550XC Series

Note: The DIP switch on the front panel of MW550XC can be used to adjust different values for pull-high or pull-low termination resistors on the RS-485 COM ports. If the RS-485 network range is shorter than 100 meters, the termination resistors are not required (by setting the DIP switch to termination off). Otherwise, it may be necessary to insert termination resistors (by setting the DIP switch to termination on) at both ends of RS-485 network to improve signal

quality. Table 6.5 and Table 6.6 summarize the functionalities of the DIP switches for COM1 and COM2 on their MW550XC series.

The **Rear panel** (where you can mount the device on a rail or to the wall), is shown in Figure 3.5 and a simple mounting instruction is given on Figure 3.6.

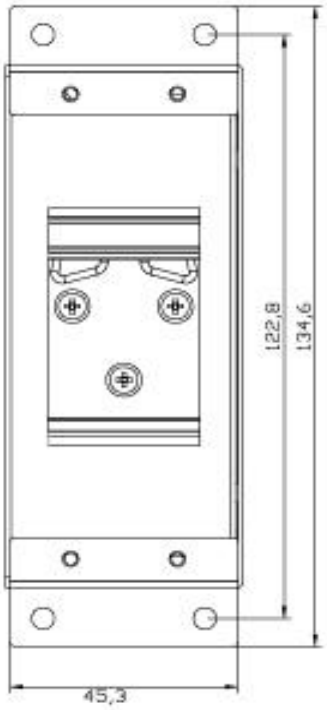


Figure 3.5 Rear Panel of All MW550XC Series

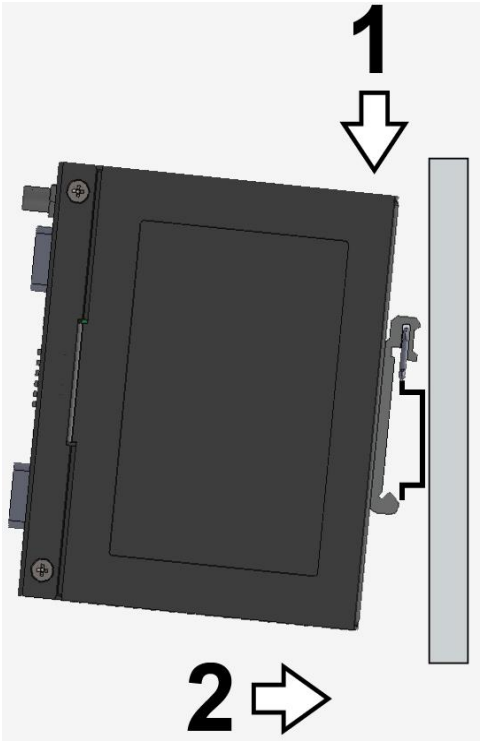
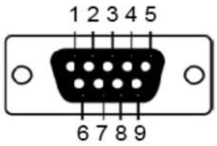


Figure 3.6 Mounting Instruction of All MW550XC Series

3.5 *Serial Pin Assignments*

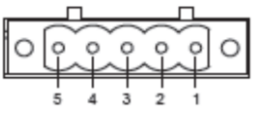
3.5.1 *D-Sub9 (DB9)*



Pin#	RS-232 Full Duplex	4-W RS-422/RS-485 Full Duplex	2-W RS-485 Half Duplex
1	DCD	N/A	N/A
2	RXD	TXD+	N/A (reserved)
3	TXD	RXD+	DATA+
4	DTR	N/A	N/A
5	SG (Signal Ground)	SG (Signal Ground)	SG (Signal Ground)
6	DSR	N/A	N/A

7	RTS	RXD-	DATA-
8	CTS	TXD-	N/A (reserved)
9	RI	N/A	N/A

3.5.2 *Terminal Block (TB5)*



Pin#	RS-232 Full Duplex	4-W RS-422/RS-485 Full Duplex	2-W RS-485 Half Duplex
1	SG	SG	SG
2	RTS	R-	DATA-
3	TxD	R+	DATA+
4	CTS	T-	N/A
5	RxD	T+	N/A

3.6 *First time installation*

Before installing the device, please adhere to all safety procedures described below, Atop will not be held liable for any damages to property or personal injuries resulting from the installation or overall use of the device. **Do not attempt to manipulate the product in any way if unsure of the steps described here[1], in such cases please contact your dealer immediately.**

1. Prepare the necessary cables, adapter, pwr cord, LAN cable, serial cable, etc; **do not connect the unit yet.**
2. Install both antennas to the SMA connectors (gold connectors) in the front panel of MW550XC device. Note that the antenna's connectors are female reverse-polarity (RP) SMA type. The gains of the antennas are 3dBi at 2.4GHz. Once installed the device to a rail or your desired location, do not put them parallel otherwise their signal will interfere with each other. Please see the recommended antennas setup for MW550XC in the Hardware Installation Guide.
3. Plug the power source to the unit, starting from the ground (It is a screw close to the power terminal block.) and then the 3-Pin power terminal block on the power panel in **Figure 3.**. A recommended power adapter (such as US315-1212 power adapter listed in Table 3.2) with 3-Pin terminal block can be connected to the power terminal block. You will hear a long beep with all LEDs turn on and after a few second you will hear a shot beep twice and the RUN LED will start blinking slowly. If the device's wireless interface is working properly, the WLAN LED will also turn on and start blinking once in a while. Device's STATUS LEDs will also start running too from bottom LED to the top LED.
4. Note that although internal grounding has been done inside, in order to ensure overall maximum performance and protection of your device it is strongly advised to properly connect the grounding. Please choose **only one** of the grounding connections either connecting the ground to the screw on the power panel or to the Frame Ground (F.G.) pin of the 3-Pin terminal block.
5. Place the device in the desired location, which is dry and free from dirt or corrosive vapors, and connect it to a **LAN** via an **Ethernet cable** with an **RJ45 connector**.
6. Connect your computer to the **LAN** network. Default configurations will be addressed later in Chapter 3.7 below.

Note[1]: Please consult your Hardware Installation Guide (leaflet available in your package) for more information when attempting an installation. Also, please follow all safety procedures when doing so.

3.7 *Factory Default Settings*

Upon arrival, the device is set with factory default settings. The MW550XC Series comes with two different IP addresses for LAN and WLAN as shown below.

Table 3.4 Factory Default Network Settings

Interface	Device IP	Subnet mask	Gateway IP	DNS1
LAN	10.0.50.100	255.255.0.0	10.0.0.254	168.95.1.1
WLAN	192.168.1.1	255.255.255.0	192.168.1.254	

Other relevant factory default settings are summarized as shown below.

Table 3.5 MW550XC Series Factory Default Settings

Parameter	Default Values
Security	
User Name	admin
Password	default
Serial	
COM1	RS-232, 9600 bps, 8 data bits, No Parity bit, 1 stop bit, No Flow Control Packet Delimiter timer: Auto
COM2	
SNMP	
SysName of SNMP	0060E9XXXXXX
SysLocation of SNMP	Location
SysContact of SNMP	Contact
SNMP	Disabled
Read Community	public
Write Community	private
SNMP Trap Server	0.0.0.0

Note: you can press the "Reset" button on the front panel for 5 seconds to restore the MW550XC Series to the factory default settings.

4 Configuration and setup

4.1 *Change basic settings with Device Management Utility*

Note: Advanced settings are not possible via Device Management Utility. This can be used to locate, access, modify network parameters, change login credentials or update firmware. For device-specific settings, please use Web Interface, as described in Chapter 4.2 below.

First, please install our configuration utility program called **Device Management Utility** (formerly **Serial Manager)** that comes with the Product CD or can be downloaded from our websites (www.atop.com.tw or www.atoponline.com).

For more information on how to install **Device Management Utility**, please refer to the manual that comes in the Product CD or that is available online. After you start the utility, MW550XC Industrial Wireless Modbus Gateway will be automatically detected if this is already connected to the same subnet as your PC and will be listed on the **Device Management Utility's** window.

Alternatively, if you did not see your MW550XC device on your network, press **"Rescan"** icon **(**first icon on the icon bar**). A** list of devices including your MW550XC device currently connected to the network will be shown in the window of **Device Management©** as shown in the Figure below.

Important information about the MW550XC device such as the IP address, MAC address, etc are going to be displayed as well. Note that a simple way to configure a new MW550XC device is to set a static IP for your personal computer to the same subnet (i.e. 10.0.50.XXX) as the default IP address of the LAN connection (i.e. 10.0.50.100).

Note: In the Figure below the MW5502C device appears with two lines because it has been set to operate in wireless client mode as two different IP addresses and MAC addresses are available. If, otherwise, MW5502C is set to operate in AP client mode, it will show up on the Device Management with only one IP address and MAC address. Details of operation modes will be presented in Section 4.4 below.

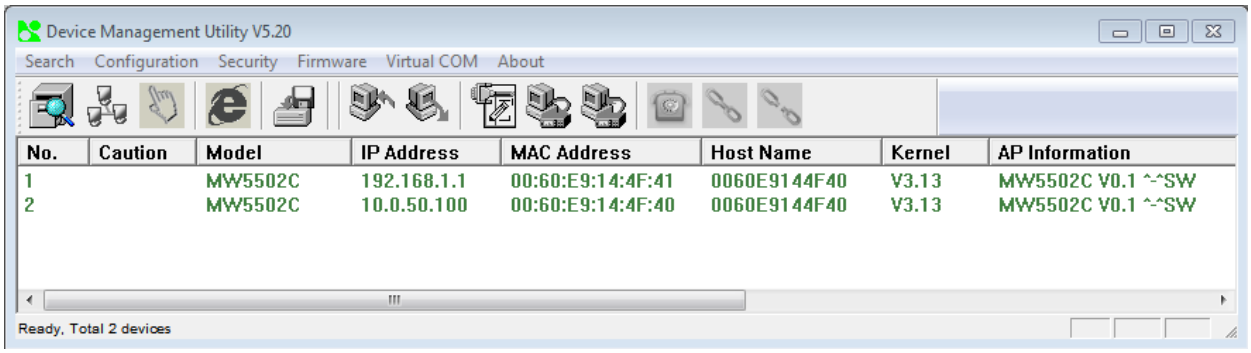


Figure 4.1 User Interface of Device Management© lists a MW550XC device in wireless client mode.

After selecting and then double-clicking the device's name on the list (such as MW5502C with IP address 10.0.50.100), a window will pop-up and prompt you to enter username and password.

Note: the default username is "*admin*" and the password is *default*, see Factory Defaults for more information), then click **"Login"** button as shown in the figure below.

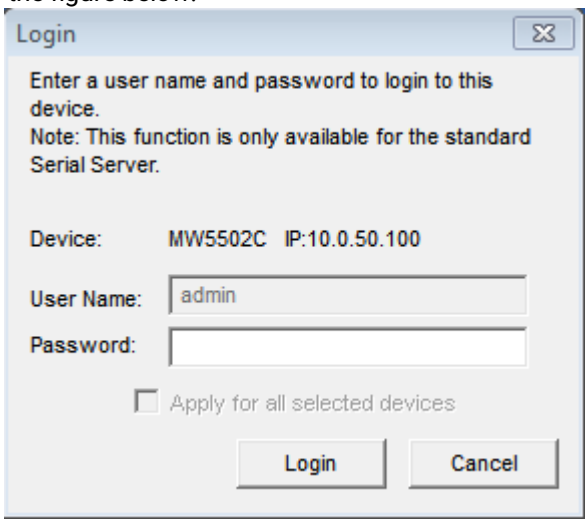


Figure 4.2 Administrator Login

A pop-up window as shown will notify you if your personal computer and the MW550XC device are on different sub-network. Click "**OK**" to accept the notification and return to the Device Management's window. In this case, please change the IP address of your PC so that it has the same subnet as the MW550XC. Then, re-select and double-click on the device in order to login to the MW550XC device again, as described in the previous paragraph.

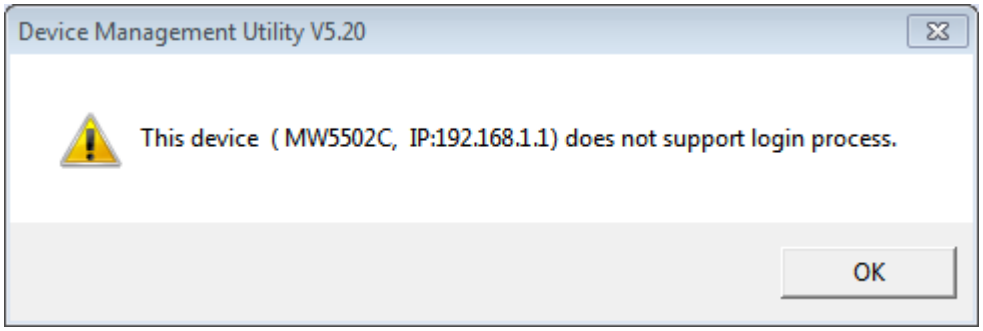


Figure 4.3 Notification in case that the MW550XC device is in different subnetwork from your PC

If successful, another pop-up window will be shown when you can successfully login to the MW550XC device. Click the "**OK**" button to proceed.

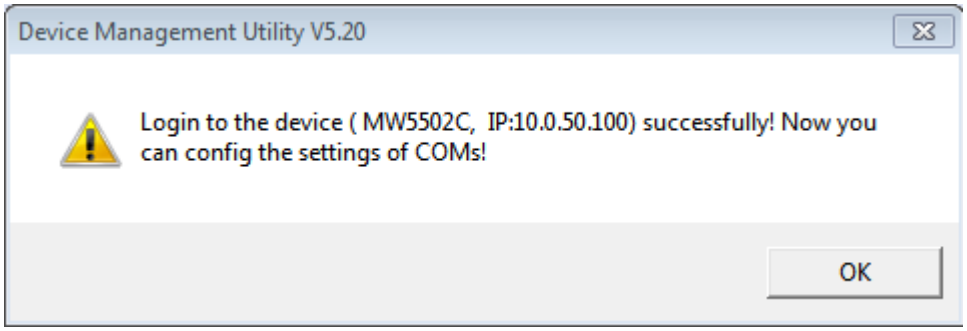


Figure 4.4 Pop-up window indicates a successful login

Then there will be a "+" symbol under the **Caution** column of the login device in **Device Management Utility** list as shown in Figure below.

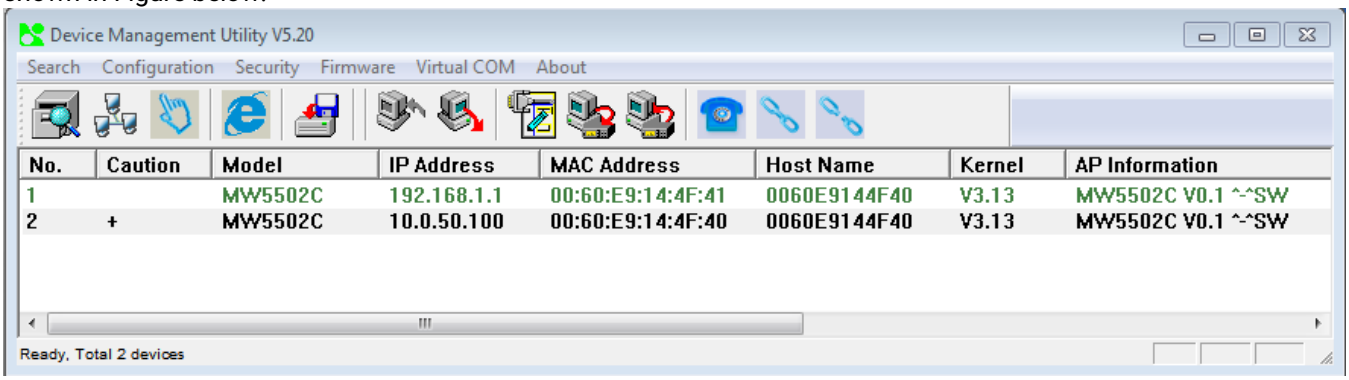


Figure 4.5 Mark of login device in the Caution column

If the device cannot be login, the system will notify you with the notification in Figure 3.6. If this happens, the user should try to check the reachability between your PC and the MW550XC with 'ping' command or utility.

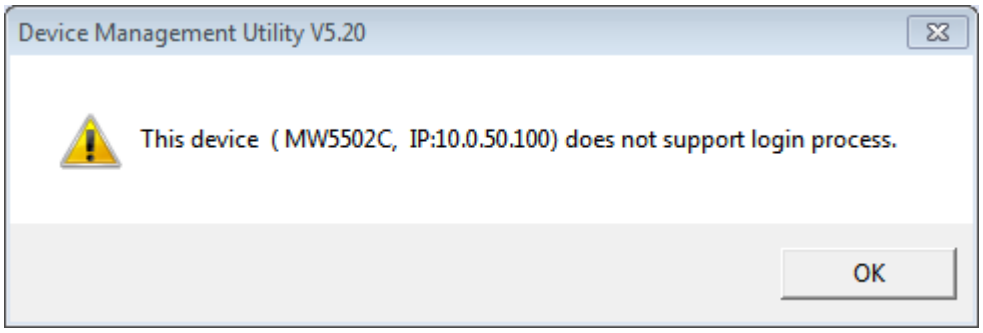


Figure 4.6 Notification of unsuccessful login when the interface is either down or unreachable.

After a successful login, the MW550XC device can then be accessed and configured through the **Device Management** Utility's interface.

Another way of doing this is by selecting the MW550XC device and then choosing the **"Config by browser"** icon from the forth icon on the icon bar or select **"Config by browser"** option from under the pull-down menu **Configuration**. Please see detail on how to configure the device via web browser in the next section.

Sometime the MW550XC device might not be in the same subnet as your PC; therefore, you will have to use our utility to locate it in your virtual environment. To configure each device, click the selected MW550XC device (default IP: 10.0.50.100) in the list of **Device Management©**, and click **"Configuration → Network..."** (or Ctrl+N) menu on **Device Management©** as shown in **Figure 4.7** or click on the second icon called **Network** on the menu bar, and a pop-up window will appear as shown in **Figure 4.8**.

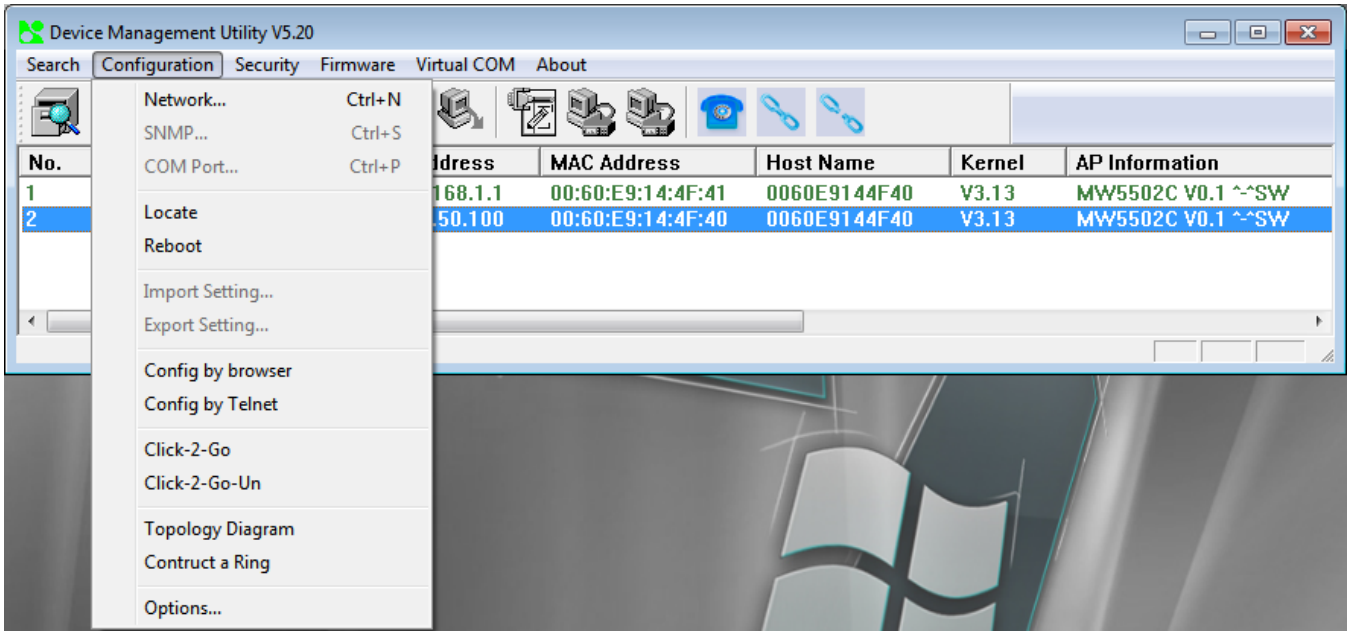


Figure 4.7 Pull-down Menu of Configuration and Network

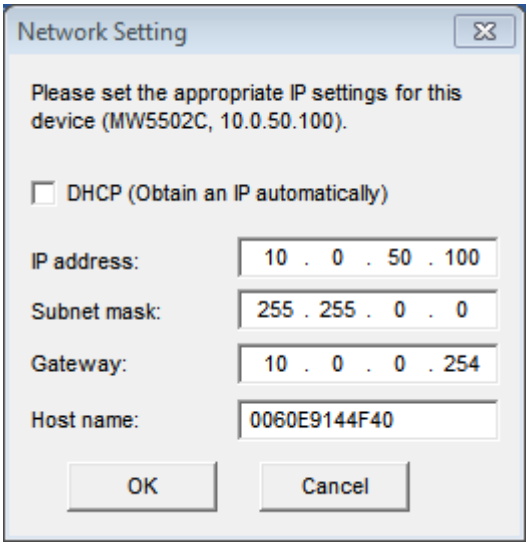


Figure 4.8 Pop-up Windows of Network Setting

You may proceed then to change the IP address, Subnet mask, and Gateway, and Host name of MW550XC to avoid any IP address conflict with other hosts on your LAN or to connect the device to your existing LAN as shown in Figure 4.8. After click "**OK**" button, the system will prompt you for a credential to authorize the changes if you are still not logged in. That is, it will ask you for the Username and the Password as shown in **Figure 4.9**. A pop-up window as shown in **Figure 4.10** will prompt the user to wait for the change on the MW550XC device.

The device will be restarted without any beep. After the device is restarted, it will beep twice to indicate that the unit is running normally. Then, the MW550XC device can be found on a new IP address. It may be listed automatically by the **Device Management Utility** along with its old record or it can be found by clicking on the **Rescan** icon.

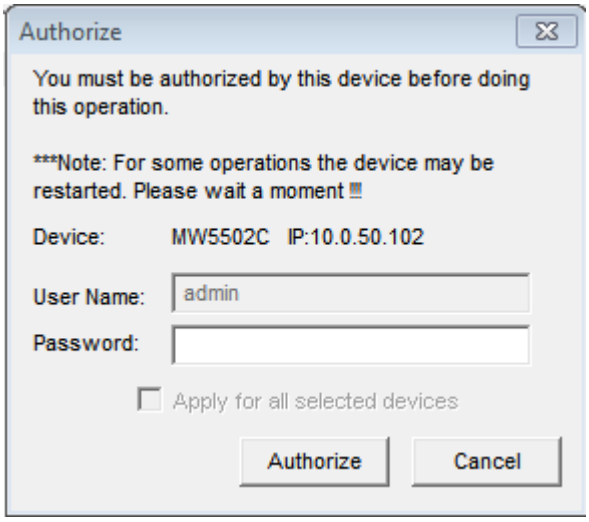


Figure 4.9 Authorization for Change

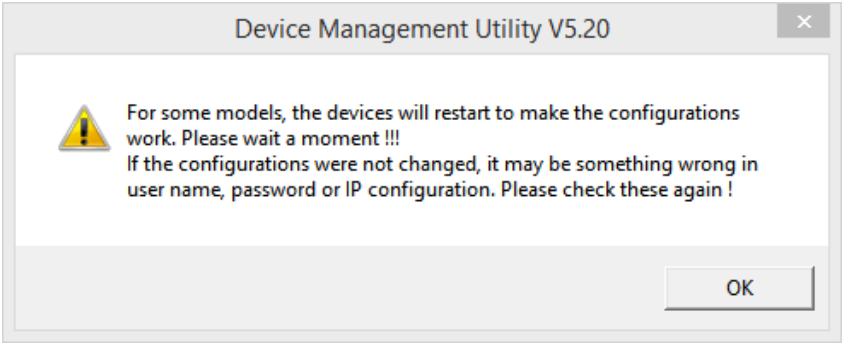


Figure 4.10 Waiting Notification for Restarting Device

A DHCP server can automatically assign the IP address, the Subnet Mask, and the Gateway (your network gateway) of the LAN interface of MW550XC device. You can simply check **"DHCP (Obtain an IP Automatically)"** box in the Network Setting dialog as shown in Figure 4.8 using our **Device Management©** utility and then restart it. Once restarted, the IP address(es) will be automatically configured.

4.2 *Advanced configuration via Web Interface*

The MW550XC Series' user interface is designed intuitively for satisfying customers' ease of use needs.
Every MW550XC device is equipped with a built-in web server. It can be accessed by using a web browser for configuring by entering the device's IP address (the default IP address is 10.0.50.100) in the URL field of your web browser. Once the device is connected to the network, it can be configured by using any web browser. An authentication request will appear as shown below when the user uses a web browser to configure the MW550XC Series. If this is the first login, please enter the default **User name** as "**admin**" and leave the **Password** default then click the **OK** button to login.

Note that you can alternately launch the Web Interface with your default web browser using **Device Management Utility** by choosing the **"Config by browser"** icon from the forth icon on the icon bar or select **"Config by browser"** option from under the pull-down menu **Configuration**

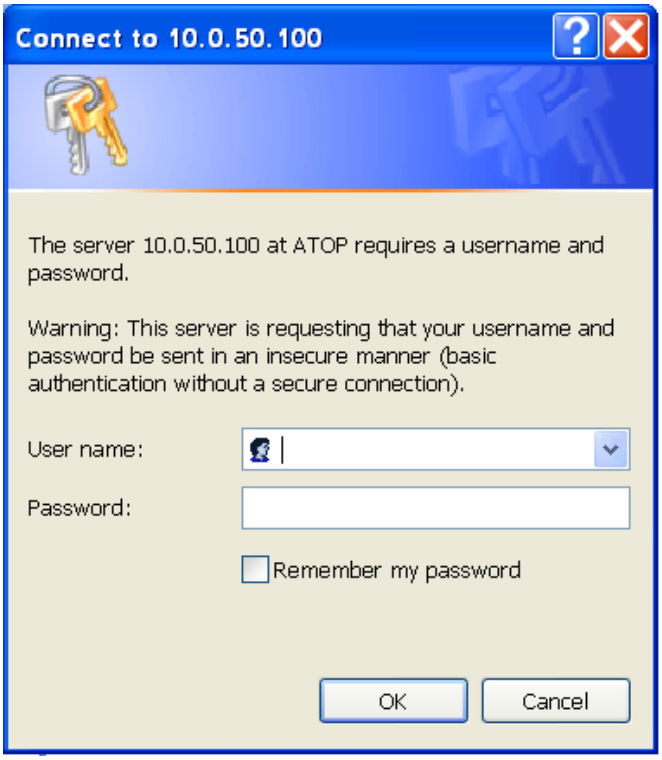


Figure 4.11 Authentication Pop-up Windows

An example of web configuration of MW550XC Series is shown below.

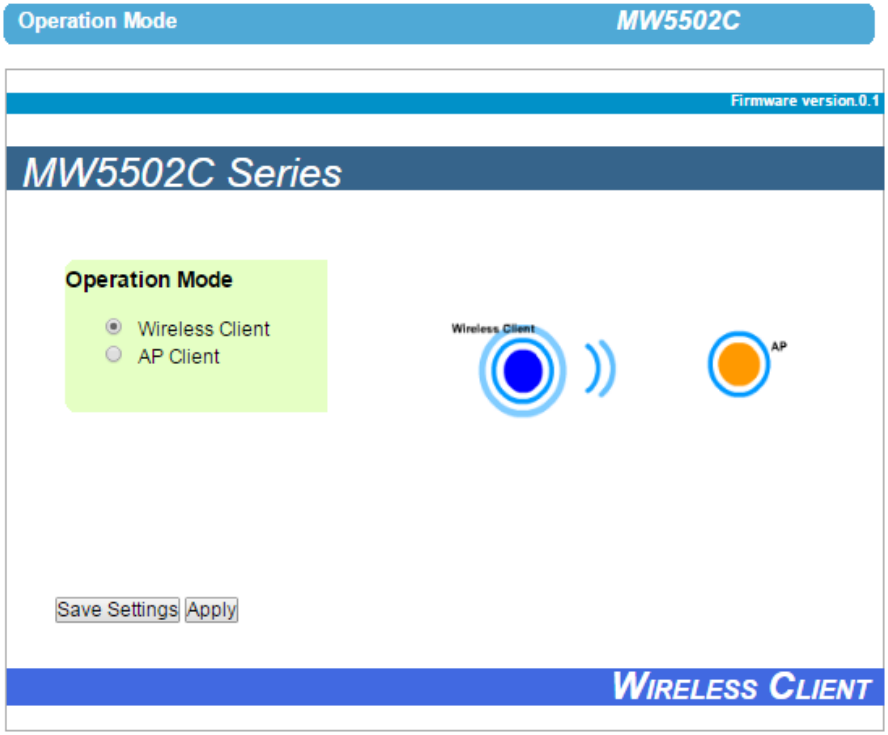


Figure 4.12 User Interface of Web Configuration

On the left side of the screen, a menu-tree is listed with all available modes and options as shown **Figure 4.13**. On the right side of the screen, the contents of each mode/option will be displayed in a graphical format. For more information on each selection, please refer to each corresponding section throughout this manual.

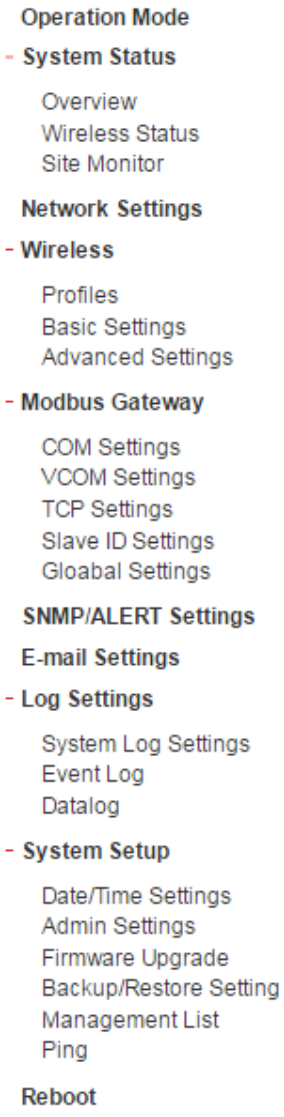


Figure 4.13 Menu-tree of All Available Modes and Options of MW550XC Series

There are three common buttons presented in almost every web configuration menu or section as shown below.

Table 4.1 Common Buttons in Web Configuration Menu

Button	Function
Save & Apply	Save and apply the current configuration input on the page.
Apply	As the caption implies, it applies the current configuration immediately but it will not save into the device. Until the device is restarted, the device will return to the old parameters.
Cancel	Cancel the current configuration input and show the original setting.

4.2.1 *Operation Mode*

The MW550XC Serial Device Server Series has been designed as a Wireless Client with the ability to choose a connection between Wireless Local Area Network (WLAN) and Local Area Network (LAN). It can also operate as an AP (access point) client, which will bridge a connection from WLAN to LAN or vice versa. This Operation Mode page is the welcome screen for the MW550XC Series. There are two operation modes to choose from:

1) **Wireless Client**
2) **AP Client.**

In **Wireless Client** mode, MW550XC will have **two independent** network interfaces: LAN and WLAN. Each interface would have its own IP address; hence, traffic from the LAN interface won't be transferred to the WLAN interface, and vice versa.

In the **AP Client** mode, the LAN and the WLAN interfaces are **bridged together** to create one single bridged interface using one IP address. Traffic from either side of the network will be passed onto the other side of the network.
The figure below shows the configuration page for **Operation Mode** of MW550XC. The user can select one of the two radio buttons inside the Operation Mode box. An image on the right side of the box displays the MW550XC as the blue circle while a remote access point (AP) that provides wireless access is the orange circle.

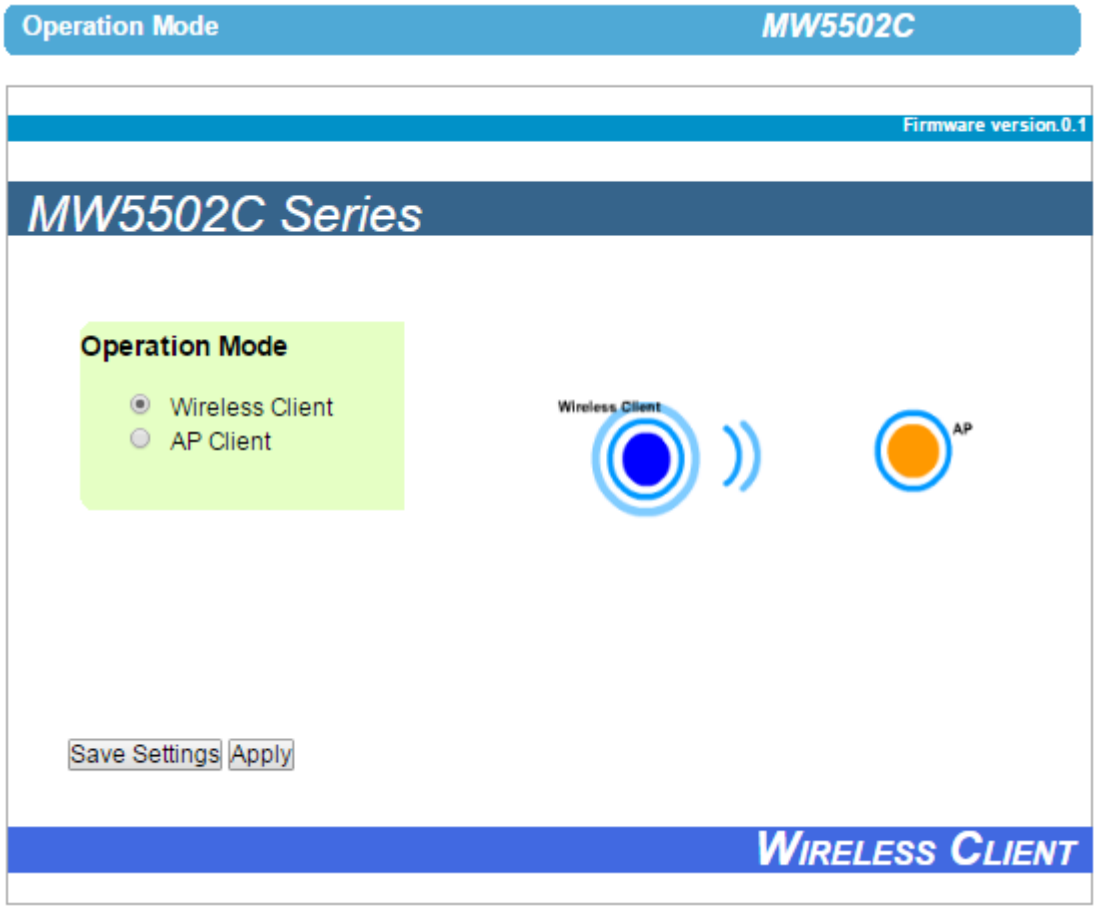


Figure 4.14 Configuration Page of Operation Mode with Wireless Client Setting

After finish configuring the **Operation Mode**, please click on **Save Settings** button to keep the change that you have made and to apply your setting**.** A pop-up window with a message **"Please wait for a while..."** will appear as shown below. When the saving is finished, the pop-up windows will disappear and return to the **Operation Mode** page**.**

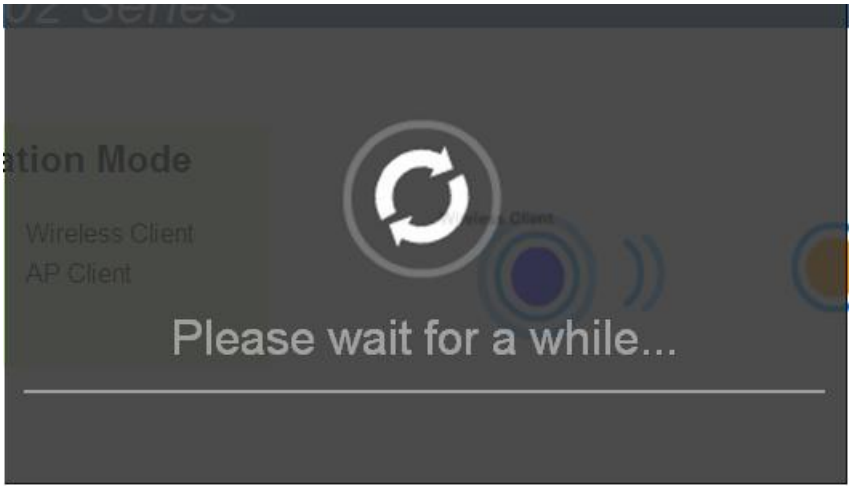


Figure 4.15 Waiting Message

If you only want to save the settings and restart the device to a selection of **Operation Mode**, you can click **"Apply"** button to apply the setting and reboot the MW550XC device**.** Note that after clicking the **"Apply"** button, the user will briefly see the same pop-up window as in above and after a few second another pop-up window will appear as shown below**.** Then, you will be redirected back to the **Operation Mode** page**.**

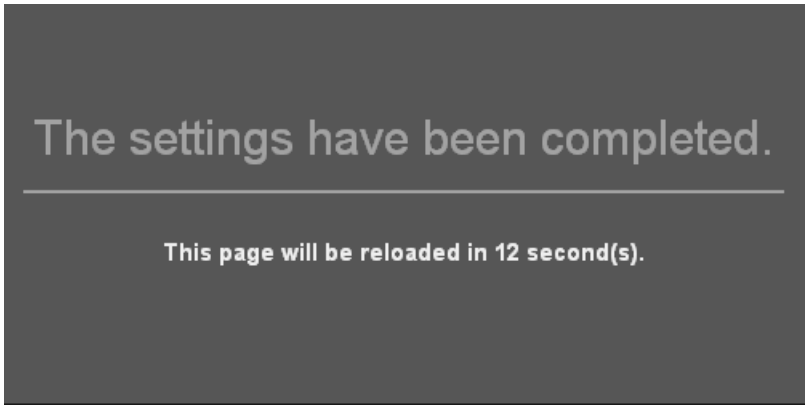


Figure 4.16 Completion of the settings and counting down for a page reload

The next figure shows an example of AP Client operation mode setting**.** Note that the graphic image on the right side of the box isplays the MW550XC as the blue circle with an Ethernet connection to a device denoted with a green circle. The remote access point (AP) that provides wireless access is still represented by the orange circle.

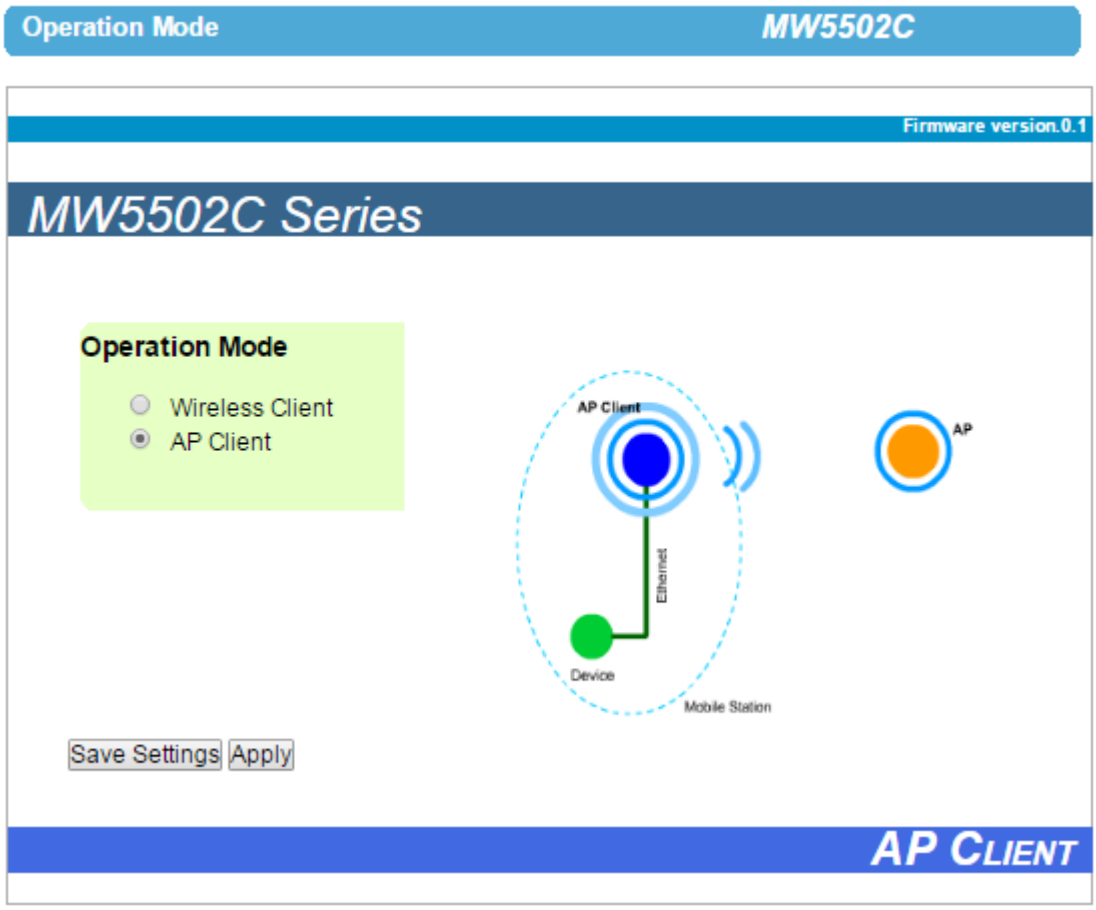


Figure 4.17 AP Client Operation Mode Setting

4.2.2 *Overview*

The "**Overview**" submenu under the "**System Status**" menu, displays overall and current general information on the MW550XC device's status and settings. An example of MW5502C's **Overview** page is shown below.

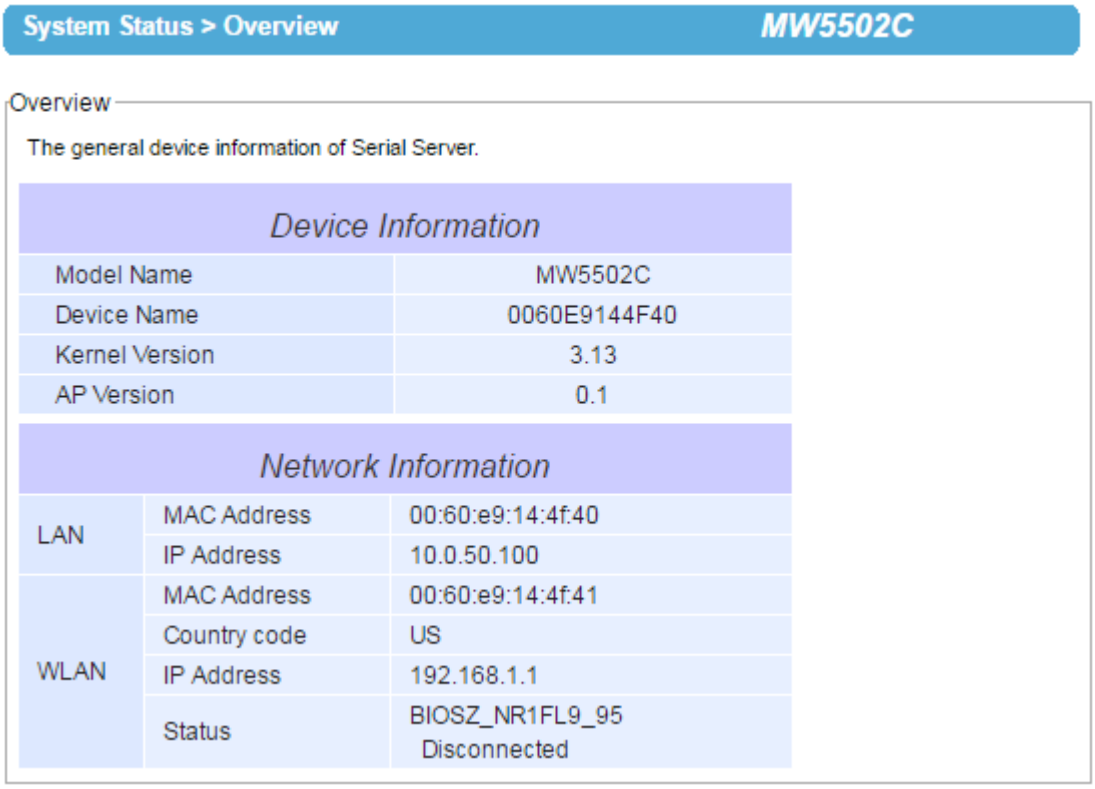


Figure 4.18 Overview Information Page of an MW550XC Device

- Information under the **Device Information** box displays the **Model Name**, the **Device Name**, **Kernel Version** and **AP Version** of the MW550XC device. Note that the default **Device Name** is the **MAC address** of your device. The firmware version of your MW550XC consists of the **Kernel Version** and the **AP Version**.
- Information under the **Network Information** box shows the summary of both **LAN** and **WLAN** interfaces. For **LAN** interface, there are its **MAC address** and current **IP address**. For **WLAN** interface, there are its **MAC Address**, the **Country code**, current **IP Address**, and the **Status** of the interface. Note that the Country code indicates the available radio channels for your WLAN interface while the **Status** displays current MAC Address of an access point (AP) that the MW550XC associates with and the AP's link quality in percent.

4.2.3 *Wireless Status*

The MW550XC's current wireless network status is displayed in this section called "**Wireless Status"** submenu under the "**System Status"** menu. The current information is summarized below. Please remember to always keep a note of your preferred setting. The **Current Information** includes **SSID**, **BSSID (AP MAC)**, **Topology** (infrastructure or other), **Band mode**, **Channel**, **Encryption**, and **Status**. Note that the **Status** of current information will be display as green bar(s) with percentage number to indicate the quality of the wireless link.

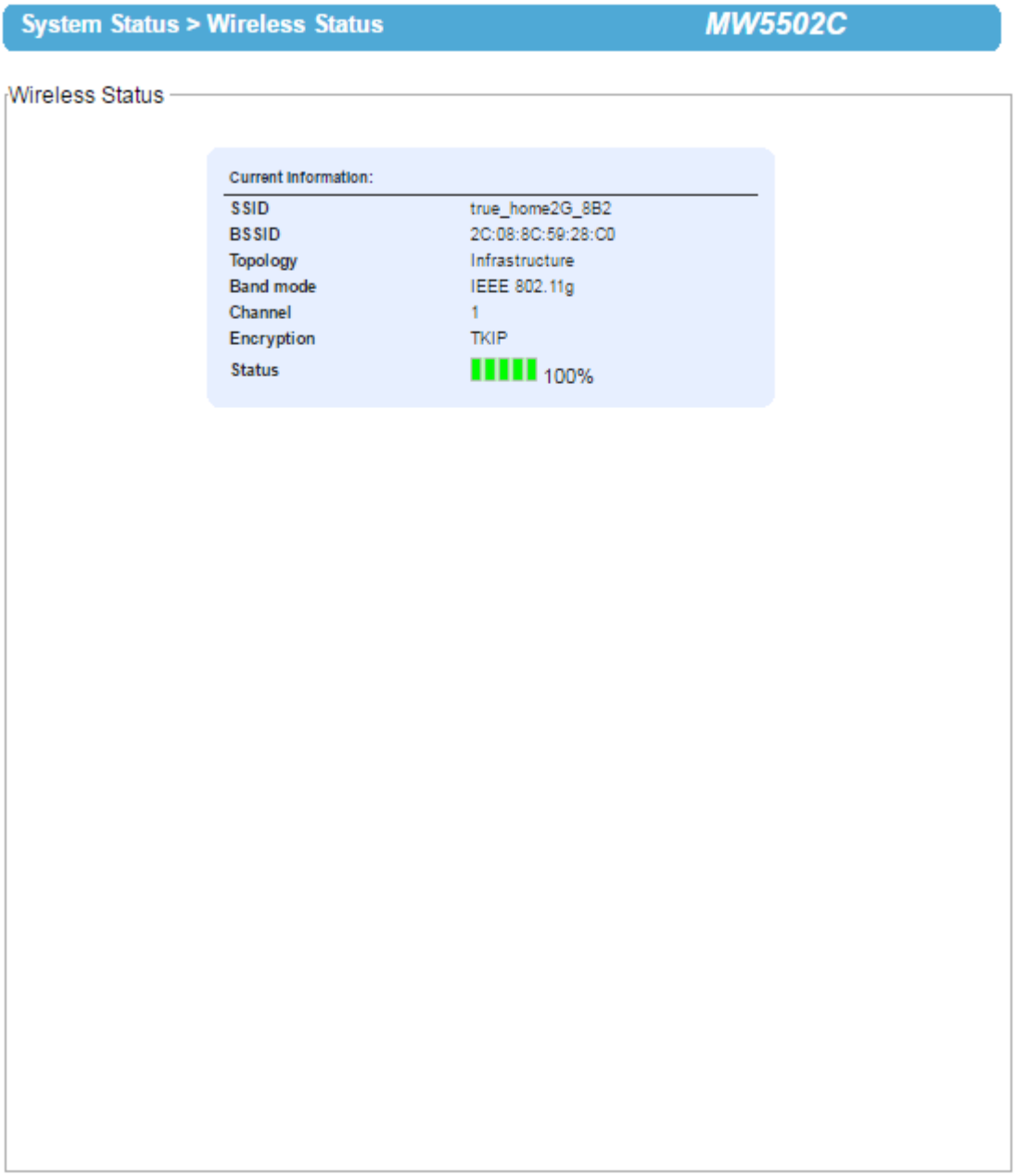


Figure 4.19 Wireless Status page shows current information of MW550XC.

4.2.4 *Site Monitor*

Site Monitor submenu under the **System Status** menu allows users to view other wireless networks in the neighborhood. It also provides information on other access points (APs) such as **SSID**, occupied **Channel(s)**, the **RSSI** (**R**eceived **S**ignal **S**trength **I**ndicator), Security and other parameters. It can be helpful when setting SSID and Channel number for your MW550XC device to avoid SSID name and Channel number conflict and prevent unexpected errors or degradation of your wireless network performance. Note that it will take a few second (approximately 10 seconds) for this option to gather information of the surrounding wireless networks. During this process, the web page will show a "Please wait..." message with running animation as shown below.

Figure 4.20 Transition page during the gathering of surrounding wireless network information.

An example of a list of nearby WLAN APs which is reported by the **Site Monitor** is shown in Below figure.
The available information includes the **SSID**, the **Mode** of IEEE 802.11 standards (which could be 802.11b, 802.11g, 802.11n, or a combination of standards), the radio **Channel** number, the **Authentication** mode (such as Open, WPA-PSK, WPA2-PSK, WPA2(PEAP), WPA2(EAP-TLS), WPA2(EAP-TTLS)), the **Encryption** standards (such as None, WEP,

AES or TKIP or a combination of TKIP/AES), the data rate in **Mbps**, and the quality of the wireless signal which is reported in **Signal%**.

The "**Refresh**" button at the bottom of the page allows user to obtain the latest information from the Site Monitoring process. Note that when there are two numbers under the **Channel** column, it means that there are **Primary Channel** and **Secondary Channel** used by that access points.

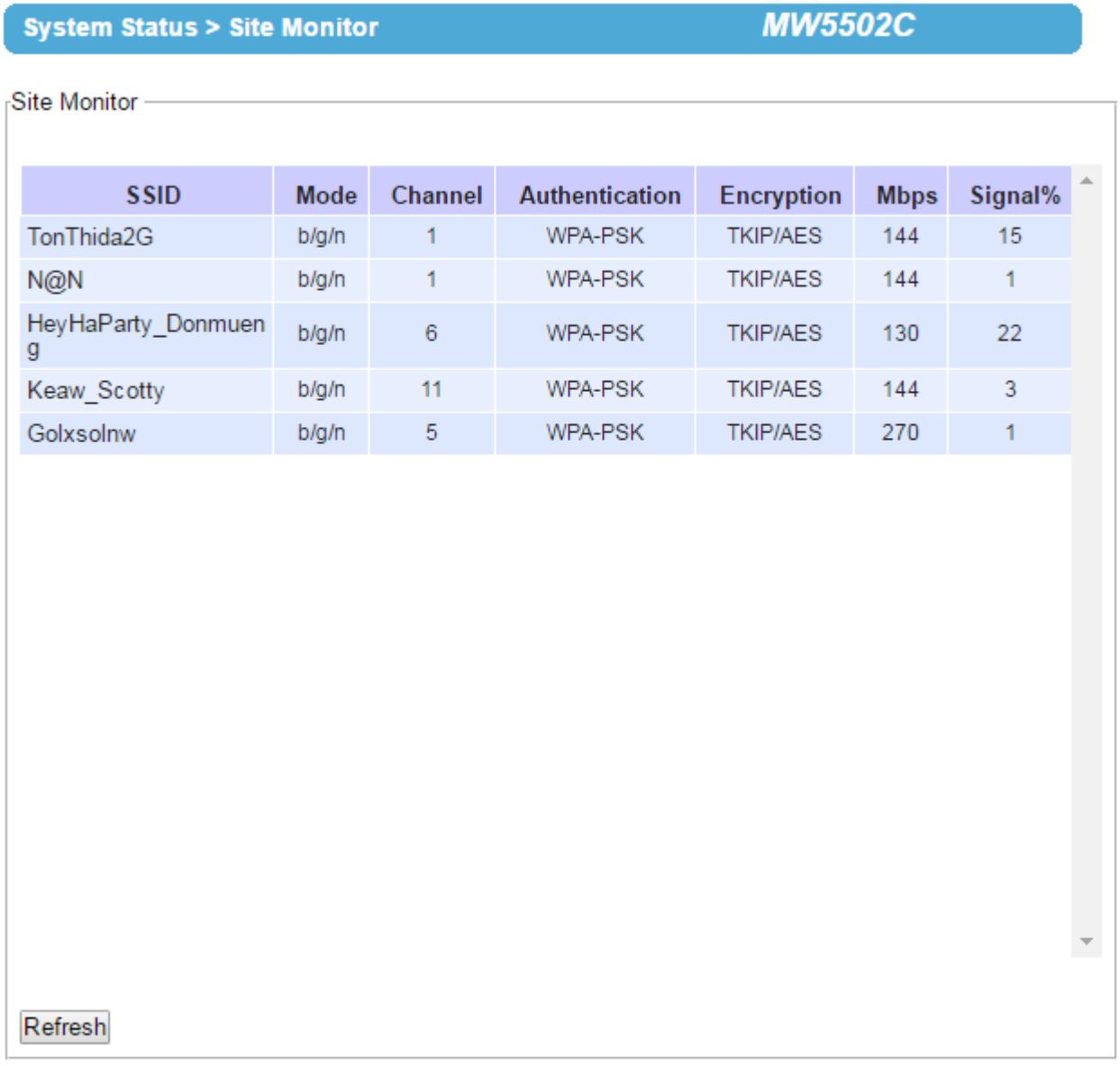


Figure 4.21 Results of a Site Monitoring of MW550XC Series.

4.3 *Web configuration - Network settings*

The MW550XC series have the ability to utilize dual connections, i.e., WLAN and LAN at the same time. The user can configure both LAN and WLAN interfaces in this section. An example of **Network Settings** page for MW550XC in Wireless Client mode is shown below.

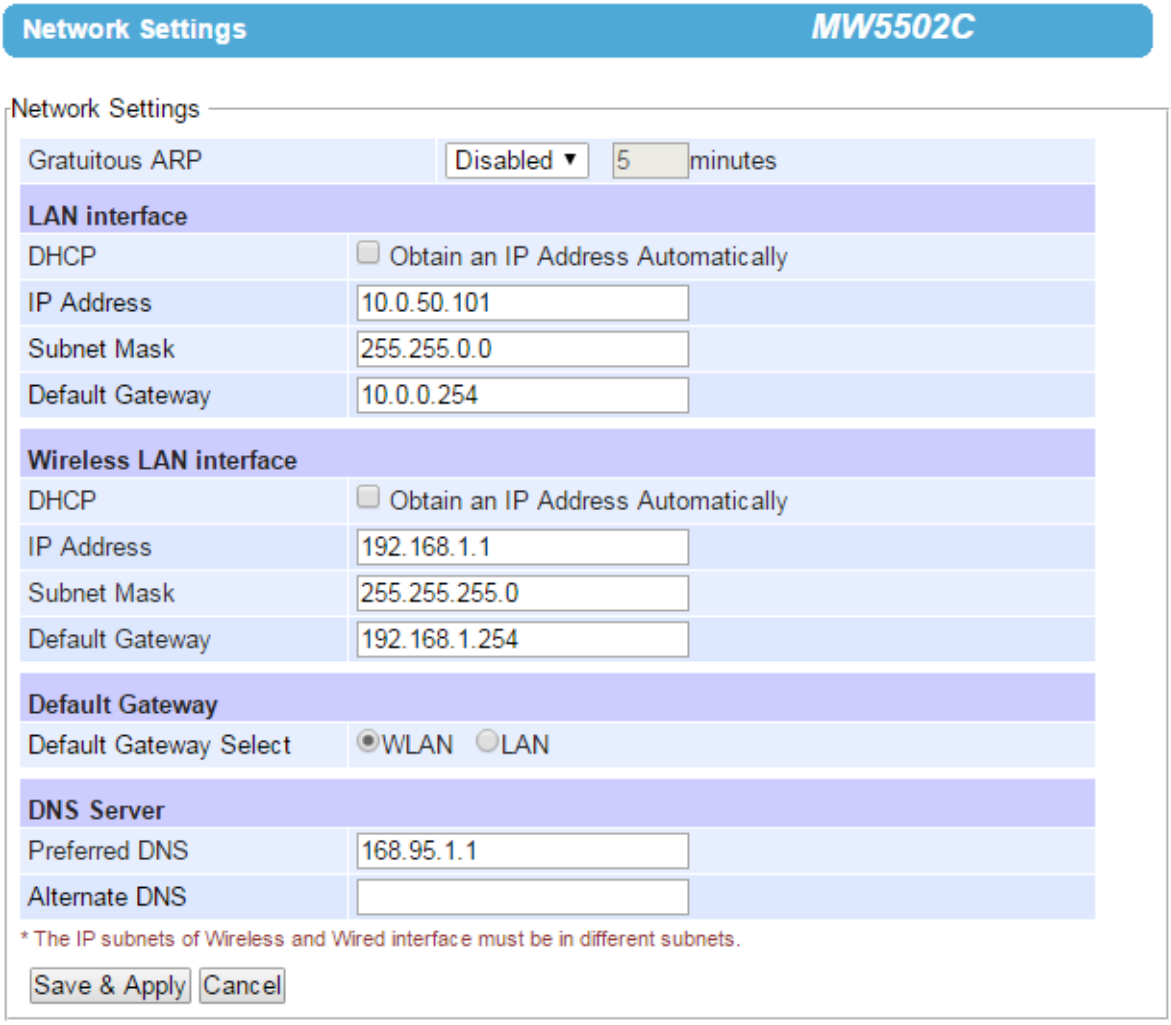


Figure 4.22 Network Settings Page (**Wireless Client Mode**)

There are four configurable parts under **Network Settings** which are **LAN interface**, **Wireless LAN interface**, **Default Gateway** and **DNS Server**. The first configurable option under the Network Settings is Gratuitous ARP (Address Resolution Protocol). This option enables MW550XC device to periodically send out an ARP response automatically to notify that MW550XC device is in the network. The frequency of transmission is in minutes which can be selected from the pull-down menu and the period of transmission in the unit of minutes can be set in the followed textbox as shown.

1) **LAN Interface and Manual Settings Part**
   - **a.** MW550XC device can get IP information automatically from a DHCP server in LAN. The user can check the box in front of the **"Obtain an IP Address Automatically"** to get the necessary IP information or enter the IP values manually if known in the **Manual Settings** section of this part.

b. **Manual Settings** – If the user wants to fix the IP address of **LAN interface**, the desired **IP Address**, **Subnet Mask**, and **Default Gateway** should be entered in this section.

2) **Wireless LAN Interface Part**
   a. MW550XC device can also get IP information automatically from a DHCP server in WLAN as well. The user can check the box in front of the **"Obtain an IP Address Automatically"** to get the IP information or enter the IP values manually if known in the following fields of this part.
   b. IP Settings for WLAN also include the desired **IP Address**, **Subnet Mask**, and **Default Gateway**.

Note that under the **Wireless Client** mode, LAN and WLAN can be seen separately. They need to be configured into different subnets. The user must choose which interface that should be the **Default Gateway** by selecting the corresponding radio buttons between **WLAN** and **LAN** as shown in the screenshot (see next part).

3) **Default Gateway Part**
   Default Gateway Selection specifies either **WLAN** or **LAN** interface as the default gateway. The selected interface is usually the one that is connected to a network gateway or Internet. Settings from one of them will not be applicable to the other, i.e., if the WLAN is selected over the LAN then IP, Subnet mask, etc., on the LAN side will be OFF. However, it can be changed to another value not in used and save those parameters.

Note that under the **AP Client** mode, you will only see one bridged interface (**LAN & WLAN Interface**) and the default gateway selection will be unnecessary (this part will disappear) as shown below.

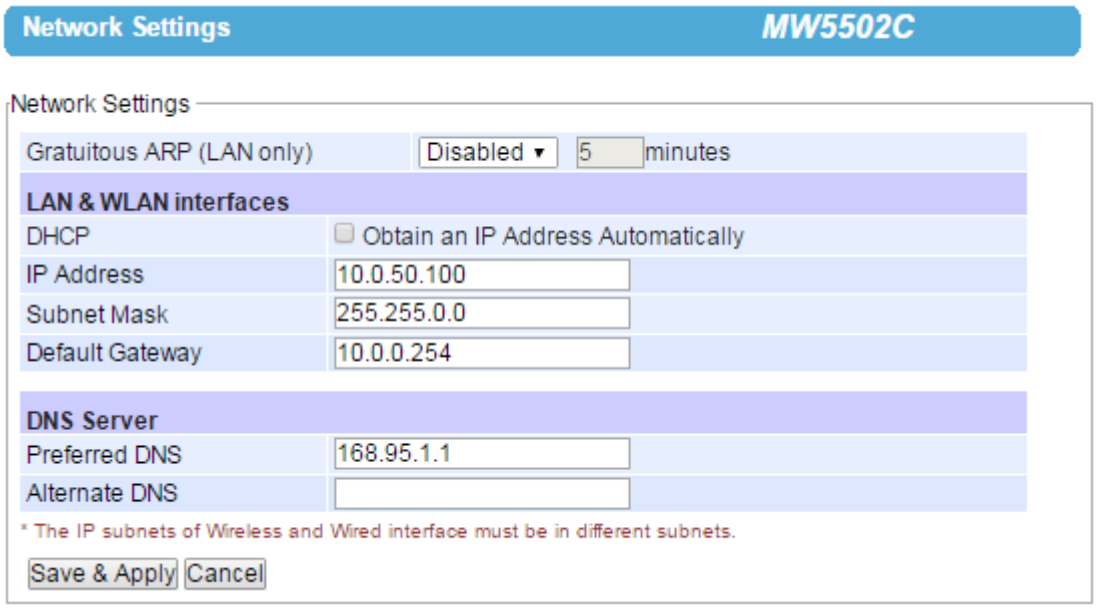


Figure 4.23 Network Settings Page for Bridged Interface (AP Client Mode)

4) **DNS Server Part:**
To allow your MW550XC device to properly connect to the Internet and be able to resolve for a host over the Internet, you must specify Preferred DNS) Domain Name Server(and)optionally (Alternate DNS in this part .

After finish configuring the **Network Settings**, please click on **Save & Apply** button to keep the change that you have made and to apply your setting**.** A pop-up window with a message **"Please wait for a while..."** will appear briefly**.** Then, another pop-up window with message **"The settings have been completed"** will be displayed**.** When the saving and applying are finished, the pop-up window will disappear and the web browser will be redirected to the **Operation Mode** page**.** If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button**.**

4.4 *Web configuration – Wireless Settings*

4.4.1 *Wireless Profiles*

Starting from firmware version V3.XX, each wireless profile can be directly set from the profile webpage. Users no longer need to set wireless profile through the Basic Setting **(**see next subsection**).** When the **Wireless Profile** is enabled by checking the **Enabled** box and clicking **Apply** button behind the **Wireless Profile** option, there will be an **Add** button under the **AP List** for adding new wireless profile as shown below**.**

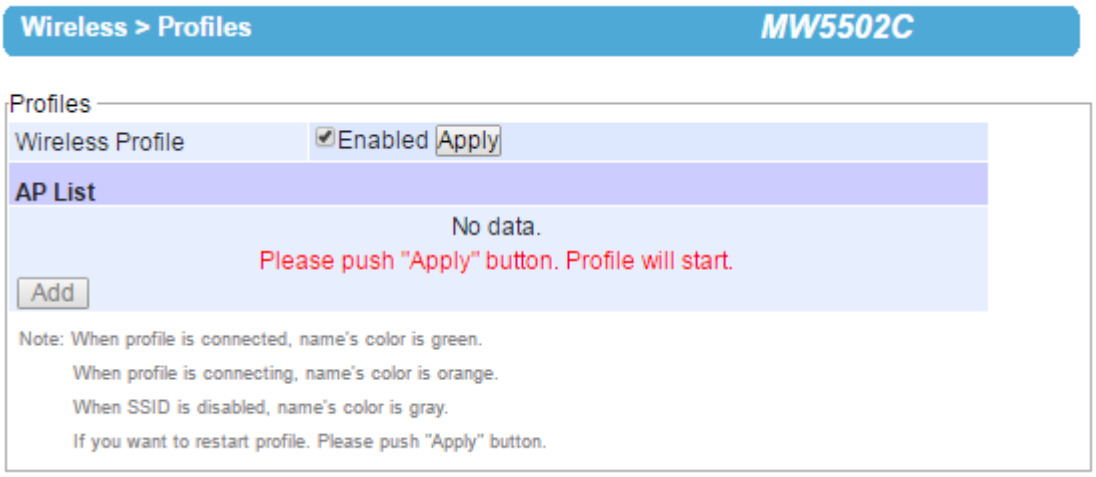


Figure 4.24 Enabling Wireless Profile Option to Add New Access Point

This will bring up the **Basic Settings List** webpage as shown in in the next page for entering the necessary information of each wireless profile**.** Description of each field can be found in the next subsection**.** When entering all necessary information of the wireless profile, click **Save** button at the bottom**.** Users are allowed to save up to ten wireless connection profiles or list of network names or SSIDs (called **AP List**) inside MW550XC. MW550XC will retry each and every enabled profile (network name or SSID) for one minute before continuing to the next profile if the current profile failed to connect.

You can use the **Sort** column to adjust the precedence of the profiles. However, this function is disabled by default.

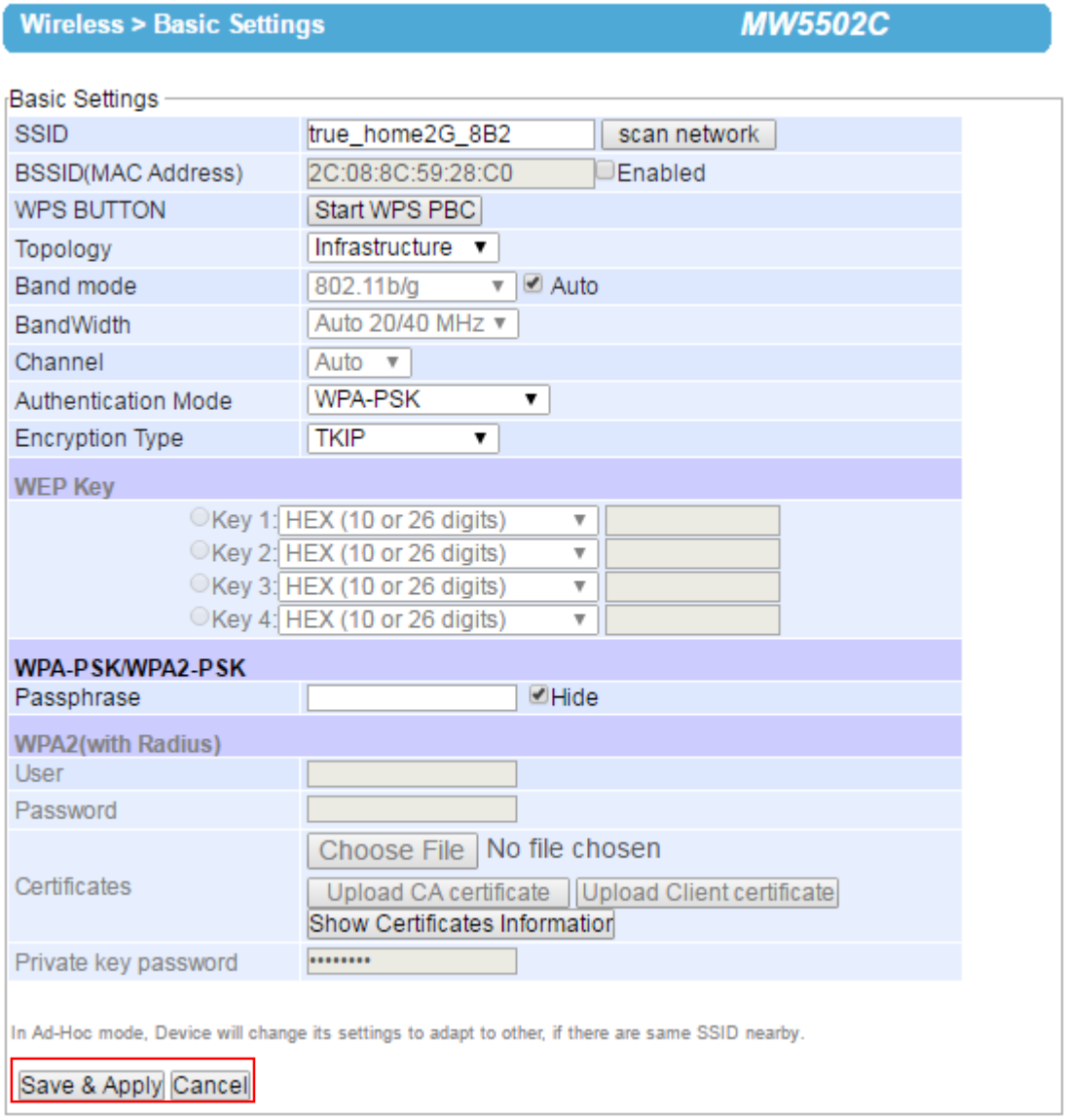


Figure 4.25 Basic Setting List Webpage after Clicking Add Button

Figure below shows an example of enabled Wireless Profile in which an **AP List** consists of ten available entires for network names or SSIDs. Each entry will have its number (**No.**) on the list and **Name**. Color of the **Name** is used to indicate the current status of the SSID or profile on the list. When the color of the **Name** is green, the profile is connected. When the color of the **Name** is orange, the profile is connecting. When the color of the **Name** is grey, the profile is disable. Under the **Modify** column, there are two options: **Edit** and **Delete**. If the user clicks on **Edit**, this will bring up the **Basic Setting List** webpage. On the other hands, if the user clicks on **Delete**, this will remove the profile from the list. The last column in the list is the **Sort** column which has arrow button(s) to allow changing the order of the profiles (access points) on the list.

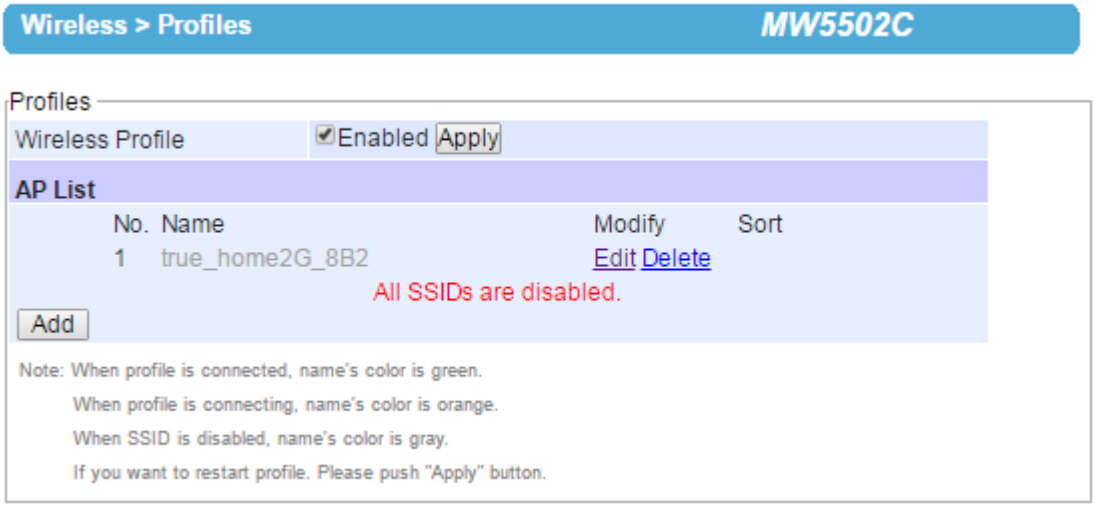


Figure 4.26 Wireless Profile Page

4.4.2 *Basic Settings*

To set up a wireless connection for MW550XC, a number of parameters are needed to be configured in this section. However, the user will have two different wireless configuring pages when **Wireless Profile** (see previous subsection) is enabled as shown in previous paragraph and when **Wireless Profile** is disabled as shown in Figure below. The only differences between the two pages are that when **Wireless Profile** is enabled, the **Basic Settings** web page will be disabled or cannot be used. When **Wireless Profile** option is enabled by checking the **Enabled** box (see previous paragraph), the following sentence will be displayed in the pop-up window: "Basic Settings can't be used, because Profile is enabled" as shown in figure below.

When **Wireless Profile** is disabled, the **Basic Settings** web page can be used. The default settings in **Basic Settings** page can be in two **Topology** modes: **Infrastructure Mode** or **Ad Hoc Mode**. The user will have both modes to choose from. **Table 4.2** and **Table 4.3** summarized the default settings for **Infrastructure mode** and **Ad Hoc mode**, respectively.

Table 4.2 Default Settings in Infrastructure Mode:

Caption	Default
SSID	Null
BSSID (MAC Address)	Any (unless enabled)
Topology	Infrastructure
Band Mode	Automatic Detection
Channel	Automatic Detection
Bandwidth[1]	Automatic Detection
Secondary Channel	Automatic Detection
Authentication Mode	OPEN
Encryption Type	NONE

Table 4.3 Default Settings in Ad Hoc Mode:

Caption	Default
Radio Off	Disabled (box not checked)
SSID	Null
BSSID (MAC Address)	Any (unless enabled)
Topology	Ad-Hoc
Band Mode	802.11b
Channel	13
Bandwidth[1]	20 MHz
Secondary Channel	Disabled
Authentication Mode	OPEN
Encryption Type	NONE

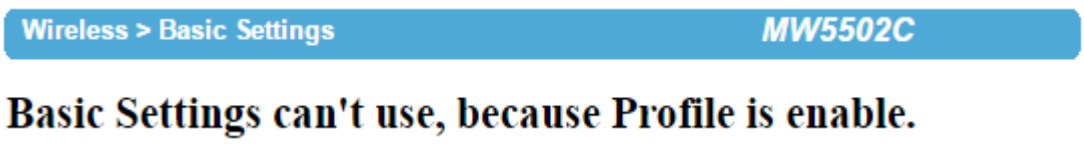


Figure 4.27 Basic Settings for Wireless Connection when Wireless Profile is Enabled

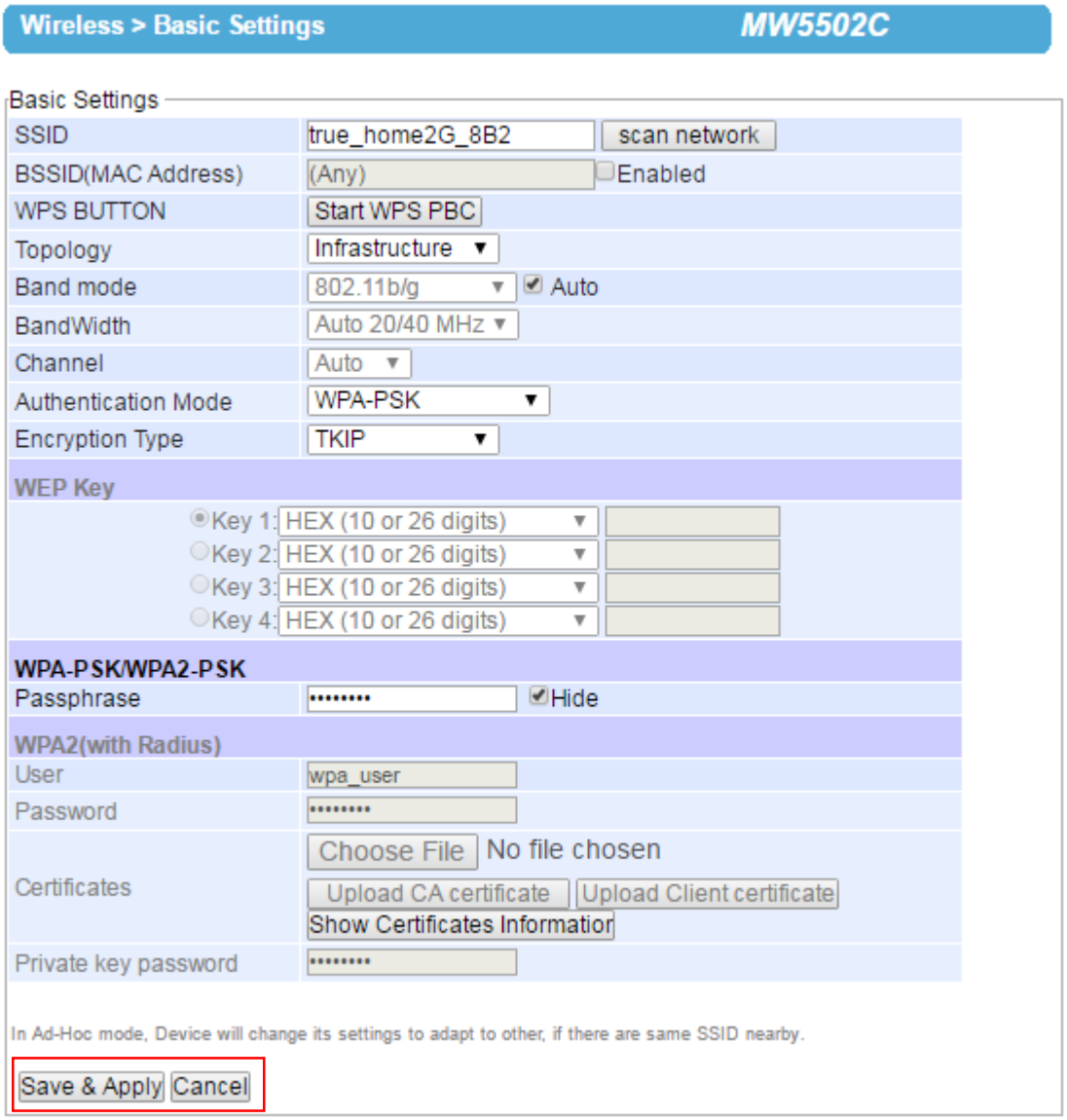


Figure 4.28 Basic Settings for Wireless Connection when Wireless Profile is Disabled.

After the user finished setting the **Basic Settings** as shown above, please click the **Save & Apply** button to save the new wireless configuration on the MW550XC and allow the configuration to take effect. If the user want to discard any changes on the configuration, please click **Cancel** button. Then, the page will be reloaded.

Attention

- In order to avoid disconnection issue, using LAN interface to setup Wireless Configurations is recommended. The Web UI (User Interface) might freeze or lock up if the setup is made using the wireless interface because the connection would be lost whenever wireless settings are changed. It might take some time for the device to attach to the Access Point with new settings.

Each configurable option under the **Basic Settings** is described as follows:

- **SSID:** This specifies the SSID (or network name) that MW550XC should connect to wirelessly. There is a **"Scan Network"** button on the right of the empty text box. This button makes it possible to look for nearby available

wireless networks to attach to. Once clicked, it will start a scanning process and prompt a window with a list of available wireless networks. Detailed steps for setting the **SSID** or using **Scan Network** button will be explained after this list.

- **BSSID (MAC Address):** This refers to access point's MAC address on which the MW550XC should connect to. Enabling this option by checking the box behind it will lock MW550XC to that access point. Therefore, MW550XC would not roam to another access point with the same SSID.
- **Wifi-Direct Group Owner:** Click to enable the function. This function will allow MW550XC to find nearby Wi-Fi Direct device and form a Wi-Fi Direct group to communicate over a peer-to-peer link without wireless access point in the infrastructure mode. The group owner will work as a access point in the infrastructure mode and the other devices join the group as clients. For more details, please refer to Section 4.4.6
- **WPS BUTTON:** The **WPS** acronym stands for **W**i-Fi **P**rotected **S**etup and the **PBC** stands for **P**ush **B**utton **C**onfiguration. To use this feature, first trigger the WPS process in a WPS supported access point (AP) and click on the **Start WPS PBC** button on MW550XC's UI. The AP and the MW550XC should connect automatically. Note that the **Topology** setting (next option) in this case should be **Infrastructure** and the **Band Mode** (option after the next) should be **Auto** so that the **WPS** can work. Note that this button is unavailable when the **Wireless Profiles** is enabled. For more details, please refer to Section 4.4.6.
- **Topology:** There are two type of wireless network topologies which are **Infrastructure** (for connecting to an Access Point) or **Ad Hoc** (for connecting to a wireless client). Note that the **Ad Hoc** mode is unavailable when the **Wireless Profiles** is enabled. For more details, please refer to Section 4.4.3-4.4.4.3
- **Band Mode:** This option allows user to select the radio frequency band which are supported by IEEE 802.11b, 802.11b/g, and 802.11b/g/n standards. It is recommended to leave this option to **Auto** for MW550XC to sense for the best available mode automatically by checking the **Auto** box.
- **Channel:** This option allows the user to specify the radio channel number for MW550XC to operate on. However, the available channels would depend on the **Band Mode** and the regulatory domain (CN, EU, TW, or US) selected in the **Wireless Advanced Settings** (discussed next section). This option is disabled when the **Band Mode** is set to **Auto**.
- **Bandwidth:** This option allows MW550XC to select between 20 MHz or 40 MHz radio bandwidth usage. The latter fills a larger spectrum; hence, it provides a better throughput if it is allowed by the Access Point. However, it is not recommended to use 40 MHz at 2.4 GHz band for IEEE 802.11b/g/n standards.
- **Channel:** This option specifies the radio channel number that MW550XC will use which can be chosen from the drop down list between 1 and 11.
- **Authentication Mode:** This option allows the selection of wireless network authentication mechanisms which could be **OPEN, SHARED, WPA-PSK, WPA2-PSK, WPA2 (PEAP), WPA2 (EAP-TLS),** and **WPA2 (EAP-TTLS)**.
- **Encryption Type:** This option specifies the encryption algorithm for wireless connection which could be **WEP**, **TKIP** and **AES**. However, please beware that **WEP** and **TKIP** are not supported by the IEEE 802.11n standard; therefore, the wireless link speed would be limited to 54Mbps.
- **WEP Key:** This option is enabled when **Authentication Mode** is set to **OPEN** and **Encryption Type** is set to **WEP**. Up to 4 different hexadecimal or ASCII keys can be entered in this option.
- **WPA-PSK/WPA2-PSK Passphrase:** This option is enabled when **Authentication Mode** is set to **WPA-PSK** or **WPA2-PSK**. The passphrase can be between 8 and 63 characters long.
- **WPA2 (with RADIUS):** Depending on selected **Authentication Mode**, different fields in this option will be enabled. **WPA2 (PEAP)** would require you to provide the user, password, and the certificates. **WPA2 (EAP-TLS)** would require you to provide the certificates and private key password. **WPA2 (EAP-TTLS)** would require you to provide the user, the password, and the certificates. Please note that only *.pem certificates are supported.

Please remember that 2.4 GHz frequency can be easily interfered by other wireless devices that operate in the same spectrum (namely, Bluetooth, ZigBee, microwave oven, etc.); therefore, it is better to choose the IEEE 802.11b/g/n which operates in the 2.4 GHz spectrum when the user's network allows.

4.4.3 *Configure MW550XC as a Wireless Ad-hoc Peer*

In Ad Hoc mode, each wireless node will communicate directly with each other and have equal role in communication in which they are usually called peer. To configure MW550XC as an ad-hoc peer, please click on **Basic Settings** page under the **Wireless** menu and follow steps in Paragraph 4.2.1 above . Figure 4.29 shows an example of a wireless ad-hoc peer in IEEE 802.11b network with open authentication and no encryption. However, Atop recommends that you should enable the security mechanism using the Wire Equivalent Privacy (WEP) with 128-bit encryption key as summarized in Table 4.4.

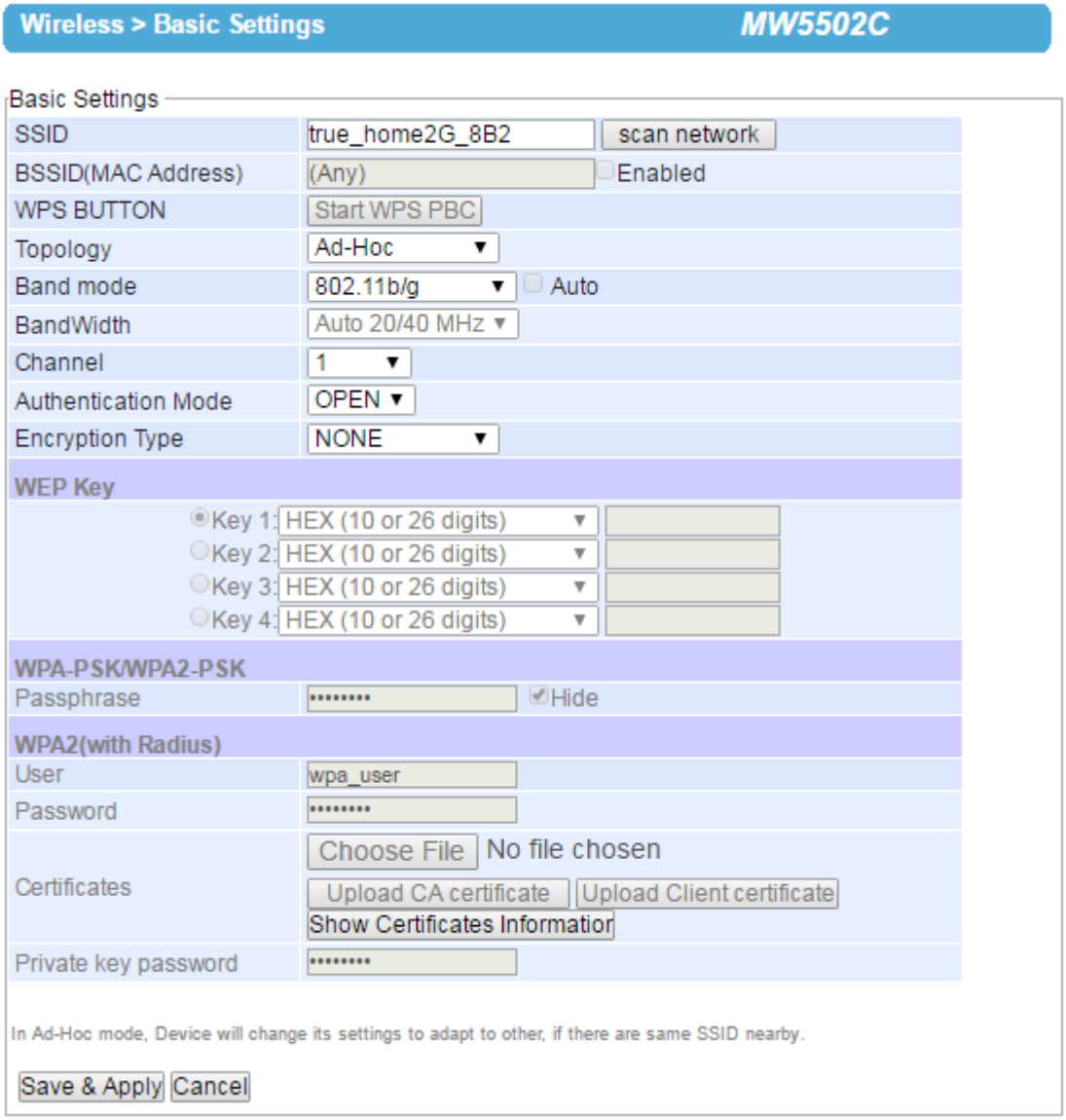


Figure 4.29 Wireless Ad-Hoc Peer Settings for MW550XC

Table 4.4 Summary of Parameter Settings for Wireless Ad-Hoc Peer with WEP Security

Topology	**Adhoc**
Band Mode	802.11b, it provides better wireless sensitivity with lower maximum rate at 11Mbps.
Tx Rate	Auto

Channel	1; we recommend using 1, 6, or 11 (for 2.4 GHz).
Authentication	Open
Encryption	WEP
WEP Key	For 64-bit encryption, enter 5 ASCII value or 10 Hexadecimal digits. For 128-bit encryption, enter 13 ASCII value or 26 Hexadecimal digits. Use 128-bit when possible.

It is possible to pair up two MW550XC devices in Ad-Hoc mode or have them connect to AW5500C (Infrastructure) automatically without entering the Web UI. Please refer to Device Management's manual for more details on click-2-Go.

4.4.4 *Configure MW550XC as a Wireless Client in the Infrastructure mode (PSK)*

In Infrastructure mode, each wireless node cannot communicate directly with each other. They must communicate via the access point only. Note that MW550XC cannot be operated as an access point in infrastructure mode. If you require an access point, please consider a deployment of Atop's AW5500C series. Atop recommends the user to utilize the strongest wireless security measure as described in the following subsections.

To configure MW550XC as a Wireless Client in infrastructure mode with WPA2-PSK authentication mode and AES encryption, please click on **Basic Settings** page under the **Wireless** menu and follow steps in Paragraph 4.2.1 above. The screenshow shows an example of a wireless client in infrastructure mode with these security mechanisms enabled as summarized in Table 4.5 **Parameter Settings for Wireless Client in Infrastructure Topology with WPA2-PSK Security**

Table 4.5 Parameter Settings for Wireless Client in Infrastructure Topology with WPA2-PSK Security

Topology	Infrastructure
Band Mode	Auto
Tx Rate	Auto
Channel	Disabled (auto sensing)
Authentication	As defined by the Access Point
Encryption	As defined by the Access Point
WPA2-PSK passphrase	8~63 characters

Attention

We recommend using WPA2-PSK authentication with AES encryption as it is the most secure password-type security option without utilizing 802.1x.

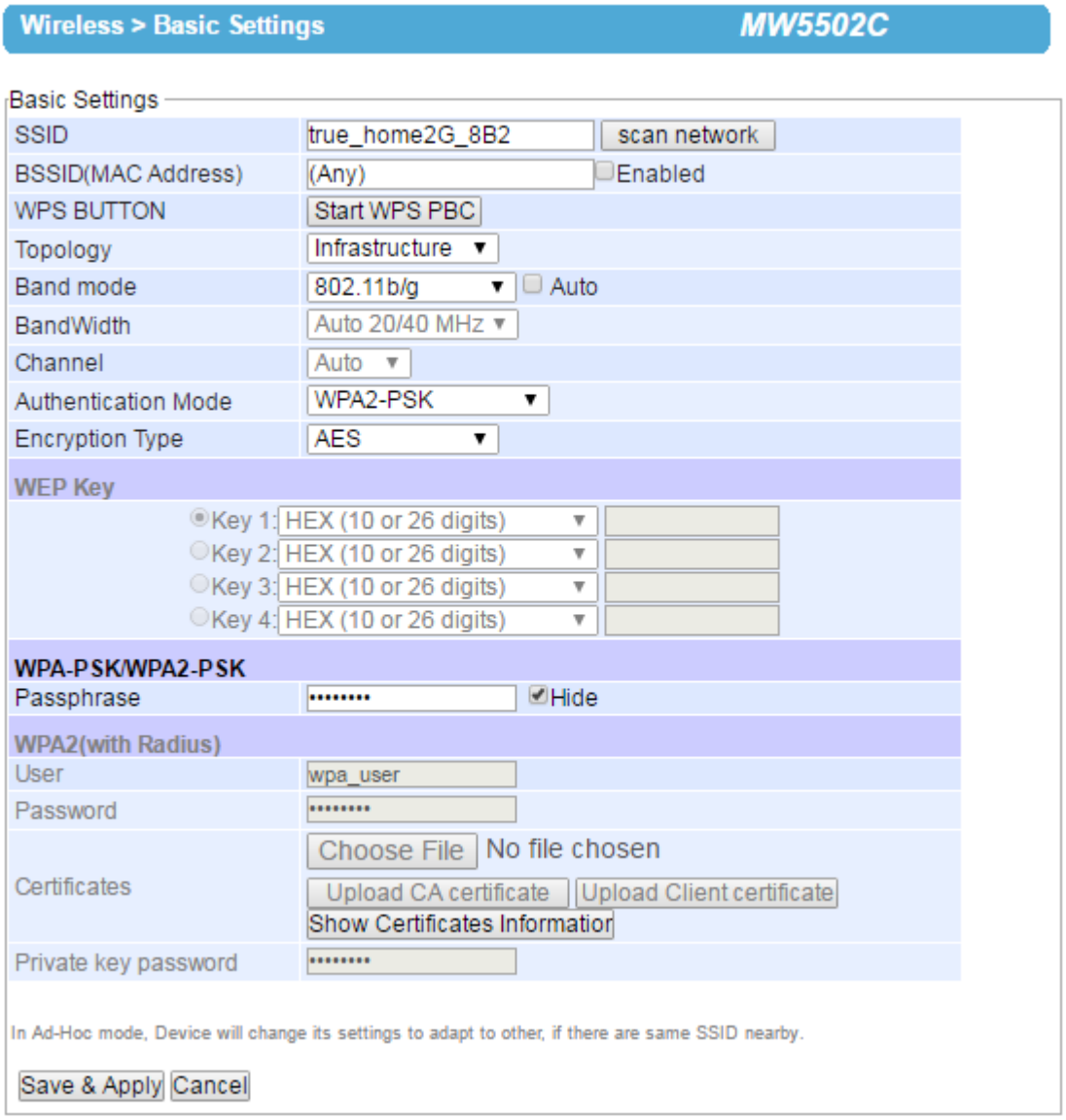


Figure 4.30 Wireless Client with WPA2-PSK Security Settings for MW550XC

4.4.4.3 Configure MW550XC as a Wireless Client in the Infrastructure mode (PEAP-MSCHAPv2)

To configure MW550XC as a Wireless Client in infrastructure mode with PEAP-MSCHAPv2 authentication mode and AES encryption, please click on **Basic Settings** page under the **Wireless** menu and follow steps in Paragraph 4.2.1 above. Figure below shows an example of a wireless client in infrastructure mode with this authentication mode enabled as summarized in Table 4.6.

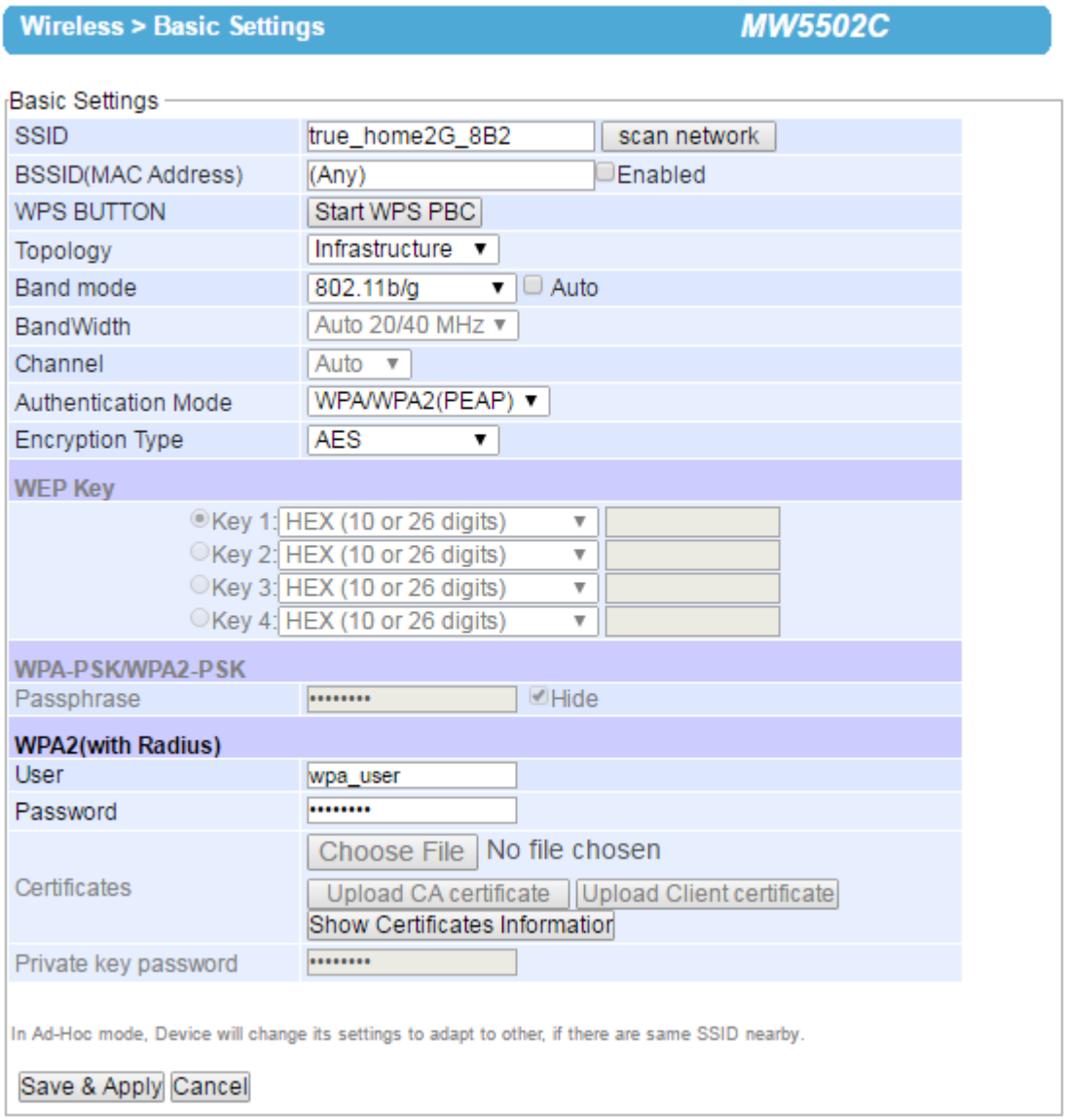


Figure 4.31 Wireless Client with PEAP Security Settings for MW550XC

Table 4.6 Wireless Client-Infrastructure Topology Parameters with WPA2 (PEAP-MSCHAPv2) Security.

Topology	Infrastructure
Band Mode	Auto
Tx Rate	Auto
Channel	Disabled (auto sensing)
Authentication	WPA2 (PEAP)
Encryption	As defined by the Access Point
Username	Defined by the RADIUS Server
Password	Defined by the RADIUS Server

Steps to Connect to an Access Point

You can manually enter the **SSID** of the connecting access point in the **SSID** option or use the "**scan network**" button to have MW550XC grab the necessary wireless information of surrounding access points in the device's coverage area. Please be patient as this process might take up to 10 seconds.

Once it has finished scanning, names and basic properties of available wireless networks will be shown below. You can then select an AP from the list by clicking on the radio button in front of the desired SSID. Then, click on the "**Connect**" button at the bottom of the page and its settings would be loaded automatically to the device's user interface (UI). If you would like the scanning process to run again, just click on the "**Refresh**" button. Otherwise, click on the "**Close**" button to close this window.

SSID	MAC Address	*T	Mode	Channel	Authentication	Encryption	Mbps	Signal%
jasaowanee	0C:54:A5:46:D6:3D	Infra	b/g	2	WPA2-PSK	AES	54	22
TANSUNUNTA	B0:C2:87:4B:7F:90	Infra	b/g/n	1	WPA2-PSK	AES	144	19
NUT@OOI	20:89:6F:F5:16:0A	Infra	b/g/n	6	WPA-PSK	AES	144	32
HeyHaParty_Donmueng	C4:A3:66:E1:3F:8C	Infra	b/g/n	6	WPA-PSK	TKIP/AES	130	32
true_home2G_8B2	2C:08:8C:59:28:C0	Infra	b/g	11	WPA-PSK	TKIP/AES	54	100
Pui_Araya	E8:DE:27:C6:08:73	Infra	b/g/n	11	WPA2-PSK	TKIP/AES	300	19
Keaw_Scotty	E8:40:F2:44:20:51	Infra	b/g/n	7	WPA2-PSK	AES	144	19
BIOSZ_NR1FL9_95	68:72:51:20:15:1E	Infra	b/g/n	4	OPEN	NONE	130	100
BeamKaew	00:04:ED:FE:20:8F	Infra	b/g/n	9	WPA2-PSK	TKIP/AES	150	19
.@ truemoveH	00:02:6F:DF:0C:4A	Infra	b/g/n	11	WPA2	AES	144	3
nook	64:51:7E:29:24:4F	Infra	b/g/n	11	WPA-PSK	AES	150	2
true_homewifi_5B1	60:03:47:08:B5:B1	Infra	b/g/n	11	WPA-PSK	TKIP/AES	72	2
.@ TRUEWIFI	00:02:6F:DF:0C:48	Infra	b/g/n	11	OPEN	NONE	144	3
HappyTowerD2	00:02:6F:77:D8:CF	Infra	b/g	1	WPA2-PSK	TKIP/AES	54	0
true_home2G_1eb	D0:60:8C:E6:F1:EB	Infra	b/g/n	6	WPA-PSK	TKIP/AES	130	15
mintto	94:FE:22:4A:54:58	Infra	b/g/n	3	WPA-PSK	AES	270	8

T is Topology (Infra = Infrastructure, Adhoc)

Connect Refresh Close

Figure 4.32 Results of network scanning when uses "scan network" buttons

If no wireless networks have been found, the list would be empty as shown below.

SSID	MAC Address	T	Mode	Channel	Authentication	Encryption	Mbps	Signal%
There is no wirelesss network detected.								

T is Topology (Infra = Infrastructure, Adhoc)
Channel is listed as Primary Channel, Secondary Channel

Refresh Close

Figure 4.33 Result when there is no wireless network available in the area.

After finish configuring the **Basic Settings**, please click on **Save** button to keep the change that you have made**.** A pop-up window with message **"Please wait for a while..."** will be displayed**.** When the saving is finished, the pop-up window will disappear and the web browser will remain on the **Basic Settings** page**.** If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button.

4.4.5 *Advanced Settings*

This subsection provides details on wireless network parameters for performance tuning. Changing options in this section may affect overall performance of your MW550XC; therefore, please be cautious. If you are still unclear on the effect of each option, please refrain from altering it. Figure below depicts the **Wireless Advanced Settings** page.

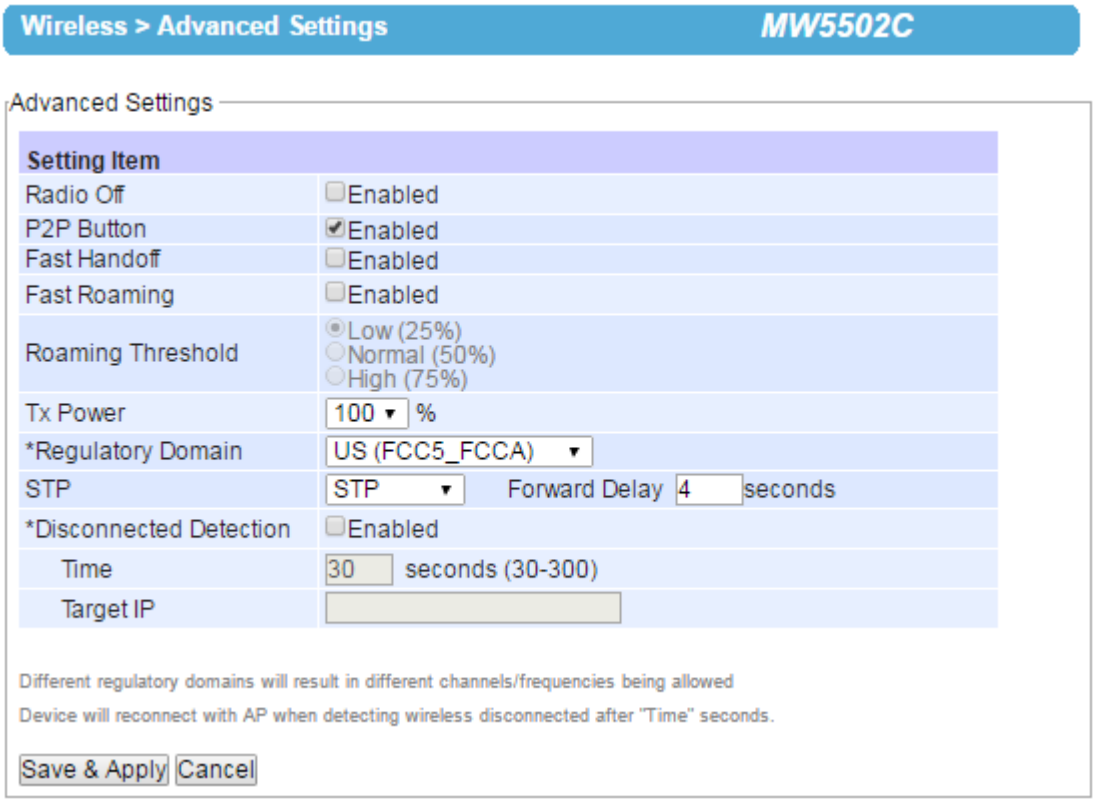


Figure 4.34 Wireless Advanced Settings when Wireless Profile is Disabled and Topology set to infrastucture

- **Radio Off** – When this option is enabled, this allows the user to turn off the wireless interface completely.
- **P2P Button** – MW550XC has an external physical WPS button called P2P Button, which can create "WI-FI direct" and "serial auto link" communication.
- **Fast Handoff –** This option enables Atop's proprietary protocol to speed up roaming between AW5500Cs (Atop's Industrial Wireless Serial Device Servers) in addition to Fast Roaming (next option). Enable this option to allow AW5500C to share its neighboring AW5500C information to MW550XC to further reduce its roaming time.
- **Fast Roaming –** Enable this option to allow MW550XC to scan for available access points in the background to speed up roaming when necessary.
- **Roaming Threshold –** This option set the threshold level used to determine when MW550XC should try to connect to another access point when the wireless signal drops below the selected range. The available thresholds are Low (25%), Normal (50%), and High (75%).
- **Tx Power –** This option allows user to set the MW550XC's **Transmission Power**. The transmission power can be reduced to prevent wireless interference to other wireless networks.
- **Regulatory Domain –** This can be selected from 4 options in the drop-down list box**:** CN**(**APL1_WORLD**)**, EU**(**ETSI2_WORLD**)**, TW**(**APL3_FCCA**)**, US**(**FCC5_FCCA**)**, and VN(ETSI3_WORLD). Note that different Regulatory Domains will result in different radio channels**/**frequencies being allowed MW550XC to operate **(**see **Channel** setting in previous subsection**).**

- **STP –** The **S**panning **T**ree **P**rotocol is only available in the **AP Client** mode. Enable this option if STP is enabled in the user's network to prevent network loops by setting up the **Forward Delay** time. When disabled, MW550XC will not forward STP Bridge Protocol Data Units (BPDUs).

Note that if Wireless Profile or Ad-hoc mode (Paragraph 4.4.1 above) feature is enabled, Fast Handoff, Fast Roaming and Roaming Threshold, and STP options will not be presented and supported, as shown below.

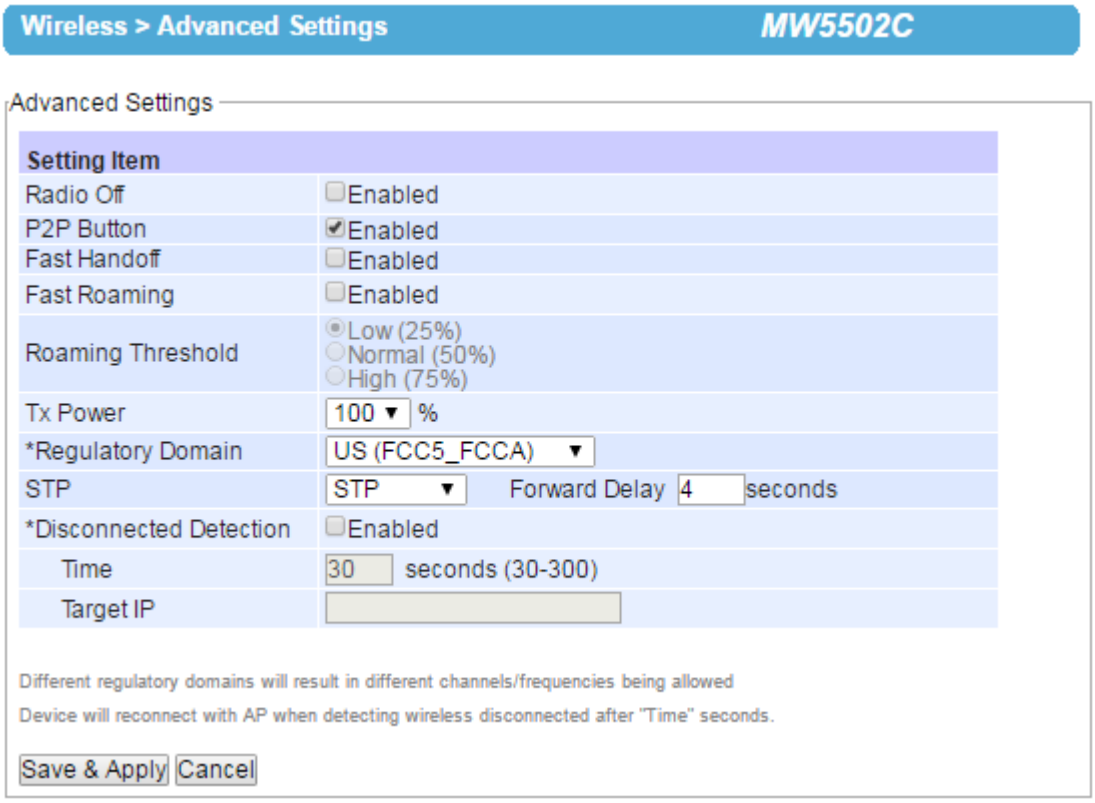


Figure 4.35 Wireless Advanced Settings Page when Wireless Profile is Enabled

After finish configuring the **Advanced Settings**, please click on **"Save & Apply"** button to keep the change that you have made**.** A pop-up window with a message **"Please wait for a while..."** will appear briefly**.** Then, another pop-up window with message **"The settings have been completed"** will be displayed**.** When the saving and applying are finished, the pop-up window will disappear and the web browser will be redirected to the **Operation Mode** page**.** If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button**.**

4.4.6 *P2P Button (External Physical WPS button)*

MW550XC has an external physical WPS button (Wi-Fi Protected Setup), or so called P2P Button. This button help creating somewhat secure "WI-FI direct" and "serial auto link" automatically, without troublesome on the user's side.

- Select this **P2P Button** option inside **Wireless > Advanced Settings** to enable it. This option is enabled by default.

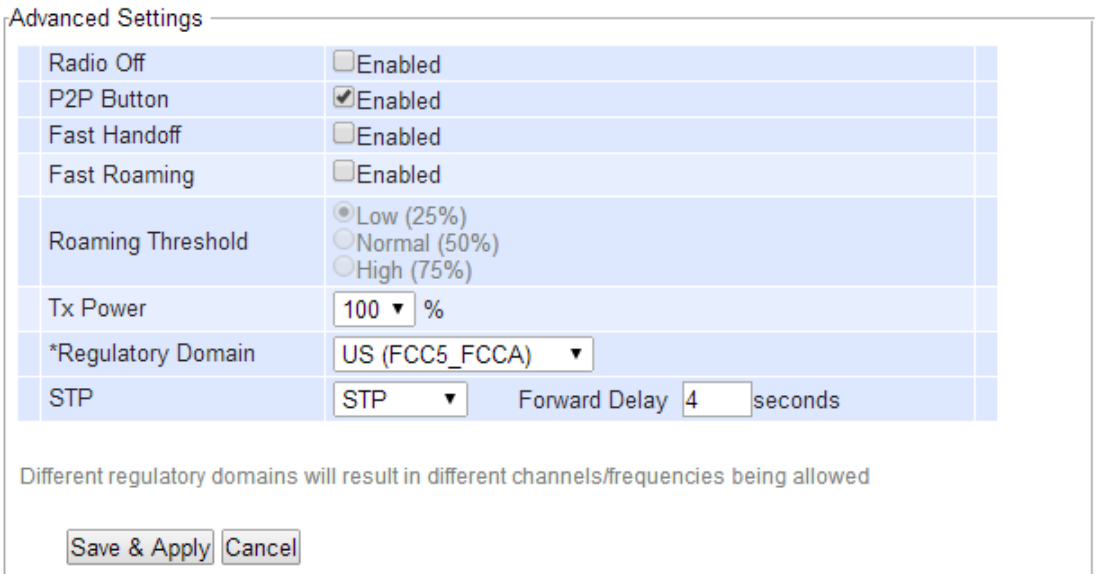


Figure 4.36 P2P Button in Wireless > Advanced Setting

- To successfully establish the connection, all devices' settings such as IP address and subnet mask must be correct. Users can input the settings via **Device Management®** .

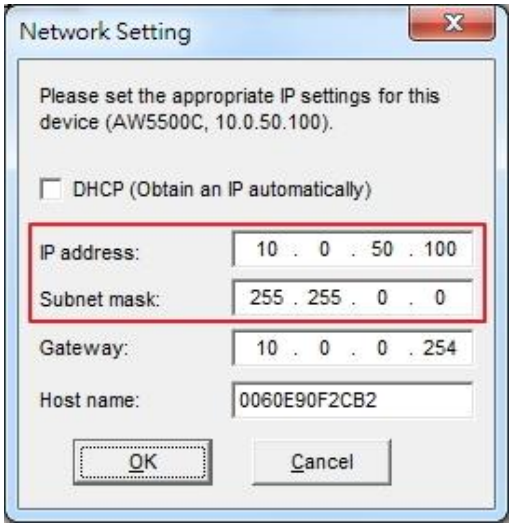


Figure 4.37 Network Setting

- By selecting the P2P button, user can assign MW550XC to various working mode, as shown in the table below.

Table 4.7 Timing Relationship on Various Working Mode

Pressing seconds	1~3(s)	4~7(s)	8~(s)
Working mode	Restart connection	AP(Wi-fi direct)	AP client

- MW550XC can create a **WIFI direct** connection only by pressing P2P button. To change AP's mode, press P2P button for 4~7 seconds. To set it as AP client, press the button over 8 seconds. If user wants the AP to connect to other clients, press only 1~3 seconds to restart theconnection.

- Before creating a **serial auto link**, first check that the MW550XC COM port has connected to RTU. Then, follow

the remaining steps of the **WIFI direct**.

- Software program will create a new SSID for both WIFI Direct and Serial Auto Link. For MW550XC, SSID would be “DIRECT - Xx” where Xx is two random alphabets.

Table 4.8 Connection Status is Illustrated through LED

LED State			
Color	Off	Blinking	On
Orange	P2P is not enabled.	P2P is connecting at Soft AP mode	Device’s P2P mode is enabled in Soft AP mode.
Green	P2P is not enabled.	P2P is connecting at Client mode	Device’s P2P mode is enabled in AP client mode.

Figure 4.38 SSID for WIFI Direck or Serial Auto Link

- Status of the connection is illustrated through LED. The following table describes the meaning of the LED color.
- **Limitation**
  - The pairing sequence time which starts after pressing WPS or P2P button is 120 seconds. The paring time for both devices must be set to 120 seconds beforehand, otherwise; pairing will be failed.
  - WPS protocol does not support pairing multiple APs to one AP client at the same time. It might cause paring failure.
  - When pairing two COM ports of the same MW550XC, the device A’s COM1 is paired to the device B’s COM1 while the device A’s COM2 is paired to the device B’s COM2.

- The AP mode is enabled by the software program, so the setting will be lost when restarting the device.
- The actual time to pair the devices depends on the complexity of the environment.

■ **Wi-Fi Direct Group Owner Mode:** Quick Steps

1) Enable Wi-Fi Direct on your MW550XC by

   a) Press and hold the button (on the side of the housing) for 4 seconds
   b) Enable it through website as shown in Figure 4.39 below

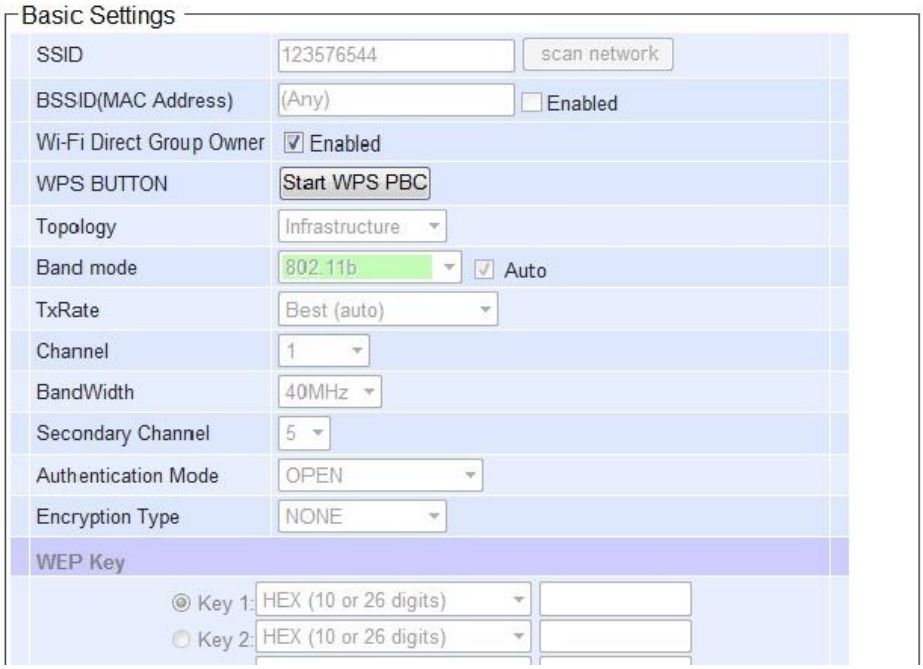


Figure 4.39 Enable WiFi Direct Group Owner through Basic Settings

2) When Wi-Fi Direct or WPS PBC (Push Button Configuration) on the wireless client is active, the AP will try to establish the connect via Wi-Fi Direct automatically.

3) In case that another device wants to join the Wi-Fi group, do the followings:

   a) Press and hold Wi-Fi Direct Group Owner's WPS button or P2P Button (on the side of the **housing**) 1 second to trigger WPS PBC
   b) Or click the start WPS PBC software button on website

Note:

   a) Reboot or click apply settings on Web GUI will break Wi-Fi Direct Group.
   b) Profiles will be disabled if Wi-Fi Direct is enabled.
   c) Press and hold the button for 8 seconds to destroy Wi-Fi Direct Group Owner mode. MW550XC will switch to AP Client mode when using the P2P button.

4.5 *Web configuration – Modbus Gateway*

In this section, the term "**Modbus Gateway device**" will be used to refer to the MW550XC series and the term "**serial device**" to refer to any Modbus device that connect to Modbus Gateway via COM, VCOM, or TCP connections. In any Modbus network, there are two types of Modbus devices: Modbus Master and Modbus Slave. The Modbus Master will send a request message to a Modbus Slave. Then, the Modbus Slave will respond to the Modbus Master's request. A Modbus device (serial device) that is connected to the MW550XC series Modbus Gateway device will either assume a role of Modbus Master or Modbus Slave. The basic settings in this section will address how to configure the role of the serial device in your Modbus Gateway device and its serial communication parameters. The term "**Operation Mode**" will be used to refer to the combination of role (Master or Slave) and the message or data transfer types (RTU/ASCII/TCP) of the Modbus protocol used by the serial device.

4.5.1 *COM Settings*

This section shows how to set up the physical ports of the Modbus Gateway device (COM ports or serial ports that serial devices are connected to). The available number of COM ports may vary according to the chosen Modbus Gateway model. Figure 4.40 shows the COM Settings web page in which COM1 port is shown with its **Operation Mode** under **Modbus Setting** and **Serial Configuration** settings. These settings will configure the role of the serial device through the **Operation Mode** and the serial communication parameters of that serial device through the **Serial Configuration** settings.

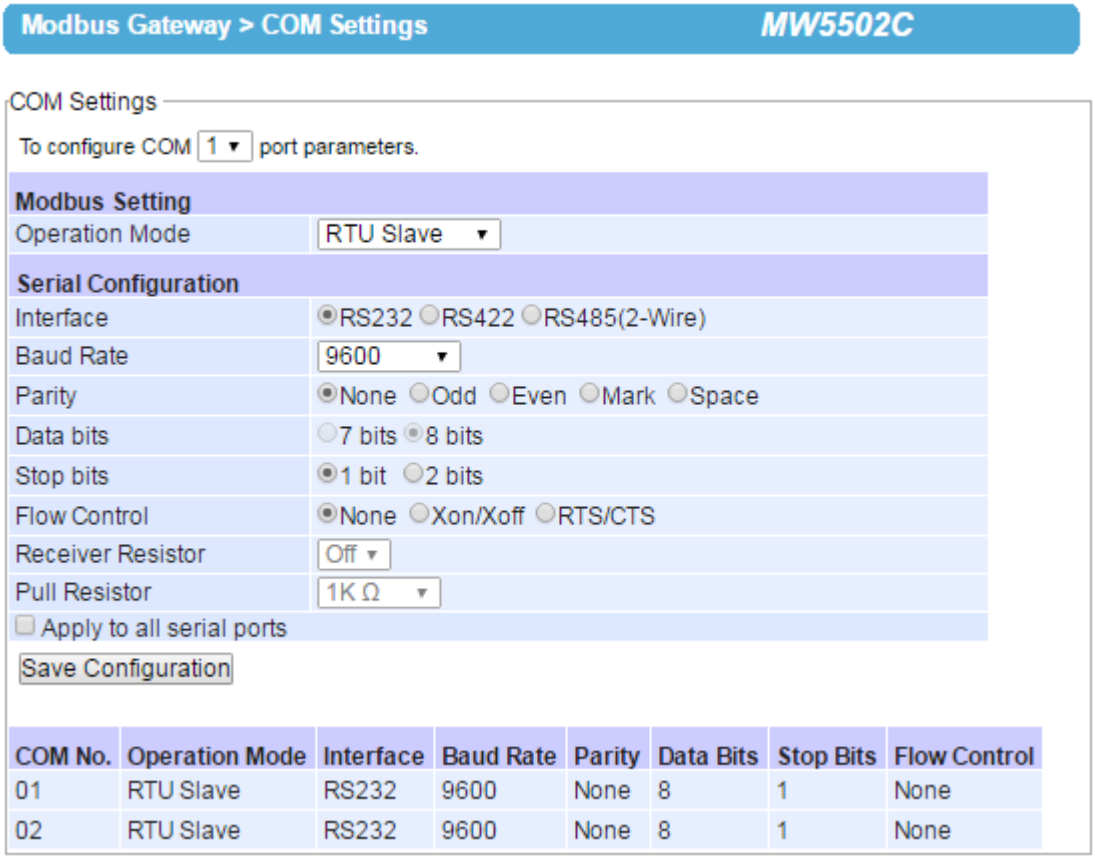


Figure 4.40 COM 1 Port Setting Page

4.5.2 *Operation Mode*

To set the **Operation Mode** of the serial device that is connected to the Modbus Gateway through a COM port, use the pull-down menu to select among the following modes under **Modbus Setting**.

- **RTU Slave:** The serial device is working as a Modbus Slave node: the serial device will wait, accept request from, and response to its Modbus Master node. Data transfer is done in RTU format.
- **RTU Master:** The serial device is working as a Modbus Master node: the serial device will issue commands to or query Modbus slave nodes. Data transfer is done in RTU format.
- **ASCII Slave:** The serial device is working as a Modbus Slave node: the serial device will wait, accept request from, and response to its Modbus Master node. Data transfer is done in ASCII format.
- **ASCII Master:** The serial device is working as a Modbus Master node: the serial device will issue commands to or query Modbus Slave nodes. Data transfer is done in ASCII format.

4.5.3 *Serial Configuration*

Figure below shows the **Serial Configuration** part of **COM** port settings. Note that these settings need to match the parameters on serial port of the serial device. Each option is later on described in detail.

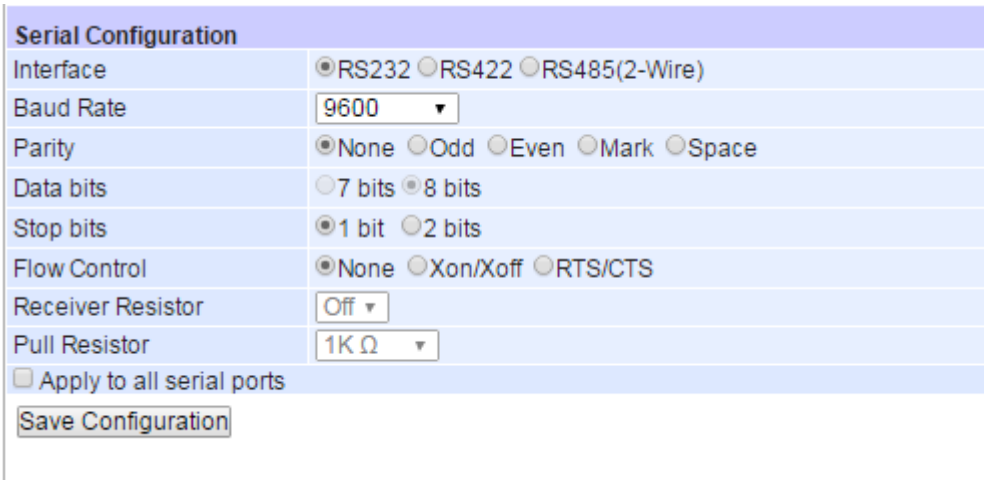


Figure 4.41 Serial Configuration Part of COM Port

- **Interface:** This option allows selection between RS-232, RS-422, and RS-485 standards. Note that RS-485 support both 2-Wire RS-485 and 4-Wire RS-485.
- **Baud Rate:** The user can select one of the baud rates (from 110 to 921600 bps) from the drop-down list.
- **Parity:** The available **Parity** options are None, Odd, Even, Mark, or Space**.**
- **Data Bits:** The setting for **Data Bits** can be 5 bits, 6 bits, 7 bits, or 8 bits**.**
- **Stop Bits:** The number of **Stop Bits** can be either 1 bit or 2 bits.
- **Flow Control:** The user can choose among None (No Flow Control), RTS/CTS (Hardware Flow Control), or Xon/Xoff (Software Flow Control). If Xon/Xoff is selected, the Xon and Xoff characters are changeable. Defaults are 0x11 for Xon and 0x13 for Xoff. Note that these are hexadecimal number of ASCII characters (i.e., 0x11 = '1' and 0x13 = '3'). If the connecting program or serial device would like to receive the Xon/Xoff signals also, the user can enable the **"Permit Xon/Xoff Character Pass Through"** by checking the box in front of the option**.**
- **Receiver Resister:** On or Off

- **Full Resister:** 1K Ω or 100K Ω

After finish configuring the COM Port **Serial Configuration**, click on **Apply to all serial ports** box (if needed) and **Save Configuration** button to keep the change that you have made**.** Note that after click **Save Configuration** the web browser will remain on the **Serial Configuration** page**.** If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button**.** The Advanced Settings button will be described in the next subsection**.**

4.5.4 *VCOM Settings*

These settings will generate a virtual Serial (VCOM) port within the Modbus Gateway device based on a TCP network connection. VCOM is a **TCP connection** which is encoded in an Atop Technologies' exclusive private protocol. MW550XC series Modbus Gateway can only run as a TCP server which will be waiting for a connection request from a TCP client (a serial device).

Figure 4.42 shows the page of VCOM Settings in which the VCOM number 1 is set as an RTU Slave. This means that a device that is connected to this VCOM port on the Modbus Gateway will be a Modbus Slave node and communicate with a Modbus Master node using Modbus/RTU protocol. It is an interface concept that allows Modbus Slave devices to be connected via TCP connection by using VCOM from a PC (for example). If a VCOM setting is needed, proceed to select **Modbus Gateway** → **VCOM Settings**.

- **VCOM Port:** Using a TCP connection, the Modbus Gateway device (TCP server) listens to any TCP Clients (VCOM Clients) connecting (using Serial-IP) to its ports. The VCOM Port or the port of the TCP connection can be configured as a number between 1 and 65535. The default VCOM Port number is 4660.

Note: For Windows operating system, a Serial/IP software is required to use this feature. A restrictive **Serial/IP Redirector** software is installed along with Atop's **Device Management Utility®**. The user can access the Serial/IP software through **Virtual COM → Serial/IP Tools** menu.

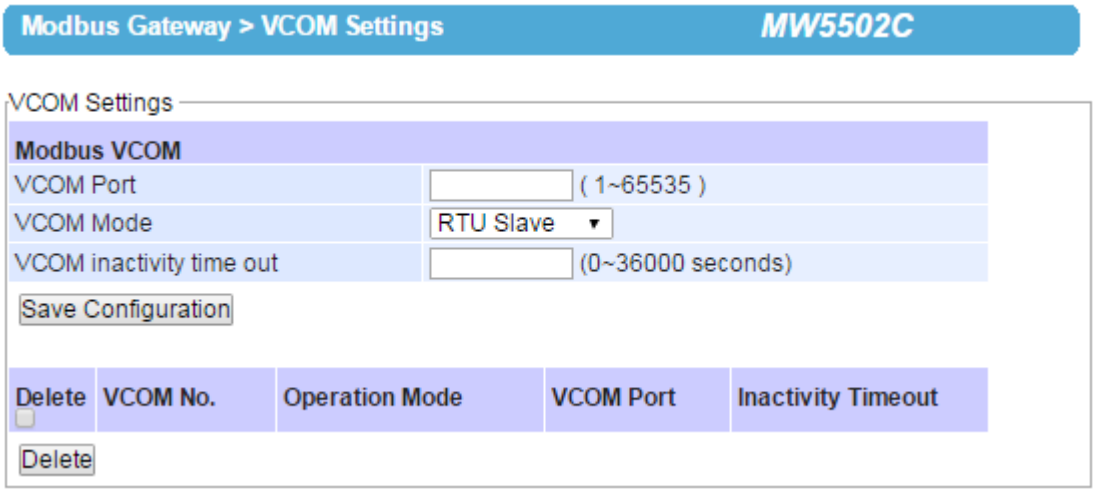


Figure 4.42 VCOM Settings Web Page

- **VCOM Mode:** This setting is a pull-down menu in which the user can select the **Operation Mode** of the devices connected through this VCOM port as shown in Figure 4.42. Its definition is the same to the one given in Section 4.5.2. Here the user can choose whether device conforms to a RTU or an ASCII message format and can select whether the device is either Modbus Slave node or Modbus Master Node. Figure 4.42 depicts the **RTU Slave** mode. So, the devices connected through VCOM 1 port will assume Modbus Slave role and communicate using Modbus/RTU protocol. If a Master mode (either RTU or ASCII) is selected, the options for the Master mode will

be the same as the Slave mode. The only difference is the device's function.

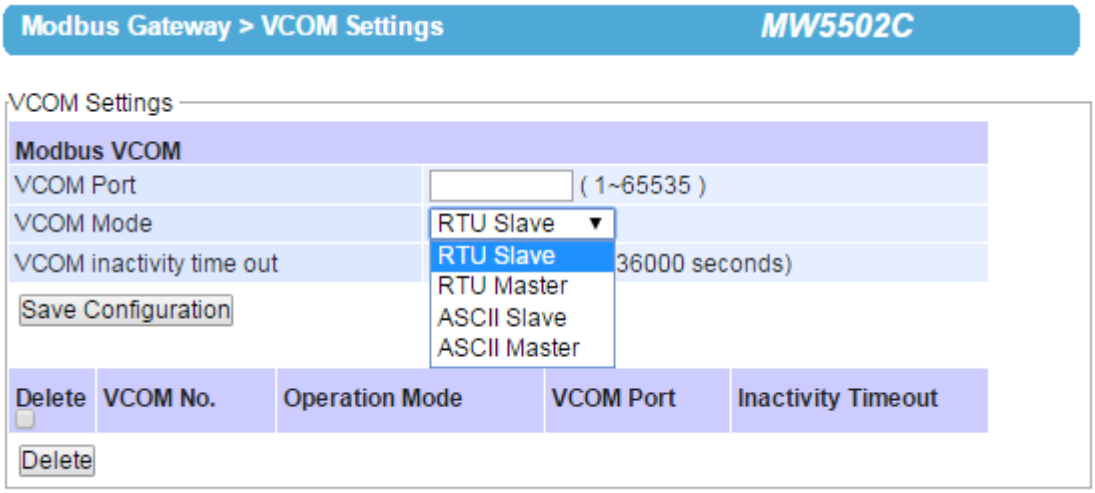


Figure 4.43 Pull-down Menu of VCOM Mode

- **VCOM inactivity Time Out:** This is a period of time allowed between actions. This setting can be set with a maximum of 600 minutes (36000 seconds) or 10 hours. If there is no activity within this period, the VCOM connection (TCP connection) will be automatically closed by the Modbus Gateway.

After finishing configuring the **VCOM Settings**, click on **Save Configuration** button to save all changes that have been made. Figure 4.44 shows **VCOM Settings** after clicking on **Save Configuration** button.

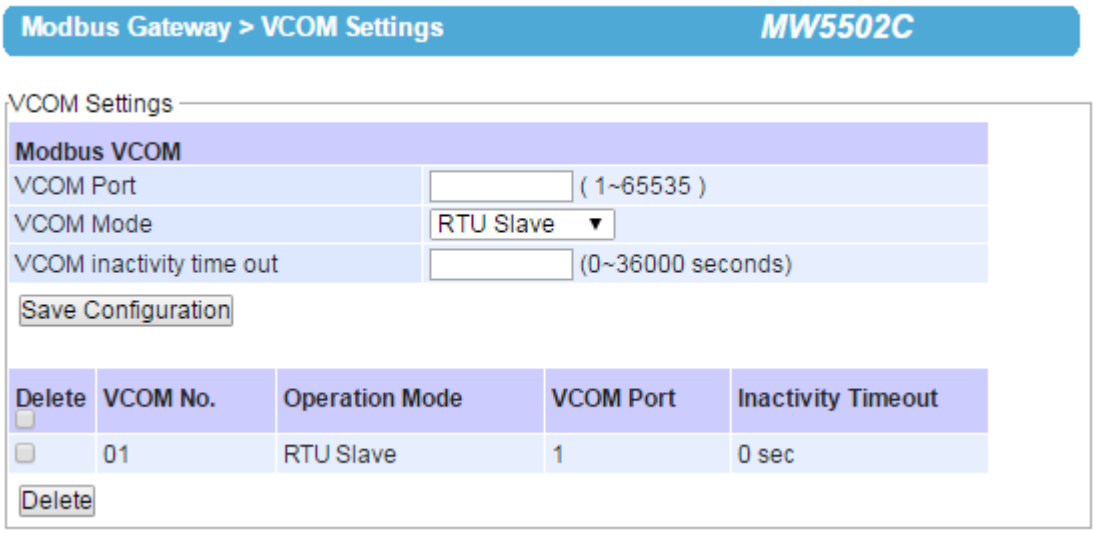


Figure 4.44 VCOM Settings after Save Configuration

4.5.5 *TCP Settings*

A device using Modbus/TCP connection, which communicates over the internet, can be set in this section. If a Modbus/TCP connection is needed, navigate to **Modbus Gateway → TCP Settings**. Figure 4.45 shows the Modbus TCP Settings page in which a device connected to this Modbus Gateway device is chosen to be run in **TCP Slave Operation Mode**. The device will take the Modbus Slave role and communicate using Modbus/TCP protocol.

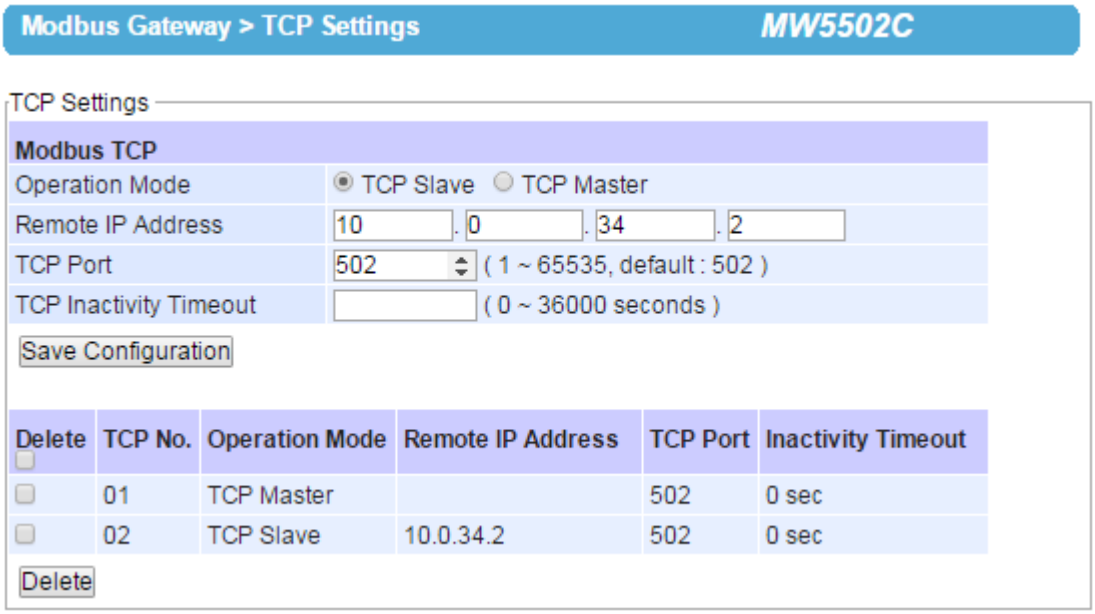


Figure 4.45 Modbus TCP Settings Web Page with TCP Slave Mode

- **Operation Mode:** There are two radio buttons in this setting: TCP Slave and TCP Master. When running on TCP Slave mode (the TCP Slave radio button is checked) as shown in Figure 4.45, the device will wait to receive Modbus requests from a Modbus Master. The data transmission is done under a Modbus/TCP protocol format. This means that the device will operate as a TCP Server that opens its TCP port to accept connections. The TCP Master option will be described at the end of this section.
- **Remote IP Address:** This setting shows the IP address of the device which is a Modbus slave node. This address refers to the IP address that belongs to the device that is going to be controlled from the MW550XC Series Modbus Gateway device. This device can also be considered as a TCP server of whom it is needed to know its IP address. This option will disappear when the operation mode as TCP Master is selected, because in that mode the device will be running as a TCP Client which does not require to publish its IP address.
- **TCP Port:** This setting shows the TCP port number of the device (or Modbus Slave node in Figure 4.45) which can be a number in between 1 and 65535. The default port number is 502.
- **TCP inactivity Time Out:** A time out period, which is the maximum period of time allowed between actions, can be set as well. This setting has a maximum duration of 600 minutes (36000 seconds) or 10 hours. If no activity has occurred within this period, the Modbus/TCP connection will be automatically terminated by the Modbus Gateway.

At the end of the **TCP Settings** page shown in Figure 4.45, a list of all configured Modbus/TCP connections with TCP No., Operation Mode, Remote IP Address, TCP Port and TCP Inactivity Time Out information will appear. The user will have the ability to remove any Modbus/TCP connection settings by checking on box in front of the record of the desired TCP settings and clicking on the **Remove** button. To remove all TCP connections, simply check the box on the header row of the list to select all items and click remove.

Alternatively, the Modbus/TCP connection can be configured to run in **TCP Master Operation Mode**. This means that the device will be a Modbus Master node and communicate using Modbus/TCP protocol. Figure 4.46 shows the TCP Master Settings. When **TCP Master Operation Mode** is selected, the **Remote IP address** setting will disappear because the device will be running as a TCP Client. Next, the **TCP Port** is the port through which the signal is going to be relayed upon by the Modbus Gateway. Once again, there is a **TCP Inactivity Time Out** with the same maximum value of 10 hours as stated in the previous mode.

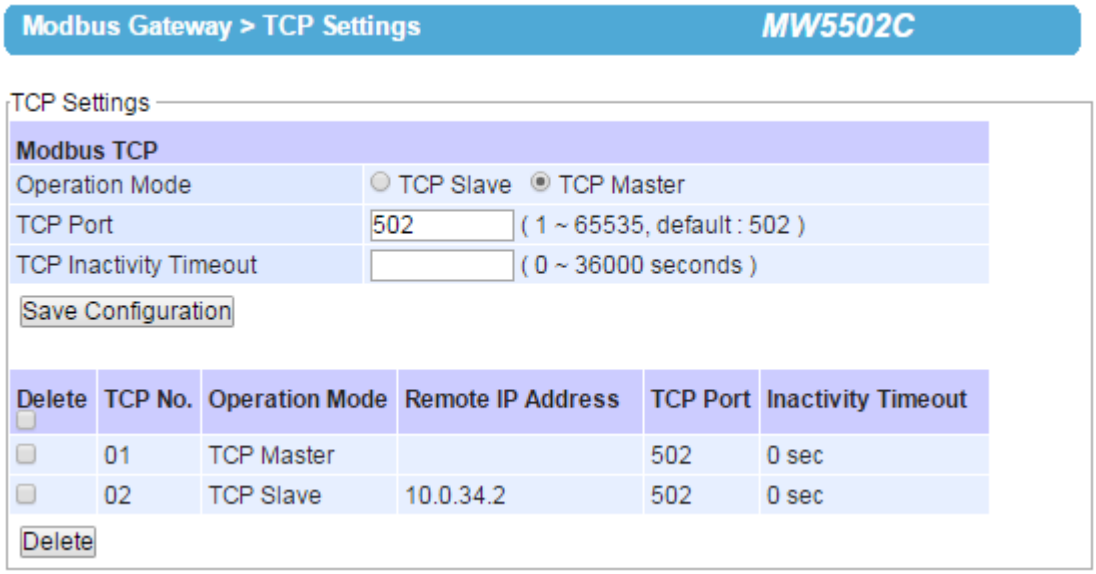


Figure 4.46 Modbus TCP Settings Web Page with TCP Master Mode

After **TCP Settings** configuration is finished, click on **Save Configuration** button to save all changes that have been made.

4.5.6 *Slave ID Settings*

The system uses the Modbus ID to route Modbus' request commands from a Modbus master node to the related Modbus Slave node. It is important to define ID mapping for each Modbus Slave node. For every Modbus Slave node, there should be a correct Virtual ID (Alias ID) and Real ID defined in the mapping. Figure 4.47 shows the Slave ID Map settings. To configure Slave 2's parameters, check the **Enable** box to enable Slave. Then, select the corresponding Slave interface.

- **Slave Interface:** When a port is set to Modbus slave mode, a slave interface will be created. Select a radio button of a port number behind the **Slave Interface,** which can be any one of the listed **COM/VCOM/TCP ports**.
- **Slave ID Setting Mode**: Next, select the mapping between real slave ID and Virtual ID to modify the slave ID setting as needed.
    - **Slave ID Virtual** maps a virtual ID to a real ID by the **Slave ID Count**. Figure 4.47 Slave ID Map Page with Slave ID Setting in Alias Modedepicts Slave ID settings of COM02 to have real slave ID from 1 to 16 mapped from virtual ID 17 to 32.
        - **Slave ID Virtual** refers to a Virtual ID for the reading Master node.
        - **Slave ID Real** is the starting real ID within this interface (COM02 in Figure 4.47).
        - **Slave ID Count** is the number of slave devices in this interface that are mapped**.**

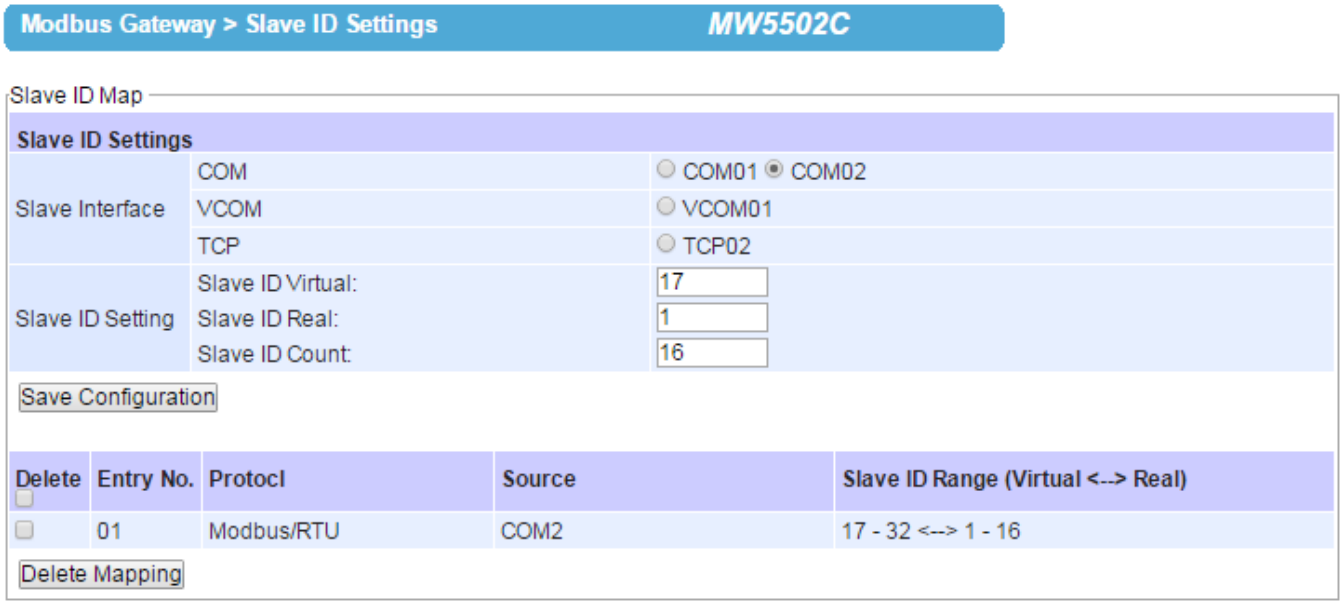


Figure 4.47 Slave ID Map Page with Slave ID Setting in Alias Mode

Note: Master and Slave IDs can be set on COM, VCOM, and TCP. However, COM works only with serial ports while TCP and VCOM operate via Ethernet ports.

After finishing configuring the **Slave ID Settings**, click the **Save Configuration** button to save all changes that have been made. A **Save Successfully** message will show up, then the web browser will be redirected back to the **Slave ID Settings** page**.**

Below the **Slave ID Settings** box, there is a list of mapping entries as shown in Figure 4.48 in which each line will summarize an **Entry No.**, a Modbus **Protocol**, a **Source**, a Slave ID Setting **Mode**, and the **Slave ID Range (Virtual <-> Real)**. Check the box in front of each entry to select that entry. Then, click **Remove** button to remove that particular entry from the **Slave ID Map**. To remove all entries, check on the box in front of the header line and click **Remove** button.

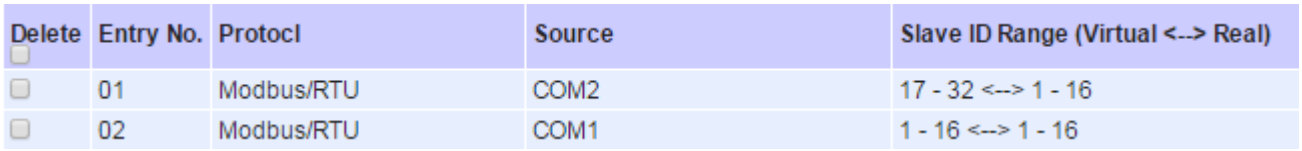


Figure 4.48 Slave ID Map Web Page with Slave ID Setting in in Offset Mode

4.5.7 *Global Settings*

In **Global Settings**, it is possible to select whether to enable **Gateway Exception** by flagging the **Enable** checkbox as shown in Figure 4.49. If the Modbus slave returns no response and timeout occurs, it may then be necessary for the gateway to return an exception. To set **Response Timeout** for COM and TCP/VCOM, fill in the timeout periods in the fields as shown in Figure 4.49. Note that the timeout setting can be applied to all COM ports by checking the **Apply to All Coms** box.

- Configure timeout for each COM port between 10ms to 120000ms with a default value of 1000ms.
- Configure timeout for TCP/VCOM port between 10ms to 120000ms with a default value of 1000ms.

After finishing the Advanced Modbus Settings configuration, click on the **Save Configuration** button to save all changes that have been made. A **Save Successfully** message will show up, and the web browser will be redirected back to the **Modbus** page**.**

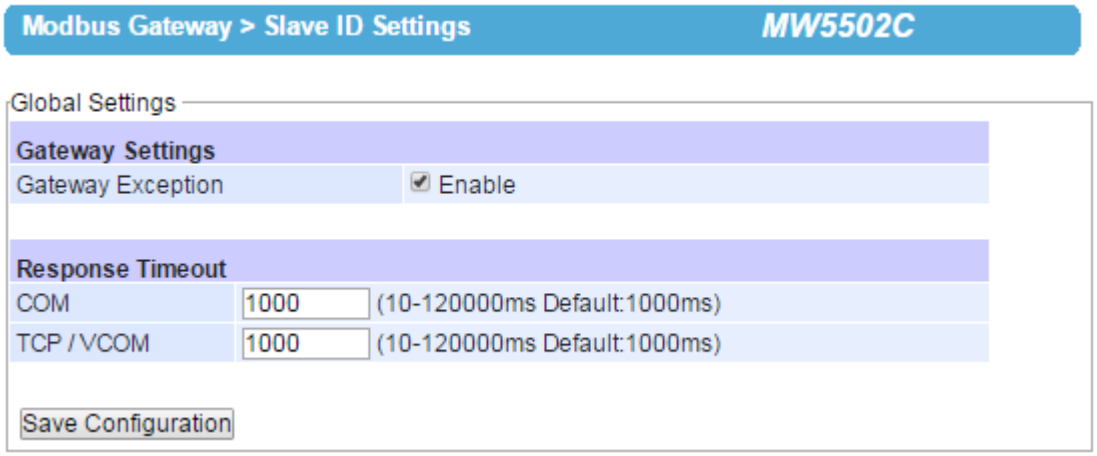


Figure 4.49 Global Settings Web Page with Gateway Settings

4.6 *Web configuration – SNMP/ALERT Settings*

The Simple Network Management Protocol (SNMP) is used by network management software to monitor devices in a network, to retrieve network status information of the devices, and to configure network parameters of the devices. The SNMP Settings page showed below allows user to configure MW550XC device so that it can be viewed by third-party SNMP software.

MW550XC provides three basic SNMP fields which are: **"System Contact"** usually used to specify the device's contact information in case of emergency (default value is **"contact"**), **"System Name"** usually used to identify this device (default value is the MAC Address of MW550XC), and **"System Location"** usually used to specify the device location (default value is **"location"**). To make the device information available for public viewing/editing, you can enable the SNMP function by checking the **Enable** box and fill in the two passphrases (or SNMP Community Strings) below it. By filling in the passphrase for the **"Read Community"**, MW550XC device allows other network management software to read its information. By filling in the passphrase for the **"Write Community"**, MW550XC device allows other network management software to read/modify its information. The default MW550XC's SNMP Community Strings (or passphrases) for **Read Community** and **Write Community** as shown in Figure 4.50 are **"public"** and **"private"**, respectively.

Additionally, you can setup a **SNMP Trap server** in the network to receive and collect all alert messages from MW550XC. To configure MW550XC to dispatch alert messages originated from any unexpected incidents, you can fill in the **IP Address** of the **SNMP Trap Server** in the field shown above. Note that any changes in these settings will take effect after the MW550XC device is restarted.

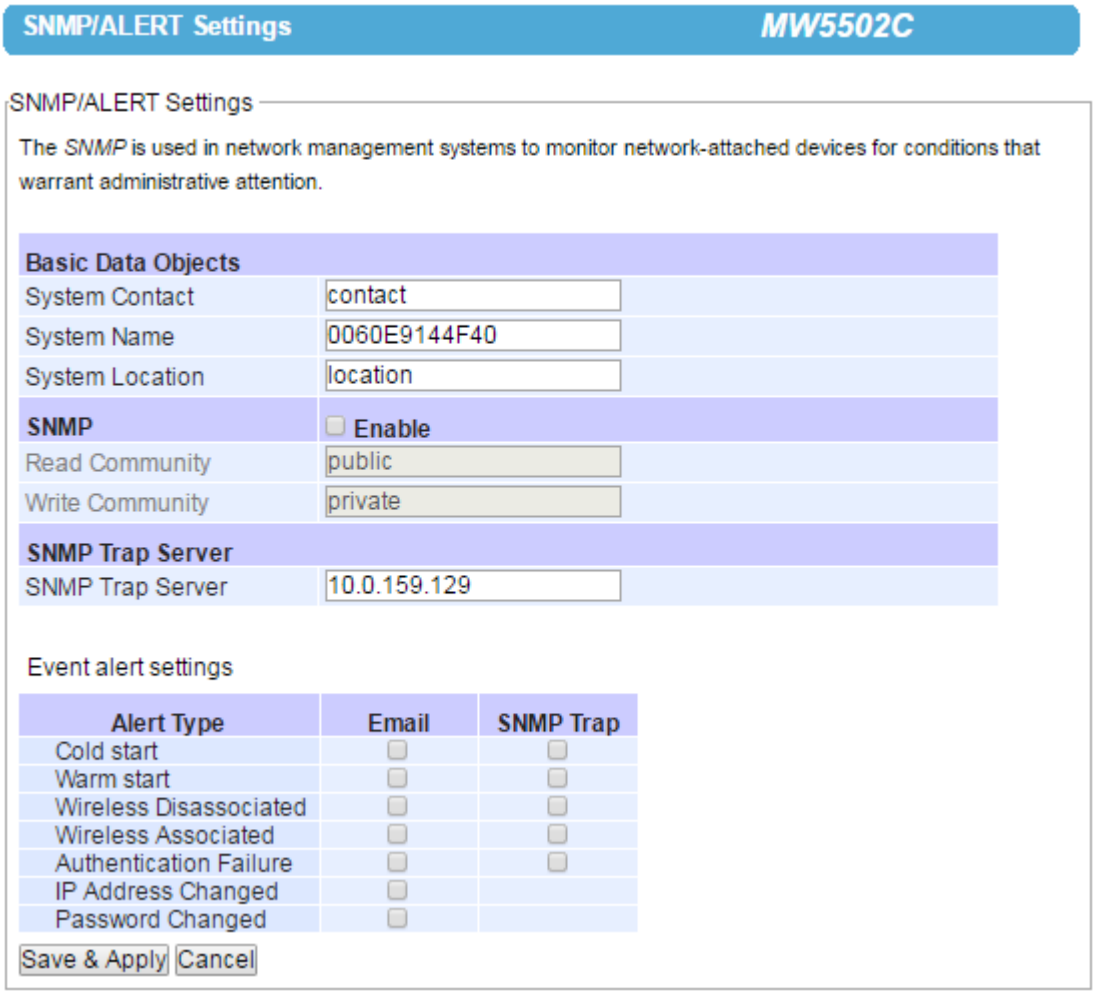


Figure 4.50 SNMP/Alert Settings Page

Under the **SNMP Trap server**, there is a list of **Alert Type** under **Event alert settings** box. There are two possible actions for each alert event: **Email** and **SNMP Trap**. You can enable the associated action(s) of each alert event by checking the box under the column of **Email** and/or **SNMP Trap**. When the **Email** box is checked and the corresponding event occurs, it will trigger an action for MW550XC to send an e-mail alert to designated addresses configured in the **E-Mail Settings** (described in the next section). When the **SNMP Trap** box is checked and the corresponding event occurs, it will trigger an action for MW550XC to send a trap alert to the designated **SNMP Trap server**.

There are seven events that will trigger the alarm from MW550XC as listed in figure above. These alerts are useful for security control or security monitoring of the MW550XC device:

- **Cold Start**: This event occurs when there is a power interruption.
- **Warm Start:** This event occurs when the device resets.
- **Wireless Disassociated:** This event occurs when wireless interface **(**IEEE 802**.**11**)** of MW550XC disassociates from an Access Point**.**
- **Wireless Associated:** This event occurs when wireless interface **(**IEEE 802**.**11**)** of MW550XC associates with an Access Point**.**
- **Authentication Failure:** This event occurs when an incorrect username and/or password are entered which could indicate an unauthorized access to the MW550XC.
- **IP Address Changed:** This event occurs when the MW550XC device's IP address is changed.
- **Password Changed:** This event occurs when the administrator password is changed.

After finish configuring the **SNMP/Alert Settings**, please click on **Save & Apply** button to keep the change that you have made and to apply your setting**.** A pop-up window with message **"Please wait for a while..."** will be displayed**.** When the saving and applying are finished, the pop-up window will disappear and the web browser will remain on the SNMP**/**Alert Settings page**.** If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button**.**

4.7 *Web configuration - E-mail Settings*

When MW550XC device raises an alert and/or a warning message, it can send an e-mail to an administrator's mailbox. This **E-mail Settings** page allows you to set up the MW550XC to be able to send an e-mail. Figure below shows the **E-mail Settings** page in which there are two configurable parts: **E-mail Address Settings** and **E-mail Server**. First for the **E-mail Address Settings** part, a **Sender**'s e-mail address is required to be filled in the **Sender**'s text box which will be used in the **From** field of the e-mail. Note that the maximum length of sender email address is 48 characters. Then, for the **Receiver**'s text box you can enter multiple recipients which will be used in the **To** field of the e-mail. Note that to fill in multiple receiver e-mail addresses in the **Receiver**'s text box, please separate each e-mail address with semicolon (;).

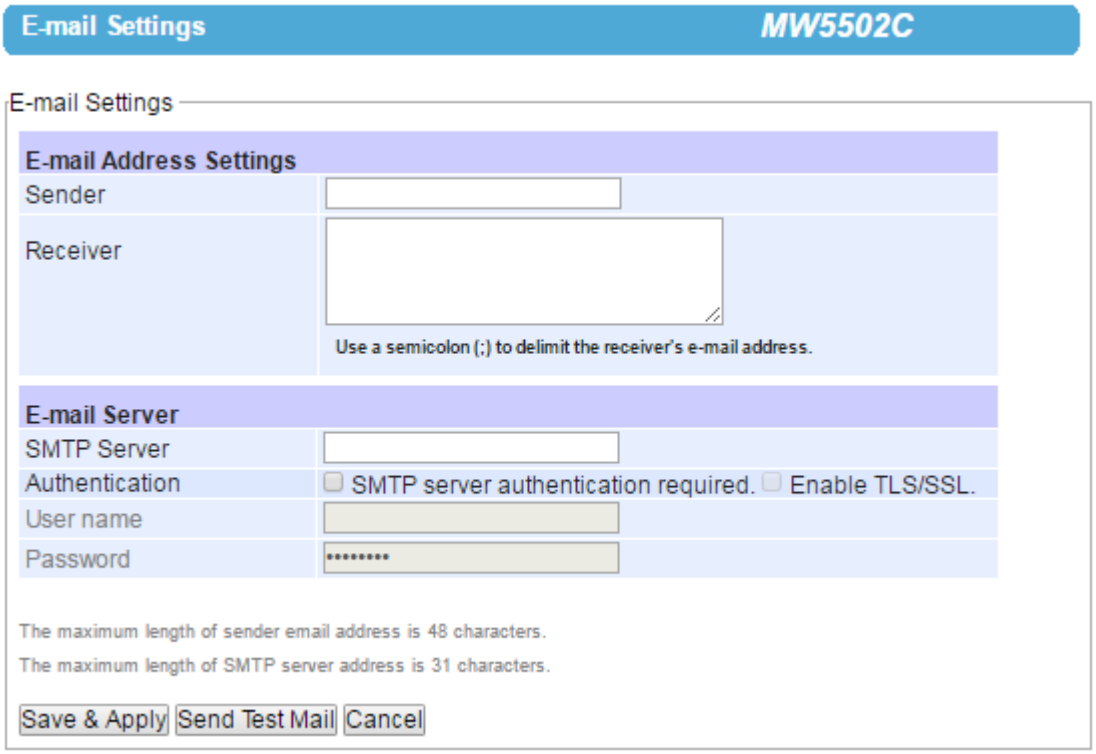


Figure 4.51 E-mail Settings Page

Second for the **E-mail Server** part, you must enter an **IP address** or **Host Name** of a **Mail Server** which is in your local network in the **SMTP Server**'s text box. Note that the maximum length of SMTP server address is 31 characters. If your Mail Server (or Simple Mail Transfer Protocol (SMTP) Server) requires a user authentication, you must check the **"SMTP server authentication required"** box in the **Authentication** option. After enabling this option, you can fill in the **Username** and the **Password** below. Please consult your local network administrator for the IP address of you Mail Server and the required Username and Password. At the end of the page, there is a **Send Test Mail** button for you to click to verify whether the **E-mail Settings** are configured correctly. Note that after clicking the **Send Test Mail** button,

a pop-up window with message **"Please wait for a while..."** will be displayed and will be followed with another pop-up window indicating the success or failure status of sending test e-mail. Figure below shows a pop-up window indicating a failure of sending a test e-mail.

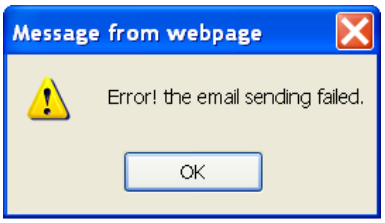


Figure 4.52 Sending Test E-mail Failed

Attention

It is also important to setup Default Gateway and DNS Servers in the Network Settings properly so that MW550XC can lookup domain names and route the e-mails to the proper default gateway. Please see the Default Gateway and DNS Sever Settings in Section 4.3 above

After finish configuring the **E-mail Settings**, please click on **Save & Apply** button to keep the change that you have made and to apply your setting**.** A pop-up window with message **"Please wait for a while..."** will be displayed**.** When the saving and applying are finished, the pop-up windows will disappear and the web browser will remain on the **E-mail Settings** page**.** If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button**.**

4.8 *Web configuration - Log Settings*

4.8.1 *System Log Settings*

The Syslog function is turned on by default and cannot be turned off for MW550XC. It is used to keep log for system events and report to an external Syslog server if necessary. Figure below shows the **System Log Settings** page under the **Log Settings** menu. Description of each option is as follows.

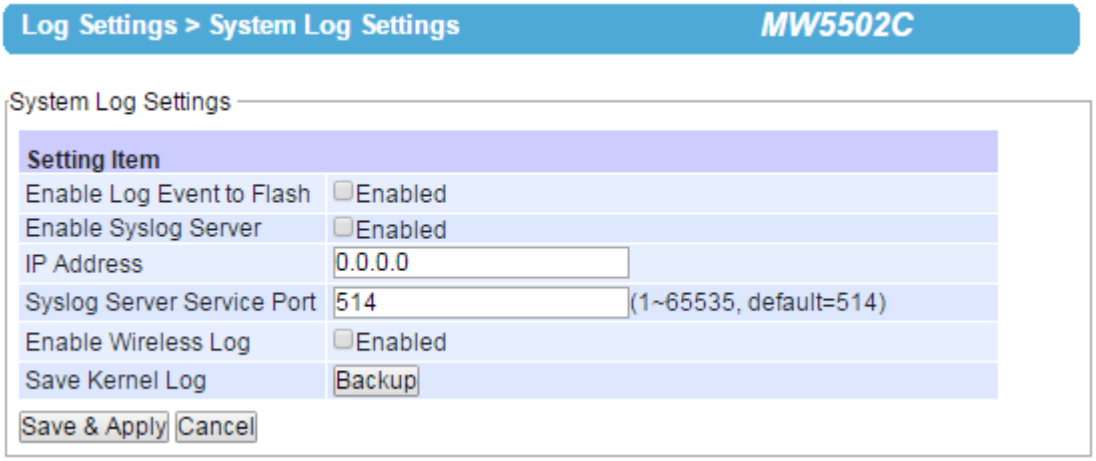


Figure 4.53 System Log Settings Page

- **Enable Log Event to Flash:** When the check box is enabled, MW550XC will write log events to the local flash. Otherwise the log events would be cleared when the device restarts because they are stored in the RAM by default.
- **Enable Syslog Server:** When the check box is enabled, it will allow MW550XC to send Syslog events to the remote Syslog server with the specified IP address **(**next option**)**. All the data sent/received from serial interface will be logged and sent to Syslog Server.
- **IP Address:** The user must specify the IP address of a remote Syslog Server in this field.
- **Syslog Server Service Port:** This option allows user to specify the remote Syslog Server Port. Note that the default port number is 514.
- **Enable Wireless Log:** Click to enable function.
- **Save Kernel Log:** Backup button is available to save lernel log.

After finish configuring the **System Log Settings**, please click on **Save & Apply** button to keep the change that you have made and to apply your setting**.** A pop-up window with message **"Please wait for a while..."** will be displayed**.** When the saving and applying are finished, the pop-up window will disappear and the web browser will remain on the **System Log Settings** page**.** If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button**.**

4.8.2 *Event Log*

This page displays the current event log stored in the MW550XC device. Figure below shows an example of logged event. Each record of the log consists of **Index**, **Date**, **Time**, **Startup Time,** and **Event** description.

At the end of the Event Log page, there are two buttons which can be used to navigate through all records .You can click on the" **Last Page**" button to go to the last page of the log and click on the" **Next Page** "button to go to the next page .To display all events in one page, you can click on "**Show All Events**" button .By clicking on "**Clear All Events** " button, you can clear all events stored in the device and the Event Log will be empty with a message "**There is no event**." To save all events to a local file)on your personal computer(, you can click on "**Save To File**" button.

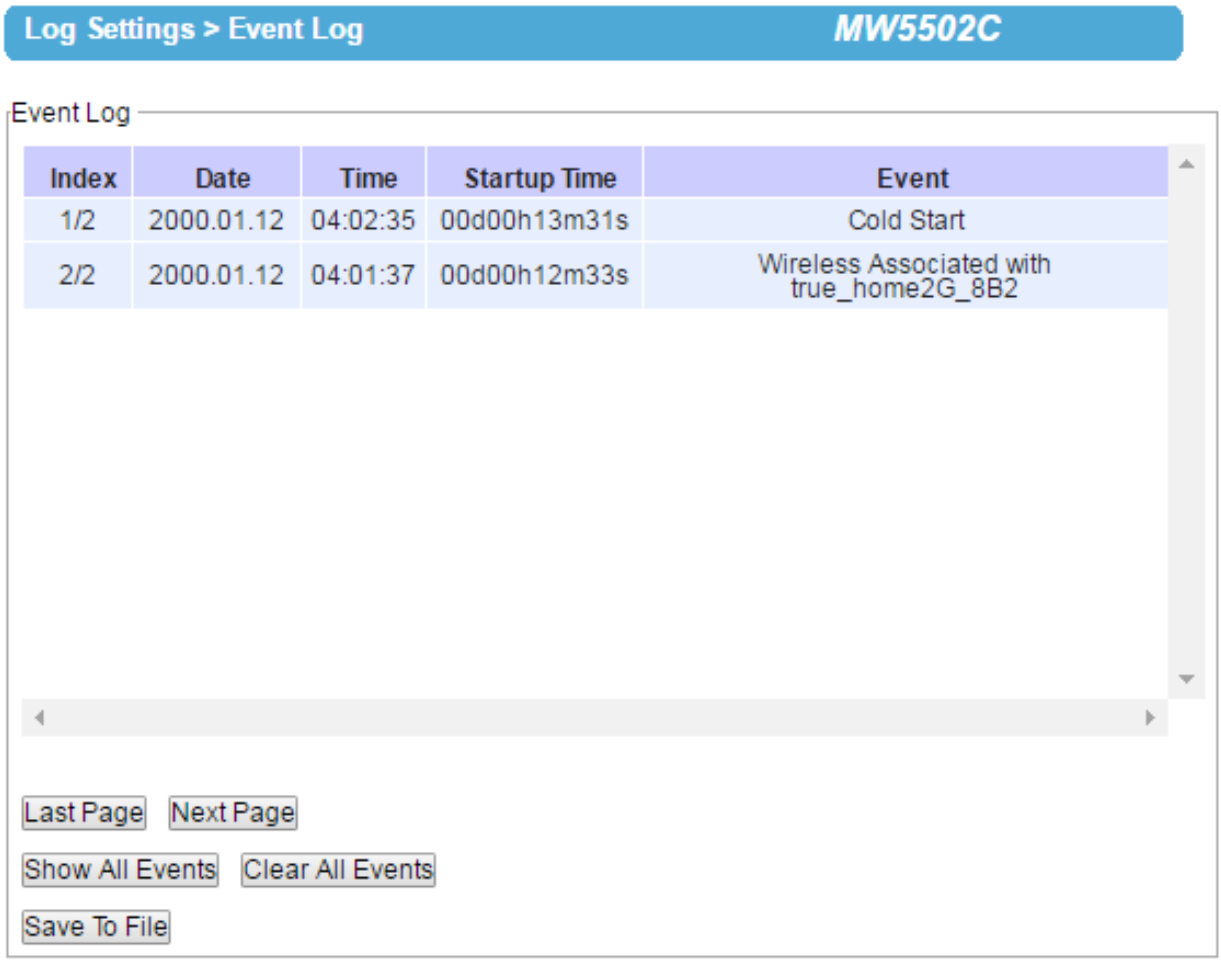


Figure 4.54 Event Log Page

4.8.3 *DataLog*

This page displays the current COM data log stored in the device. The desired COM port number can be selected from the **COM x Log** drop-down list in Figure 3.43, which allows it to display logs from different COM ports. An example of COM 1 Log is shown in Figure 3.43. The first three lines were set to log length of data while the last four lines were set to log data's content. The letter **R** refers to "**Received data**" while letter **T** refers to "**Transmitted data**". The number in the bracket, "()", is the length of the data in Bytes. Each record of the log consists of **Index**, **Date**, **Time**, **Startup Time, Level** and **Event**.

At the end of the **COM Datalog** page, there are two buttons which can be used to navigate through all records. You can click on the "**Last Page**" button to go to the last page of the log and click on the "**Next Page**" button to go to the next page. To display all events in one page, you can click on "**Show All Events**" button. By clicking on "**Clear All Events**" button, you can clear all events stored in the device and the **COM DataLog** will be empty with a message "**There is no event**". To save all events to a local file (on your personal computer), you can click on "**Save To File**" button.

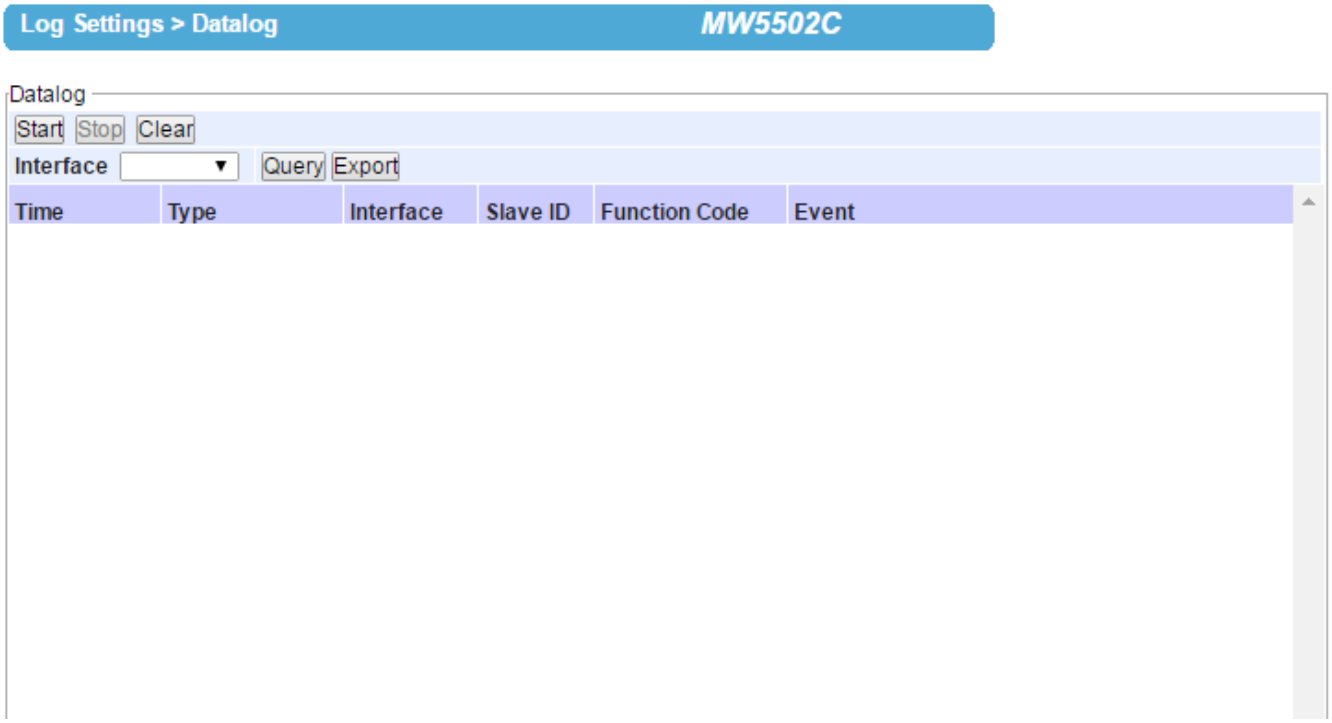


Figure 4.55 COM Data Log Page

4.9 *Web configuration – System Setup*

4.9.1 *Date/Time Settings*

Date and time can be set manually or using **N**etwork **T**ime **P**rotocol (NTP) to automatically synchronize date and time of MW550XC with a Time Server. Figure below shows the **Date/Time Settings** page. Note that the **Current Date/Time** will be updated automatically on this page. To enable automatic time synchronization, please check the **"Obtain date/time automatically"** box in the **NTP** option below **NTP Server Settings** part**.** Then proceed to enter the IP address or host name for the **NTP Server**. Note that if a host name is entered, the DNS server must be configured properly (see detail in Section 4.3 above). Additionally, a **Time Zone** can be selected as well from the drop-down list. **Daylight Saving Time Setting** is enabled when **Enable Daylight Saving Time** box is checked. When it is enabled, the user can select the detailed setting, such as **Start Date** and **End Date** with **Offset**. **Manual Time Settings** can be set in the lower part where user can set Date and Time using corresponding drop-down lists.

After finish configuring the Date/Time Settings, please click on **Save & Apply** button to keep the change that you have made and to apply your setting. A pop-up window with message "**Please wait for a while…**" will be displayed. When the saving and applying are finished, the pop-up window will disappear and the web browser will remain on the Date/Time Settings page. If you want to cancel the change and reset all changes back to their original values, just click the Cancel button.

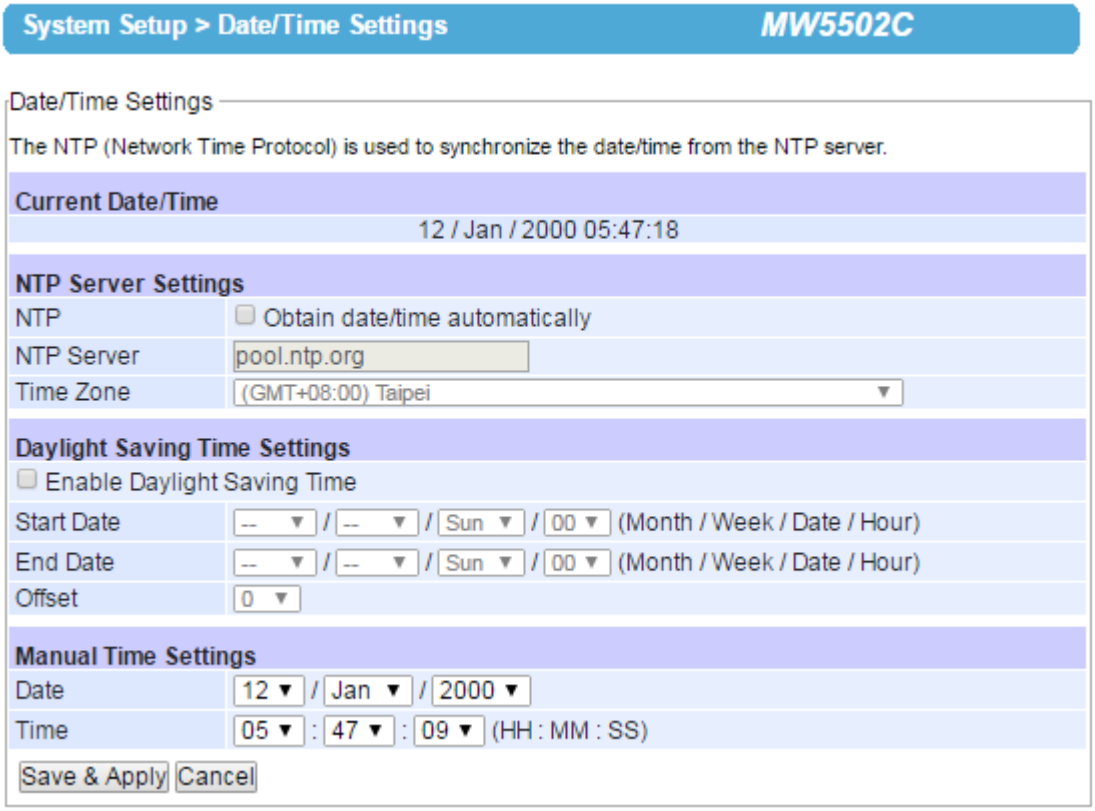


Figure 4.56 Date/Time Settings Page

Attention

It is also important to setup Default Gateway and DNS Servers in the Network Settings properly (See Section 3.5), so MW550XC can lookup DNS names and point to the proper NTP server.

4.9.2 *Admin Settings*

The MW550XC Series allows user and password management through this **Admin Settings** page under **System Setup** menu**.** By default, the **user name** is "**admin**" and the **password** is default. To set or change their values, you can enter the information in the **User name**, the **Old password**, the **New password** and the **Repeat new password** fields as shown below.

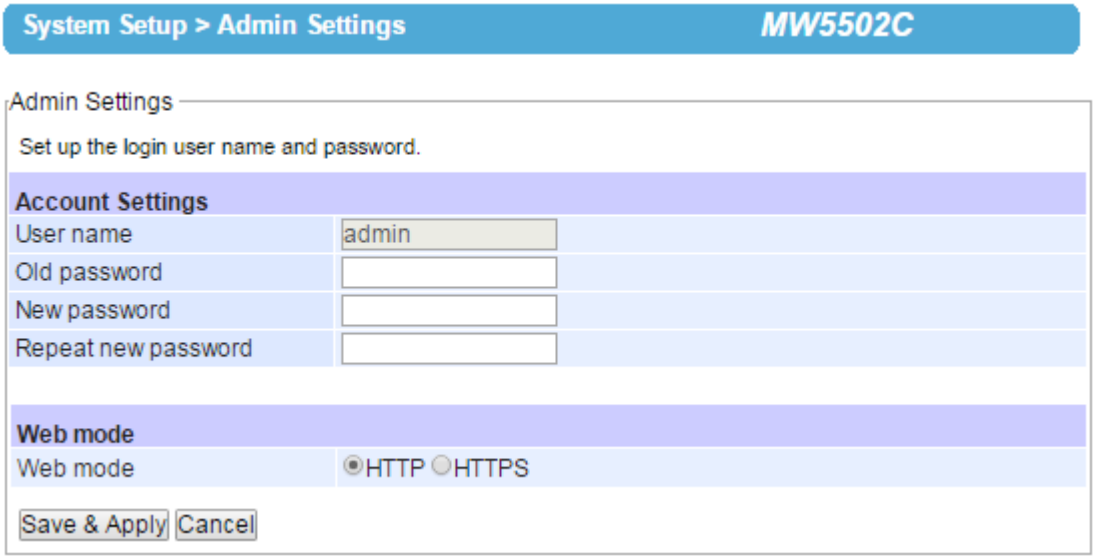


Figure 4.57 Admin Settings Page

There are two ways to access MW550XC's Web User Interface (Web UI). The first one is via Hypertext Transfer Protocol (HTTP) and the other is via Hypertext Transfer Protocol Secure (HTTPS). For enhanced security, it is recommended to use the encrypted HTTPS protocol. Note that HTTP uses port 80 while HTTPS uses port 433. You can configure whether to add security layer (or encryption) for Web UI configuration via the **Web mode** option by choosing between **HTTP** and **HTTPS** radio buttons.

After finish configuring the Admin Settings, please click on Save & Apply button to keep the change that you have made and to apply your setting. A pop-up window with message "**Please wait for a while…**" will be displayed as shown in Figure 4.15. Another pop-up window will be displayed to re-authenticate the user to access the Web UI of MW550XC as shown in Figure 4.11. You must re-enter the username and the password to login to the MW550XC. When the saving, applying, and re-authentication are finished, the pop-up windows will disappear and the web browser will remain on the Admin Settings page. If you want to cancel the change and reset all changes back to their original values, just click the Cancel button.

4.9.3 *Firmware upgrade*

Updated firmware for MW550XC is provided by Atop from time to time (for more information please visit Atop News & Events webpage) to fix bugs and optimize performance. It is very important that the device is **NOT turned off or powered off during the firmware upgrading, (**please be patient as this whole process might take up to 7 minutes**)**. Before upgrading the firmware, please make sure that the device has a reliable power source that will not be powered off or restarted during the firmware upgrading process.

To upgrade a new firmware to MW550XC, please downloaded the latest firmware for your MW550XC model from the download tab on the MW550XC product page or from the Download page under the Support link on Atop's main webpage. Then, copy the new firmware file to your local computer. Note that the firmware file is a binary file with **".dld"** extension. Next, open the Web UI and select **Firmware Upgrade** page under the **System Setup** menu. Then, click **"Browse"** button as shown in below Figure to find and choose the new firmware file. Then, click **"Upload"** button to start the firmware upgrade process**.** The program will show the upload status. Please wait until the uploading process is finished (the amount of time varies depending on the equipment used). Finally, the MW550XC device will then proceed to restart itself. In some cases, you might require to re-configure your MW550XC device. To restore your backup configuration from a file, please see the procedure in the next subsection.

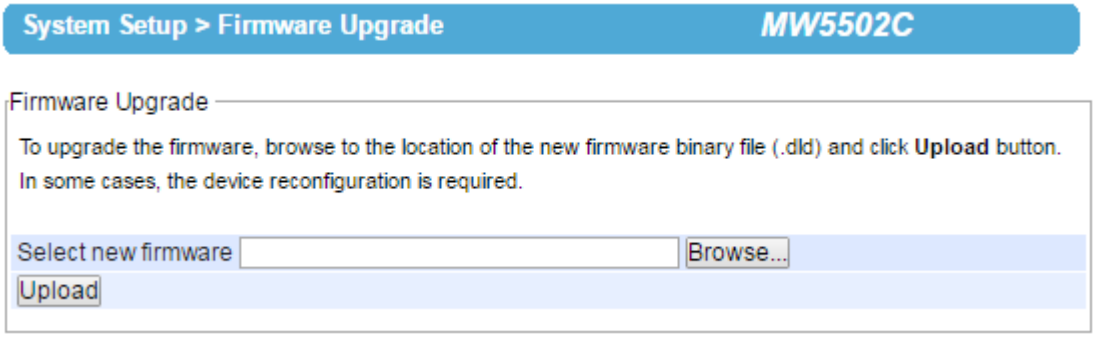


Figure 4.58 Firmware Upgrade Page

Note: if the firmware upgrade process fails and the device becomes unreachable, please follow the TFTP recovery procedure on the Emergency System Recovery.

4.9.4 *Backup/Restore Settings*

Once all the configurations are set and the device is working properly, the user should backup the current configuration of MW550XC. The backup configuration file can be used when the new firmware is uploaded and the device is reset to a factory default settings. This is done to prevent accidental loading of incompatible old settings. The backup configuration file could also be used to efficiently deploy multiple MW550XC Series devices of similar settings by uploading these settings to all devices.

To backup configuration, click **"Backup"** button under the **Backup Configuration** part as shown in below Figure, and a pop-up dialog will prompt the user for saving the backup file (station.ini) on user's computer. It is important **NOT to manually modify the saved configuration file by any editor. Any modification to the file may corrupt the file and it may not be used for later restoration.**

Please contact Atop authorized distributors for more information on this subject.

To restore the backup configuration, click **"Browse"** button under the **Restore Configuration** part as shown in Figure below to locate the backup configuration file on user's computer. Then, click on **"Upload"** button to upload the backup configuration file to the device. Once the backup configuration file is successfully uploaded, the device will restart. Note that the time needed for this process may vary on the equipment used.

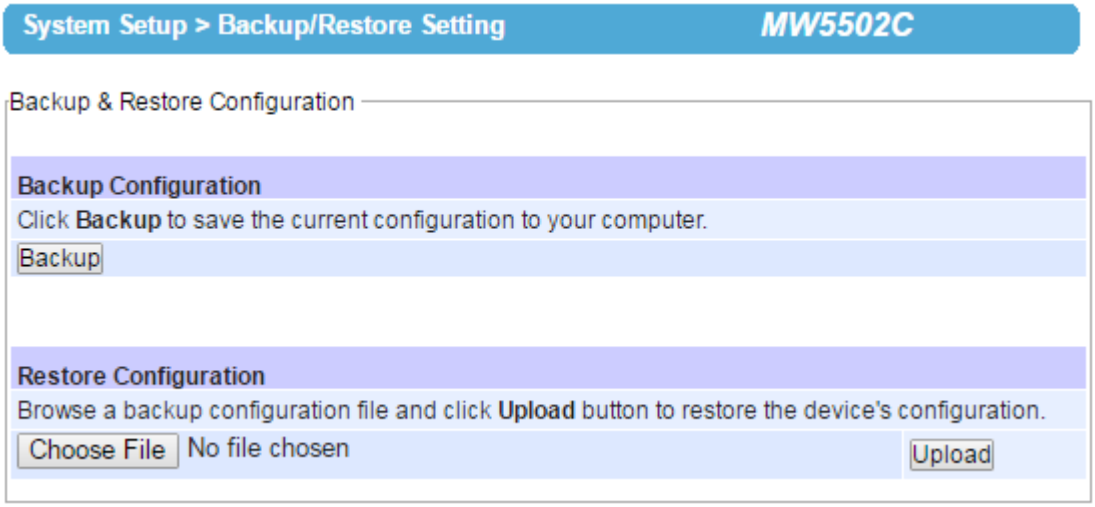


Figure 4.59 Backup/Restore Setting Page

4.9.5 *Management List*

The **Management List** is used to filter the MAC addresses that can have access to the Web management interface or Web UI. When **Management List** is enabled, only the MAC addresses entered in the list of allowed MAC address can gain access to the Web UI of MW550XC. Check the radio button in front of the **"Allow uses with MAC addresses listed below"** to enable the MAC address list. Note that the **Access Control List** allows user to input up to 10 MAC addresses and must be entered in the XX:XX:XX:XX:XX:XX format (where XX are hexadecimal numbers).

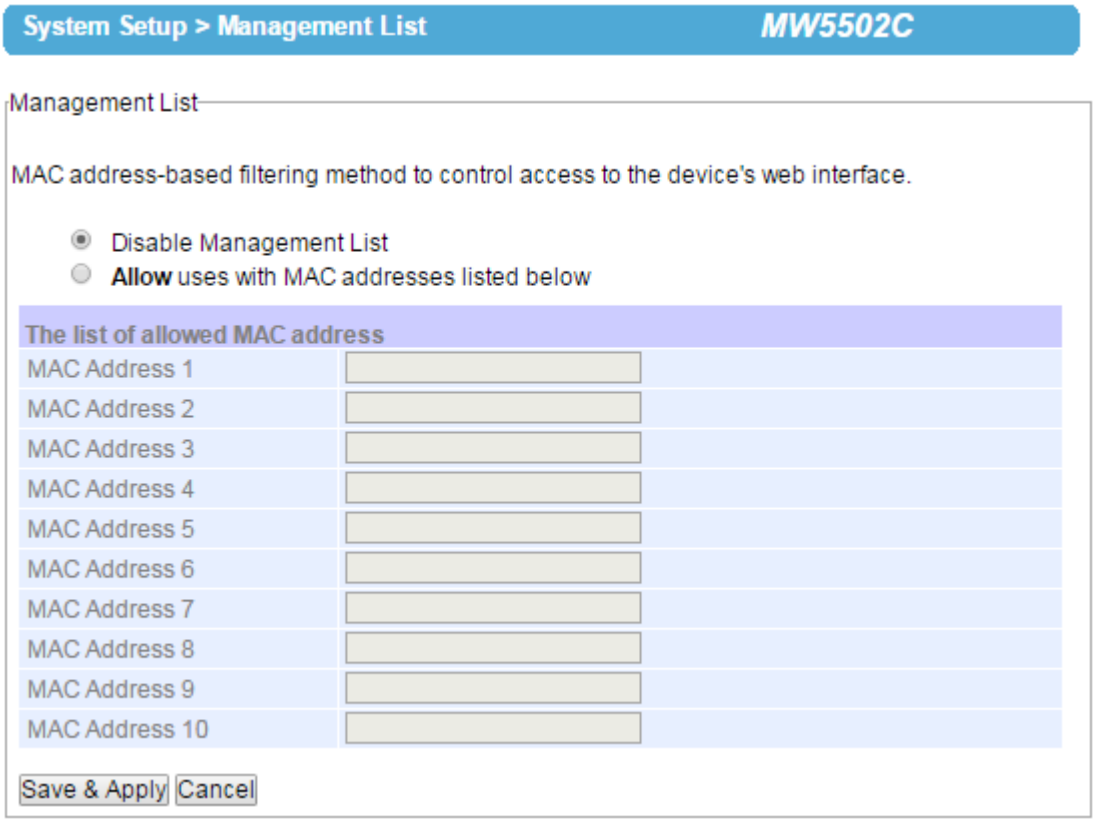


Figure 4.60 Management List Page

After finish configuring the **Management List**, please click on **Save & Apply** button to keep the change that you have made and to apply your setting**.** A pop-up window with message **"Please wait for a while..."** will be displayed**.** When the saving is finished, the pop-up window will disappear and the web browser will remain on the **Management List** page**.** If you want to cancel the change and reset all changes back to their original values, just click the **Cancel** button**.**

4.9.6 *Ping*

The Web UI of MW550XC has an interface to call **Ping,** which is a network diagnostic utility for testing reachability. You can use the **Ping** function to determine whether MW550XC can reach the gateway or other devices in the network. To use the **Ping**, enter a destination IP address in the text box behind the **Ping To** and click **Start** button as shown in **Figure 4.61**-**Figure 4.62**. This process usually takes around 20 seconds. The two figure below represent a successful ping without packet loss from MW550XC to the address 10.0.50.201 and back, and the connecting device at the address 10.0.50.202 is unreachable in which no packets have returned from the transmitted ping packets.

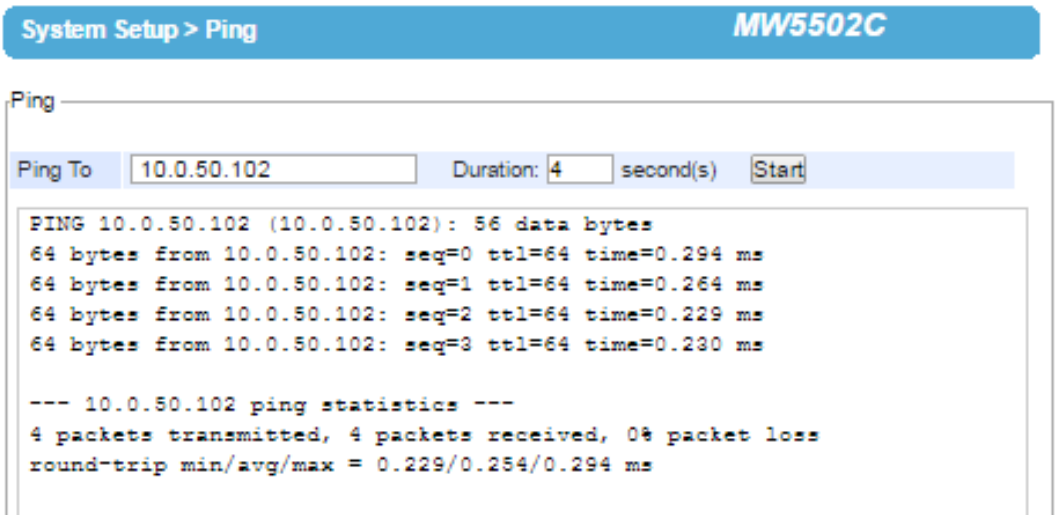


Figure 4.61 Successful Ping with No Packet Loss

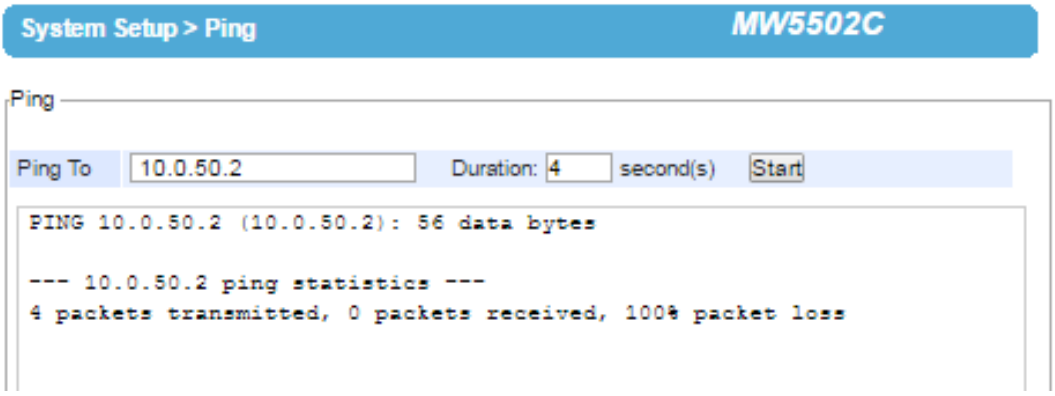


Figure 4.62 Unsuccessful Ping with 100% Packet Loss

4.10 *Web configuration – Reboot and Restore to default Settings*

To manually reboot the MW550XC device, click on the **"Reboot"** button at the end of the **Reboot** page**.** The device will then restart. A pop-up window with a message "**Please wait for a while...**" will be displayed with a countdown number in seconds. If a restoration to the factory default settings is needed, please check the **"Reset"** box before clicking on the **Reboot** button. When the rebooting process is finished, the pop-up window will disappear and the web browser will be redirected to the **Operation Mode** page**.**

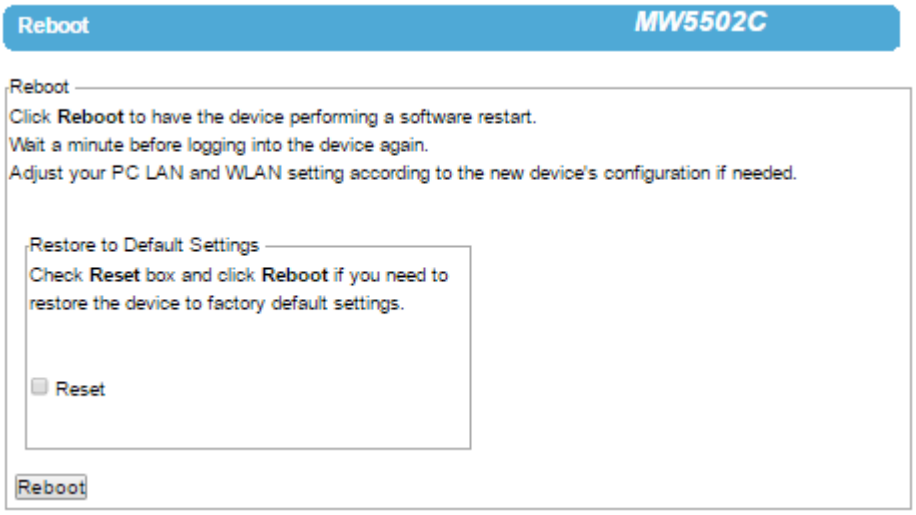


Figure 4.63 Reboot Page

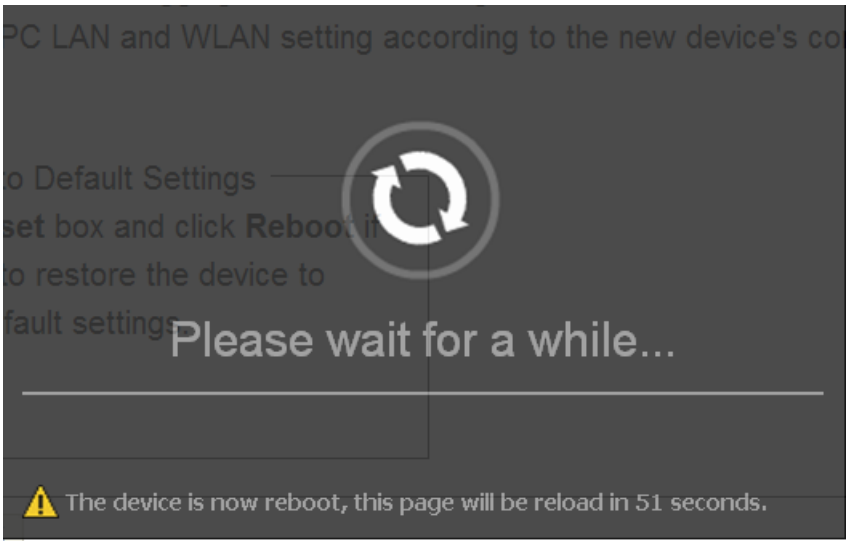


Figure 4.64 Pop-up Windows while Rebooting MW550XC with Reloading Countdown in Seconds

5 Specifications

5.1 *Hardware Specifications*

5.1.1 *Models of MW550XC Series*

Table 5.1 MW550XC series and their interfaces

Name	Serial Port			Ethernet
	DB9	TB5	TB5(ISO)	RJ45
MW5501C	1	--	--	1
MW5502C	2	--	--	1
MW5502C-TB	--	1	--	1

5.1.2 *Physical Characteristics*

Table 5.2 Physical Characteristics of MW550XC Series

Housing	Front-Panel	Weight	Dimensions	Installation
IP30 protection, SPCC case	Common ID design	500g (approx.)	47 mm x 110 mm x 90mm	● DIN-Rail ● Wall mount (optional kit)

5.1.3 *LED Indicators*

Table 5.3 Descriptions of LED Status Indicators

Name	Color	Status	Description
COM	Green	Blinking	Data is transmitting on the serial port
		Off	Data is not transmitting on the serial port
LAN	Orange	Blinking	Ethernet is connected on 10Mbps
		On	Ethernet is connected on 100/1000Mbps
		Off	Ethernet is disconnected
	Green	Blinking	Data is transmitting on Ethernet port
WLAN	Green	On	Wireless radio is enabled
		Blinking	Wireless radio is enabled and data is transmitting
		Off	Wireless Radio is disabled (Mode LEDs should also disable)
RUN	Green	Off	System is not powered on
		Blinking Steadily	AP firmware is running normally
		Blinking Rapidly	AP firmware is not running

5.1.4 *Signal LEDs*

Symbols of LED's Status ○ Off ● On ☼ blinking

Table 5.4 Interpretation of MW550XC's Operation via Front Panel LEDs

Operations		Status	LED1	LED2	LED3	LED4	LED5
Connecting	Searching for an AP	☼	☼	☼	☼	☼	☼
	Cannot connected to the AP	☼					
	No IP provided by the DHCP Server	☼	☼				
Connected	Signal Strength is less 20%	●					
	Bad Signal Strength (20%-40%)	●	●				
	Poor Signal Strength (40%-60%)	●	●	●			
	Fair Signal Strength (60%-80%)	●	●	●	●		
	Good Signal Strength (80%-94%)	●	●	●	●	●	
	Excellent Signal Strength (95%-100%)	●	●	●	●	●	●

5.1.5 *Dip Switch (MW5501C)*

Table 5.5 Dip Switch Functions of MW5501C

COM	Dip	Function	SW	Ω
COM1	3	Pull High	On	1K
			Off	100K
	2	Pull Low	On	1K
			Off	100K
	1	Termination	On	120
			Off	0

5.1.6 *Dip Switch (MW5502C)*

Table 5.6 Dip Switch Function of MW5502C

COM	Dip	Function	SW	Ω
COM1	6	Pull High	On	1K
			Off	100K
	5	Pull Low	On	1K
			Off	100K
	4	Termination	On	120
			Off	0
COM2	3	Pull High	On	1K
			Off	100K
	2	Pull Low	On	1K
			Off	100K
	1	Termination	On	120
			Off	0

5.1.7 *Wireless Specifications*

Table 5.7 Wireless Interface Specification of MW550XC Series

PCI-e Module	Tx/Rx	Wireless Standard Conformance	Antenna
Atheros AR9382	2T2R MIMO (2x2 with MCS 0-15)	■ 802.11b ■ 802.11g ■ 802.11n	■ 3/5 dBi Dual antenna design ■ SMA(R) Female connector

5.1.8 *Frequency Range*:

Table 5.8 Operating Frequencies in Different Regions at 2.4GHz

	2.4Ghz
United States (FCC)	■ 2412-2462(20Mhz) ■ 2422-2452(40Mhz)
Europe (ETSI)	■ 2412-2472(20Mhz) ■ 2422-2462(40Mhz)
Taiwan (NCC)	■ 2412-2462(20Mhz) ■ 2422-2452(40Mhz)

5.1.9 *Data Rate*:

Table 5.9 Supported Data Rate for Wireless Interface under IEEE 802.11 Standards

802.11b	1, 2, 5.5 and 11Mbps	
802.11g	6, 9, 12, 18, 24, 36, 48, 54Mbps	
802.11n	20 MHz	■ 1Nss: 65Mbps @ 800GI, 72.2Mbps @ 400GI (Max.) ■ 2Nss: 130Mbps @ 800GI, 144.4Mbps @ 400GI (Max.)
	40MHz	■ 1Nss: 135Mbps @ 800GI, 150Mbps @ 400GI (Max.) ■ 2Nss: 270Mbps @ 800GI, 300Mbps @ 400GI (Max.)

5.1.10 *Output Power*

Table 5.10 Maximum Output Power of Wireless Interface under IEEE 802.11Standards

802.11b	■ +14dBm	
802.11g	■ +17dBm @ 6, 9, 12,18,24Mbps ■ +17dBm @ 36Mbps	■ +16dBm @ 48Mbps ■ +16dBm @ 54Mbps
802.11n 2.4GHz/HT20	■ +16dBm @ MCS 0/8 ■ +16dBm @ MCS 1/9 ■ +16dBm @ MCS 2/10 ■ +16dBm @ MCS 3/11	■ +16dBm @ MCS 4/12 ■ +16dBm @ MCS 5/13 ■ +16dBm @ MCS 6/14 ■ +15dBm @ MCS 7/15
802.11n 2.4GHz/HT40	■ +15dBm @ MCS 0/8 ■ +15dBm @ MCS 1/9 ■ +15dBm @ MCS 2/10 ■ +15dBm @ MCS 3/11	■ +15dBm @ MCS 4/12 ■ +15dBm @ MCS 5/13 ■ +15dBm @ MCS 6/14 ■ +14dBm @ MCS 7/15
802.11n 5GHz/HT20	■ +15dBm @ MCS 0/8 ■ +15dBm @ MCS 1/9 ■ +15dBm @ MCS 2/10 ■ +15dBm @ MCS 3/11	■ +15dBm @ MCS 4/12 ■ +11 - 14dBm @ MCS 5/13 ■ +9 - 12dBm @ MCS 6/14 ■ +7 - 10dBm @ MCS 7/15
802.11n 5GHz/HT40	■ +14dBm @ MCS 0/8 ■ +14dBm @ MCS 1/9 ■ +14dBm @ MCS 2/10 ■ +14dBm @ MCS 3/11	■ +14dBm @ MCS 4/12 ■ +10– 13dBm @ MCS 5/13 ■ +8 – 11dBm @ MCS 6/14 ■ +6 – 9dBm @ MCS 7/15

5.1.11 *Receiver Sensitivity*

Table 5.11 Receiver Sensitivity of Wireless Interface under IEEE 802.11 Standards

Standard	Data Rate	IEEE Spec (1 Rx dBm)	Typical/Maximum (2Rx dBm)
802.11b	1M	not specified	-98/-85
	5.5M	not specified	-98/-85
	11M	not specified	-94/-85
802.11g	6M	-82	-96/-85
	9M	-81	-96/-84
	12M	-79	-95/-82
	18M	-77	-93/-80
	24M	-74	-90/-77
	36M	-70	-87/-73
	48M	-66	-83/-69
	54M	-65	-82/-68
802.11b/g/n HT20	MCS0	-82	-95/-85
	MCS1	-79	-94/-82
	MCS2	-77	-92/-80
	MCS3	-74	-89/-77

Standard	Data Rate	IEEE Spec (1 Rx dBm)	Typical/Maximum (2Rx dBm)
	MCS4	-70	-86/-73
	MCS5	-66	-82/-69
	MCS6	-65	-80/-68
	MCS7	-64	-78/-67
802.11b/g/n HT40	MCS0	-79	-92/-82
	MCS1	-76	-92/-79
	MCS2	-74	-89/-77
	MCS3	-71	-86/-74
	MCS4	-67	-83/-70
	MCS5	-63	-77/-66
	MCS6	-62	-76/-65
	MCS7	-61	-75/-64

5.1.12 *Security*

Supported Wireless Security Mechanisms

- 64-bit and 128-bit WEP encryption
- 802.1x authentication
- AES and TKIP, WPA/WPA2

5.1.13 *Regulatory Requirements*

Table 5.12 Conformed Radio Frequency and Electromagnetic Standards

EMC	▪ EN 301 489-1 V1.9.2 (2011-09) ▪ EN 301 489-17 V2.2.1 (2012-09)
Radio	▪ 47 CFR FCC Part 15 Subpart C § 15.247 ▪ 47 CFR FCC Part 15 Subpart E § 15.407 ▪ EN 300 328 V1.8.1 (2012-06) ▪ EN 301 893 V1.7.1 (2012-06)
EMF	▪ 47 CFR FCC Part 2 Subpart J, section 2.1091 ▪ EN 62311:2008 and EN 50385:2002

Table 5.13 Conformed Electrical Standards

Test	Item		Value	Level
IEC61000-4-2	**ESD**	Contact Discharge	±8KV	4
		Air Discharge	±15KV	4
IEC61000-4-3	**RS**	Radiated(Enclosure)	10(V/m)	3
IEC61000-4-4	**EFT**	AC Power Port	±2.0 KV	3
		LAN Port	±2.0 KV	4
		COM Port	±2.0 KV	4
IEC61000-4-5	**Surge**	AC Power Port	Line-to-Line±1.0 KV	3
		AC Power Port	Line-to-Earth±2.0 KV	3
		LAN Port	Line-to-Earth±2.0 KV	3
		COM Port	Line-to-Earth±2.0 KV	3
IEC61000-4-6	**CS**	Conducted(Enclosure)	10 V rms	3
IEC61000-4-8	**PFMF**	(Enclosure)	10(A/m)	3
IEC61000-4-11	**DIP**	AC Power Port	-	-

*AC Ports are tested through an authorized power adaptor.

5.1.14 *Environmental Limits*

- **Operating Temperature:** -10°C ~60°C (-4°F ~149°F)
- **Storage Temperature:** -40°C ~85°C (-40°F ~ 185°F)
- **Ambient Relative Humidity:** 5~95%RH, (non-condensing)

5.1.15 *Other*

- Safety: UL60950-1/CB, EN60950-1, CNS 14336
- Shock: IEC 60068-2-27
- Freefall: IEC 60068-2-32
- Vibration: IEC 60068-2-6
- MTBF: 20 years (TBD)
- RoHS: Yes
- Maritime: N/A

5.2 *Software Specifications*

Table 5.14 Software Specifications

Configuration	■ Browser (IE8+, Firefox 6+, and Chrome 13+) ■ Telnet ■ Device Management© (Atop's Windows utility)
Protocol	■ ICMP ■ DNS ■ HTTP ■ TCP ■ SNMP ■ Telnet ■ RADIUS ■ UDP ■ NTP ■ IPv4 ■ Syslog ■ DHCP ■ SMTP ■ 802.1x
Alert Events	■ E-mail ■ SNMP Trap
Radio OFF option	Yes
Other	■ Import / Export Configuration from Web with Wireless settings ■ Firmware upgrade through Web or **Device Management©** ■ Site Monitor / Site Survey ■ LAN / WLAN Bridge (AP Client) ■ Management List

6 Emergency System Recovery

If the device becomes inaccessible and the management utility cannot find the device, please use the following procedure to recover the devices over Trivial File Transfer Protocol (TFTP).

System Recovery Procedures

System recovery is based on the TFTP Client embedded in the device. It can recover the device from a bad firmware or other unknown reasons corrupting the firmware image inside the flash memory. Please follow the procedures below to force MW550XC to download a valid firmware from the TFTP Server to recover its operating system.

Default Settings	
TFTP Server	10.0.50.201
TFTP Server Subnet Mask	255.255.0.0
Name of firmware Image*	firmware.dld
*This firmware image can be obtained from Atop's website.	

- If the device is beeping continuously after power up, this means that the bootloader is damaged and there is no way to recover it. Please contact Atop directly to obtain RMA number for further solutions.
- Obtain and setup a **TFTP server** on your **PC**. Make sure that the **PC's network settings** are set properly according to the default setting in the above table.
- Rename the firmware image that you obtained from our website to "firmware.dld" and place it in the TFTP Server's root directory. For Solarwinds TFTP Server, it is usually **C:\TFTP-Root.**
- Make sure that the device is powered OFF and the Ethernet cable is plugged in.
- Press and hold the "reset-to-default" pin next to the Antenna 2 then power ON the device. If the bootloader is still functioning, the user will hear one long beep followed by two shorter beeps.
- Release the reset pin after hearing seven consecutive short beeps. Then, the device will automatically request files from TFTP Server. Please wait until the device shows up on the management utility. This process could take up to five minutes or even more.

Important Note

Free TFTP Servers can be downloaded from the following locations:

Solarwinds TFTP Server	http://www.solarwinds.com/products/freetools/free_tftp_server.aspx
Note: for Solarwinds, please remember to Start the TFTP Server Service, the default state of the TFTP is Stop.	
TFTPD32 TFTP Server	http://tftpd32.jounin.net/tftpd32.html

7 Warranty

Limited Warranty Conditions

Products supplied by Atop Technologies Inc. are covered in this warranty for undesired performance or defects resulting from shipping, or any other event deemed to be the result of Atop Technologies Inc.'s mishandling. The warranty does not cover; however, equipment which has been damaged due to accident, misuse, abuse, such as:

- Use of incorrect power supply, connectors, or maintenance procedures
- Use of accessories not sanctioned by us
- Improper or insufficient ventilation
- Improper or unauthorized repair
- Replacement with unauthorized parts
- Failure to follow our operating Instructions
- Fire, flood, "Act of God", or any other contingencies beyond our control.

RMA and Shipping Reimbursement

- Customers must always obtain an authorized **"RMA" number** from us before shipping the goods to be repaired.
- When in normal use, a sold product shall be replaced with a new one within 3 months upon purchase. The shipping cost from the customer to us will be reimbursed.
- After 3 months and still within the warranty period, it is up to us whether to replace the unit with a new one; normally, as long as a product is under warranty, all parts and labor are free-of-charge to the customers.
- After the warranty period, the customer shall cover the cost for parts and labor.
- Three months after purchase, the shipping cost from you to us will not be reimbursed, but the shipping costs from us to the customer will be paid by us.

Limited Liability

Atop Technologies Inc. shall not be held responsible for any consequential losses from using our products.

Warranty

Atop Technologies Inc., gives a 5-year maximum warranty for Industrial Wireless Modbus Gateway products.

Atop Technologies, Inc.

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