



WH-9200AP Dual Band

Connection Guide

For WDS Bridge Mode





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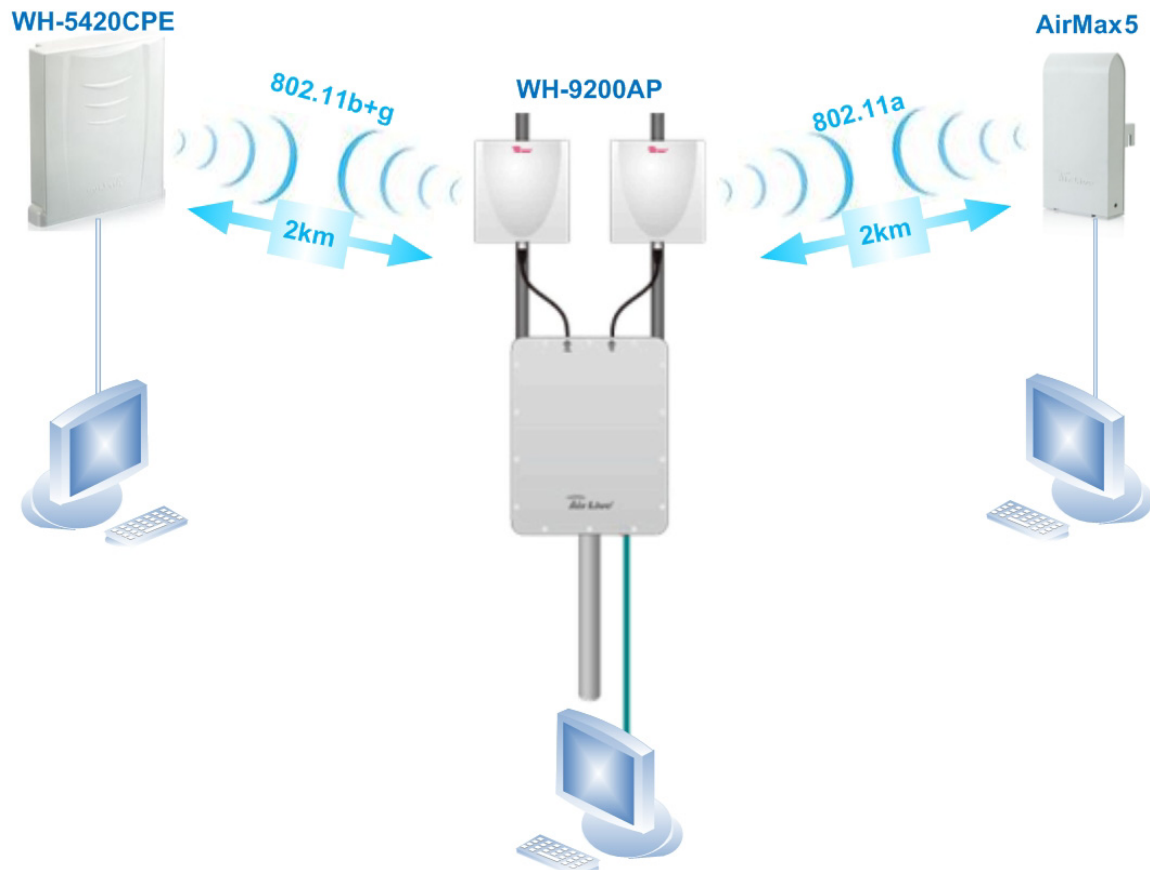
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Overview

This document guides we use WH-9200AP to connect two wireless networks simultaneously that radio1 is 802.11b/g mode and radio2 is 802.11a mode in 2km.



Devices:

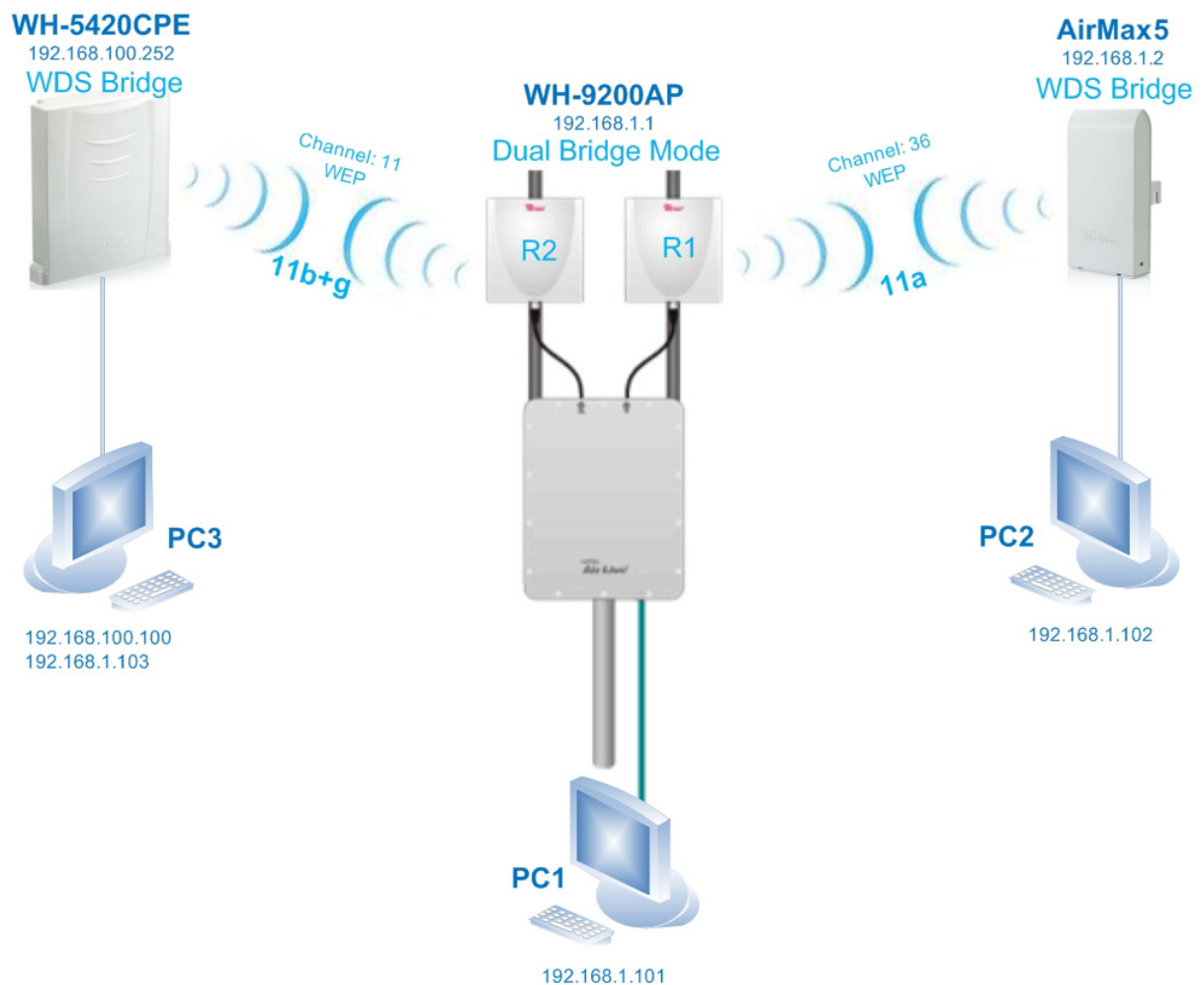
1. WH-9200AP (firmware version is v1.00e07a)
2. WH-5420CPE (firmware version is 5420cpe_e1_eu)
3. AirMax5 (firmware version is 1.00e13)
4. PC * 3

Configuration

1. Topology:

In this sample, we are going to introduce you to connect WH-5420CPE and AirMax5 with the “Dual Bridge mode” of WH-9200AP. The Radio1 of WH-9200AP is 802.11a band that connect to AirMax5 via WEP encryption, and the radio2 is using 802.11b/g band to connect with WH-5420CPE via WEP encryption.

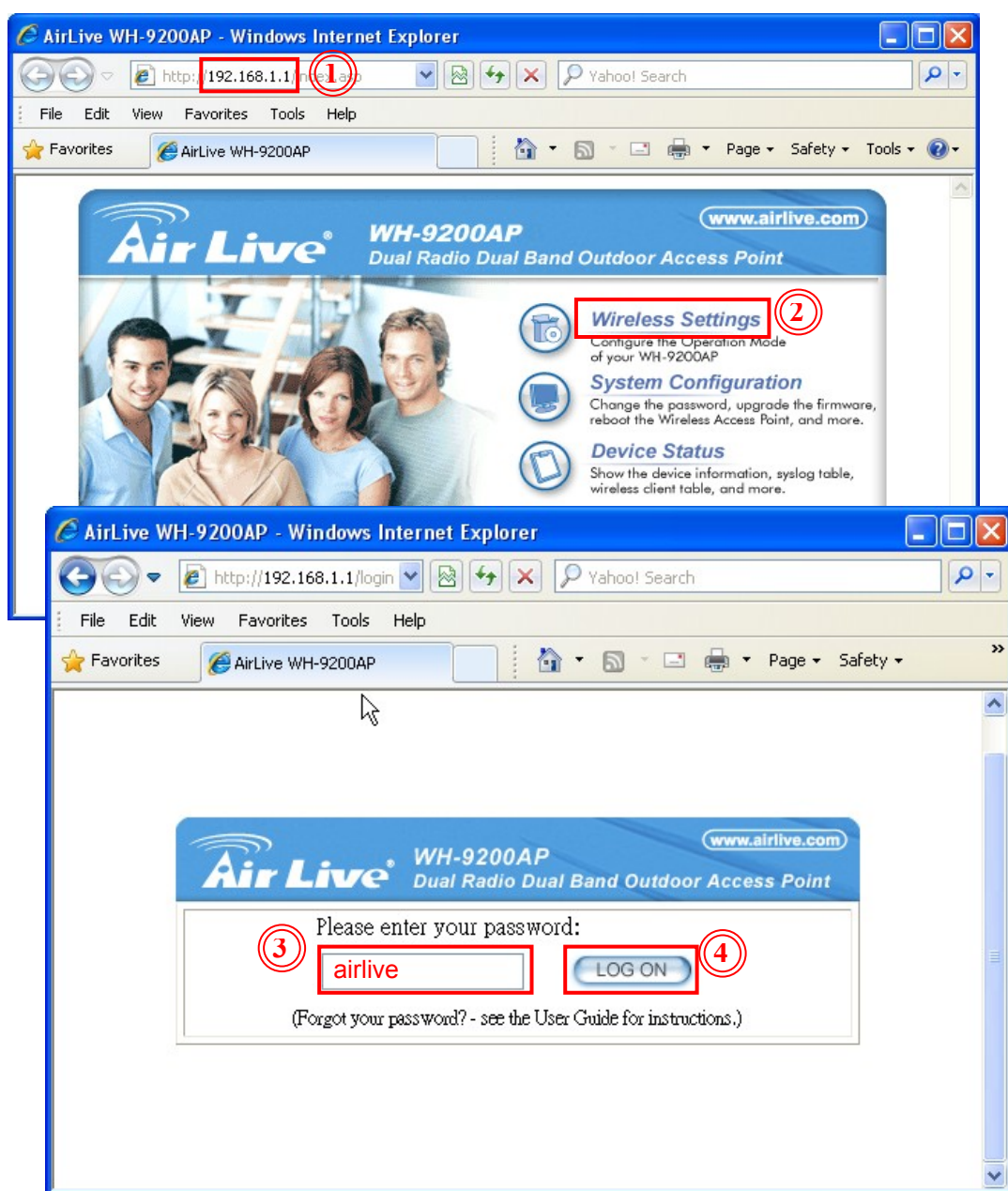
Before the process, please change the IP address of each PC and direct the devices with the following topology.



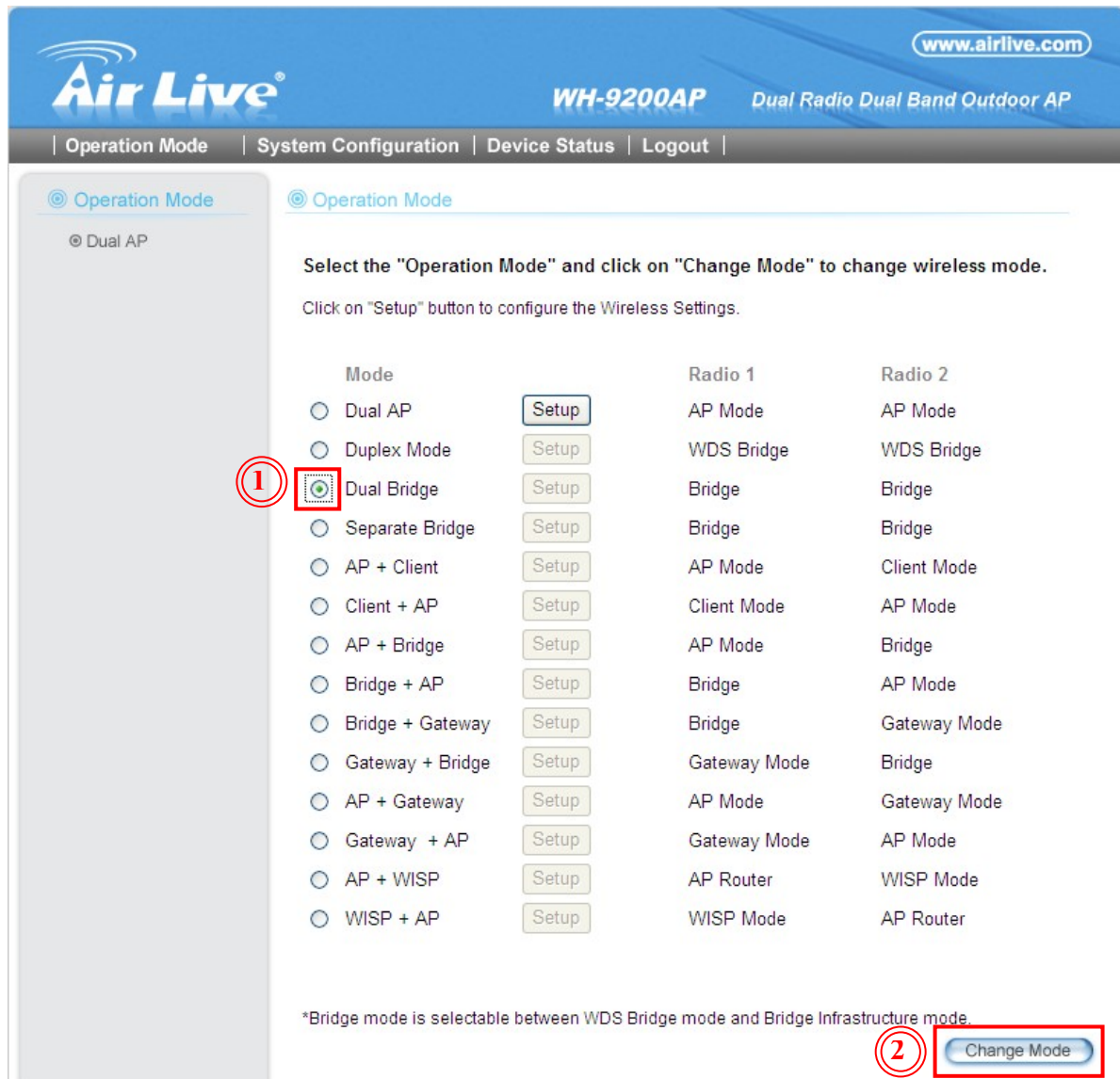
2. WH-9200AP Settings

Step 1. Change the mode to Dual Bridge

1. In PC1, type the WH-9200AP's IP address into the web browser's address field to access the device. ① (default IP is 192.168.1.1)
2. Press the "Wireless Settings" button ② then key-in the password to login the device. ③ (default password is "airlive")



- Press the "Setup" button of Dual Bridge mode to into the set up page. ⑤



www.airlive.com

Air Live® **WH-9200AP** Dual Radio Dual Band Outdoor AP

| Operation Mode | System Configuration | Device Status | Logout |

Operation Mode

Dual AP

Select the "Operation Mode" and click on "Change Mode" to change wireless mode.

Click on "Setup" button to configure the Wireless Settings.

Mode	Radio 1	Radio 2
<input type="radio"/> Dual AP	AP Mode	AP Mode
<input type="radio"/> Duplex Mode	WDS Bridge	WDS Bridge
① <input checked="" type="radio"/> Dual Bridge	Bridge	Bridge
<input type="radio"/> Separate Bridge	Bridge	Bridge
<input type="radio"/> AP + Client	AP Mode	Client Mode
<input type="radio"/> Client + AP	Client Mode	AP Mode
<input type="radio"/> AP + Bridge	AP Mode	Bridge
<input type="radio"/> Bridge + AP	Bridge	AP Mode
<input type="radio"/> Bridge + Gateway	Bridge	Gateway Mode
<input type="radio"/> Gateway + Bridge	Gateway Mode	Bridge
<input type="radio"/> AP + Gateway	AP Mode	Gateway Mode
<input type="radio"/> Gateway + AP	Gateway Mode	AP Mode
<input type="radio"/> AP + WISP	AP Router	WISP Mode
<input type="radio"/> WISP + AP	WISP Mode	AP Router

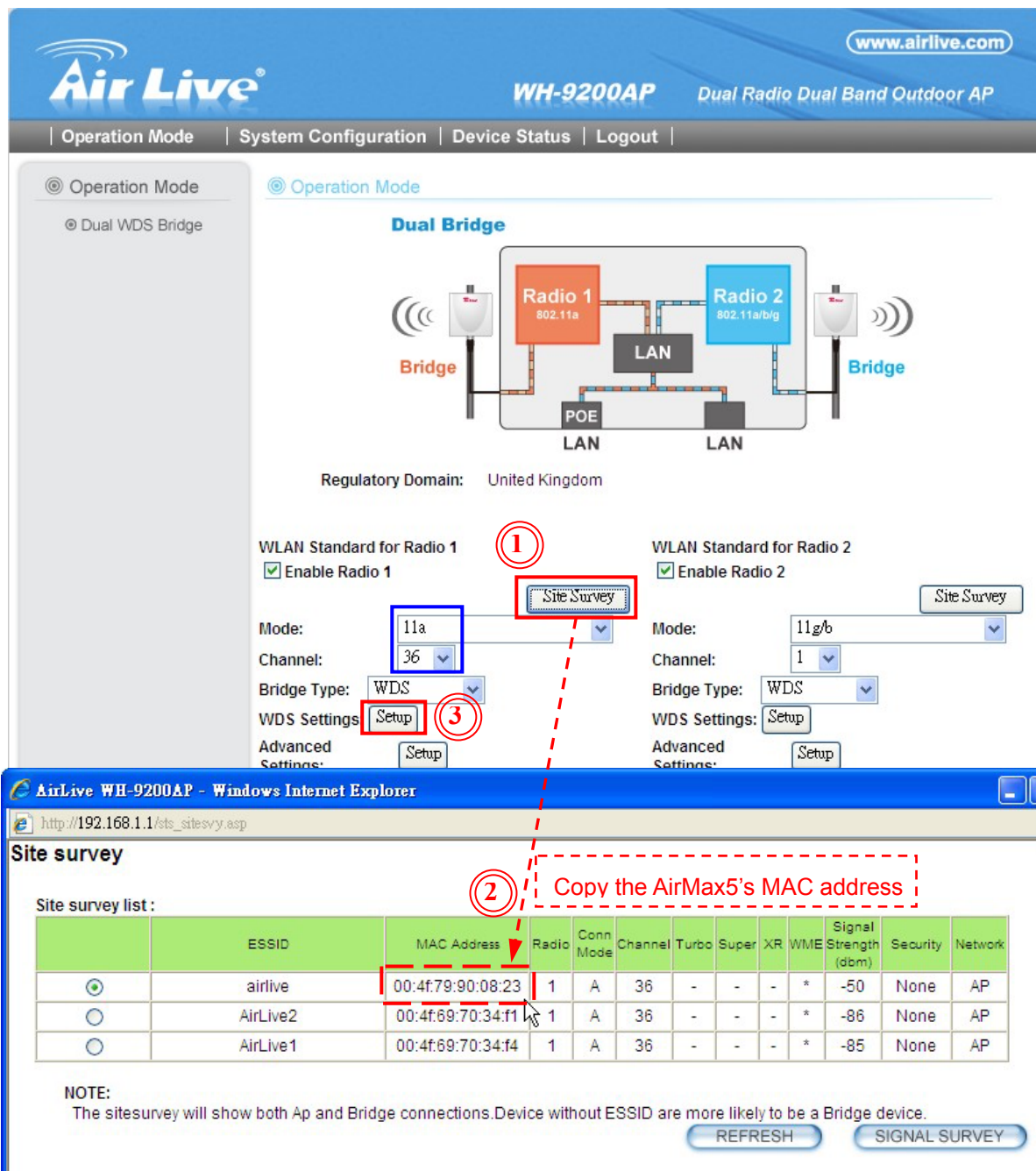
*Bridge mode is selectable between WDS Bridge mode and Bridge Infrastructure mode.

② Change Mode

Step 2. Encryption and connection settings for radio 1.

- Check if Radio1 and Radio2 is already enabled.
In this sample, the Radio Mode and the Channel number are using the default settings show as following.
Radio Mode: 11a
Channel: 36
- Please press the "Site Survey" button to site survey the signal in your environment. ①
- You can see the SSID with AirMax5, please copy the AirMax5's MAC address ②. (In our sample, the SSID is "AirLive2")

4. Please press the “Setup” button of “WDS settings” to show the “WDS settings” dialog box. ③



WDS settings for Radio 1:

- WLAN Standard for Radio 1: ☒ Enable Radio 1
- Mode: 11a
- Channel: 36
- Bridge Type: WDS
- WDS Settings: **Setup** (③)
- Advanced Settings: Setup

WDS settings for Radio 2:

- WLAN Standard for Radio 2: ☒ Enable Radio 2
- Mode: 11g/b
- Channel: 1
- Bridge Type: WDS
- WDS Settings: Setup
- Advanced Settings: Setup

Site Survey Dialog Box:

② Copy the AirMax5's MAC address

Site survey list:

	ESSID	MAC Address	Radio	Conn Mode	Channel	Turbo	Super	XR	WME	Signal Strength (dbm)	Security	Network
<input checked="" type="radio"/>	airlive	00:4f:79:90:08:23	1	A	36	-	-	-	*	-50	None	AP
<input type="radio"/>	AirLive2	00:4f:69:70:34:f1	1	A	36	-	-	-	*	-86	None	AP
<input type="radio"/>	AirLive1	00:4f:69:70:34:f4	1	A	36	-	-	-	*	-85	None	AP

NOTE:
The sitesurvey will show both Ap and Bridge connections. Device without ESSID are more likely to be a Bridge device.

Buttons: REFRESH, SIGNAL SURVEY

5. Please enter any name and SSID for your own reference (i.e. toAirMax5). ④
6. Then enter the AirMax5's wireless MAC address in “MAC address” field. ⑤
(In this sample, the AirMax5's wireless MAC address is 00-4f-79-90-08-23)

7. Select the “WEP” encryption.⑥

In our sample, we use these parameters:

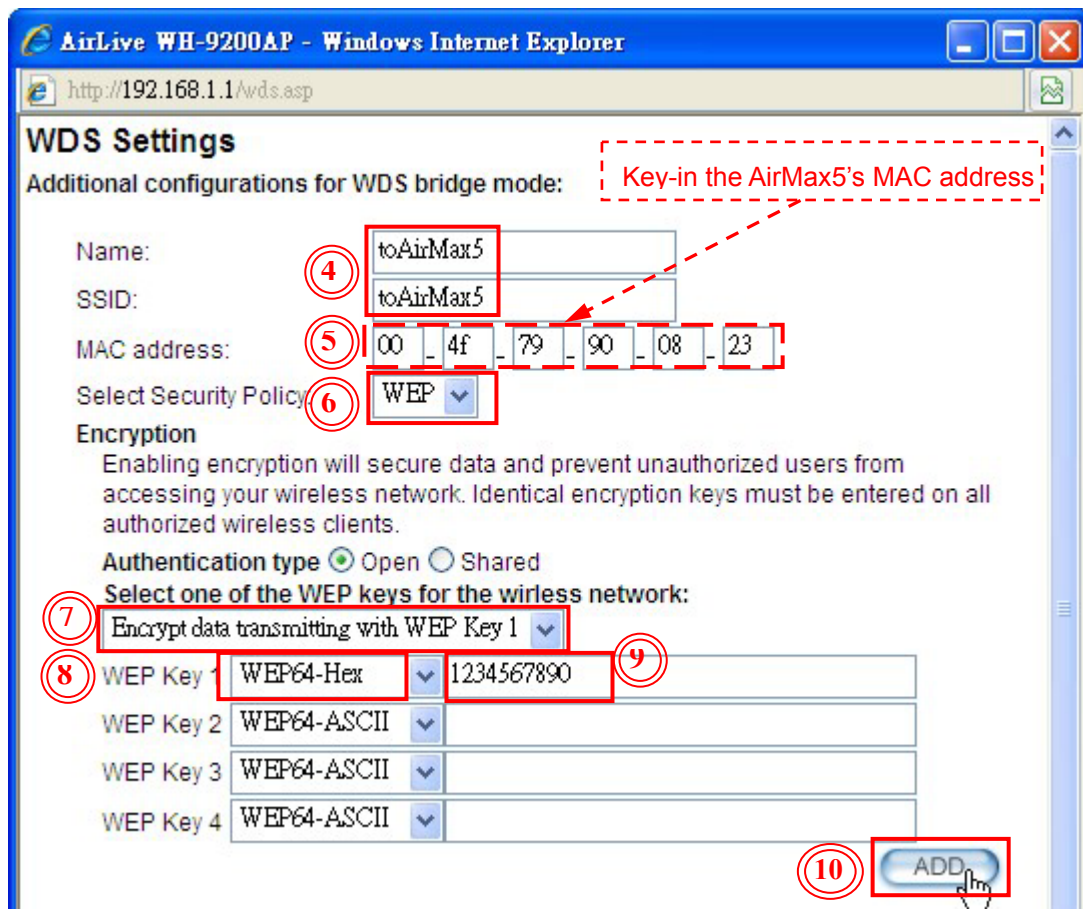
Encrypt data transmitting: WEP Key 1⑦

WEP Key 1: WEP64-Hex⑧

WEP Key 1 string: 1234567890⑨

(If you want to use other encryptions, you must use the same as AirMax5’s wireless encryptions.)

Then press “ADD” button to add the WDS connection in WH-9200AP’s Radio1.⑩



WDS Settings
Additional configurations for WDS bridge mode:

Name: ④ toAirMax5

SSID: ④ toAirMax5

MAC address: ⑤ 00 - 4f - 79 - 90 - 08 - 23

Select Security Policy ⑥ WEP

Encryption
Enabling encryption will secure data and prevent unauthorized users from accessing your wireless network. Identical encryption keys must be entered on all authorized wireless clients.

Authentication type ☒ Open ☐ Shared

Select one of the WEP keys for the wireless network:

⑦ Encrypt data transmitting with WEP Key 1

⑧ WEP Key 1 WEP64-Hex ⑨ 1234567890

WEP Key 2 WEP64-ASCII

WEP Key 3 WEP64-ASCII

WEP Key 4 WEP64-ASCII

⑩ ADD

8. Press the “Setup” button of “Advanced Settings” to show the “Advanced Wireless Settings” dialog box⑪, then press “ACK Calculator” button⑫.

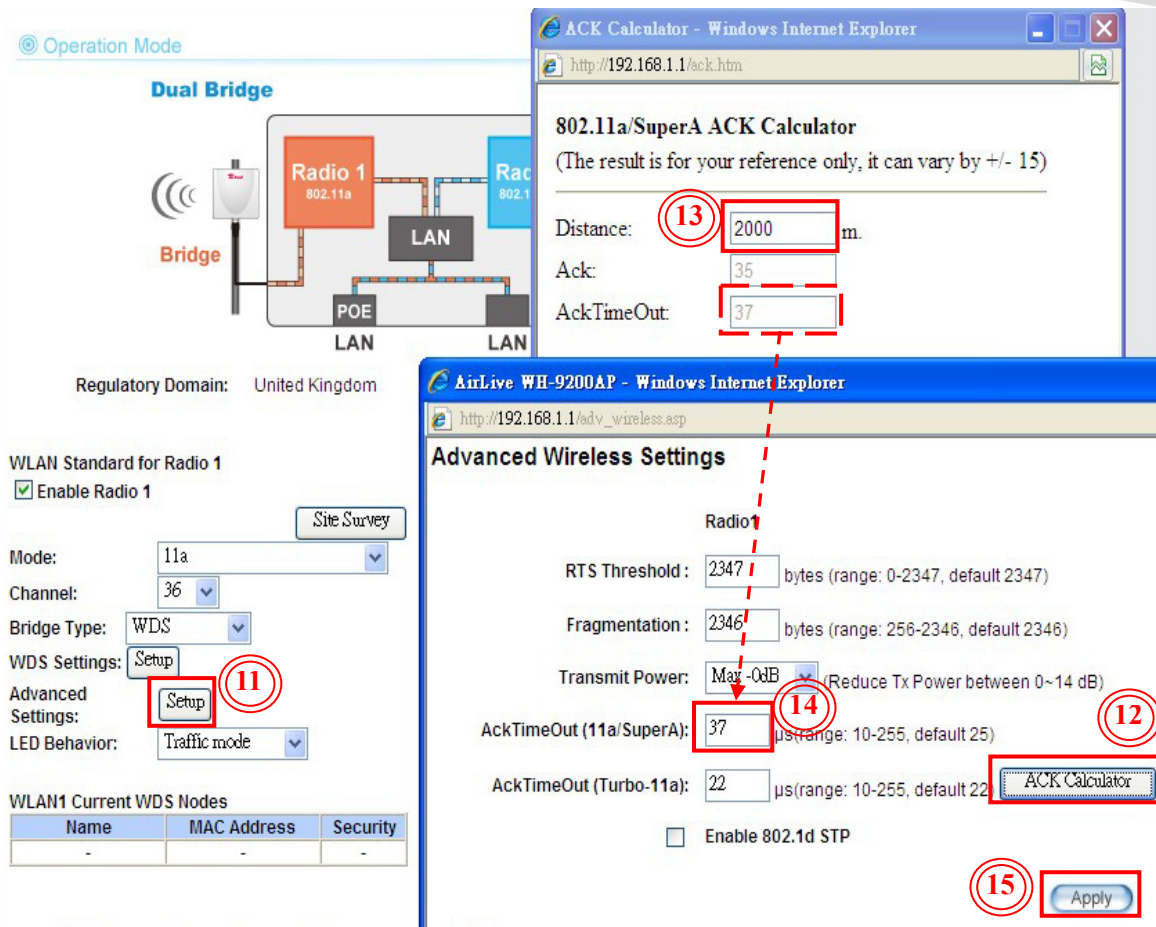
It shows “802.11a/SuperA ACK Calculator” dialog box.

Please enter the distance between WH-9200AP and AirMax5⑬, then press the “Tab” button on your keyboard, at this time it shows the Ack time out value in the field.

(In this sample, the distance is 2000m; the Ack Time Out is 37)

You can copy the value to paste with “AckTimeOut(11a/SuperA)” field⑭.

Remember press “Apply” button to save the settings⑮.



Step 3. Encryption and connection settings for Radio 2.

1. Check the radio1 is 11b/g mode and the channel number is 11.
2. Please press the "Setup" button of "WDS settings" to show the "WDS settings" dialog box. ①
3. Enter any name and SSID for your own reference(i.e. to5420). ② Then key-in the WH-5420CPE's MAC address in "MAC address" field. ③ (In this sample, the WH-5420CPE's MAC address is 00-4f-62-1c-3c-cd)
4. Select the "WEP" encryption. ④
In our sample, we use these parameters:
Encrypt data transmitting: WEP Key 1 ⑤
WEP Key 1: WEP64-Hex ⑥
WEP Key 1 string: 1234567890 ⑦
(If you want to use other encryptions, you must use the same as WH-5420CPE's wireless encryptions.)

Then press "ADD" button to add the WDS connection in WH-9200AP's Radio1. ⑧

WDS Settings
Additional configurations for WDS bridge mode:

Name: to5420
SSID: to5420
MAC address: 00 - 4f - 62 - 1c - 3c - cd
Select Security Policy: WEP
Encryption: ☒ Open ☐ Shared
Select one of the WEP keys for the wireless network:
Encrypt data transmitting with WEP Key 1
WEP Key 1: WEP64-Hex 1234567890
WEP Key 2: WEP64-ASCII
WEP Key 3: WEP64-ASCII
WEP Key 4: WEP64-ASCII
ADD
DELETE SELECTED

WLAN Standard for Radio 2
☒ Enable Radio 2
Mode: 11g/b
Channel: 11
Bridge Type: WDS
WDS Settings: Setup
Advanced Settings: Setup
LED Behavior: Traffic mode

WLAN2 Current WDS Nodes

Name	MAC Address	Security
-	-	-

5. Press the “Setup” button of “Advanced Settings” to show the “Advanced Wireless Settings” dialog box^⑨.
Then enter the Ack Time Out value in “AckTimeOut(11g/SuperG)” field^⑩.
The value is the same as 11a. (In this sample, the Ack Time Out is 37)
Remember press “Apply” button to save the settings.^{⑪⑫}

Advanced Wireless Settings

Radio2

RTS Threshold: 2347 bytes (range: 0-2347, default 2347)
Fragmentation: 2346 bytes (range: 256-2346, default 2346)
Transmit Power: Max -0dB Reduce Tx Power between 0~14 dB
AckTimeOut (11g/SuperG): 37 μs (range: 10-255, default 48)
AckTimeOut (Turbo-11g): 22 μs (range: 10-255, default 22)
AckTimeOut (11a/SuperA): 25 μs (range: 10-255, default 25)
AckTimeOut (Turbo-11a): 22 μs (range: 10-255, default 22) ACK Calculator
☐ Enable 802.1d STP
Apply

WLAN Standard for Radio 2
☒ Enable Radio 2
Site Survey
Mode: 11g/b
Channel: 11
Bridge Type: WDS
WDS Settings: Setup
Advanced Settings: Setup
LED Behavior: Traffic mode

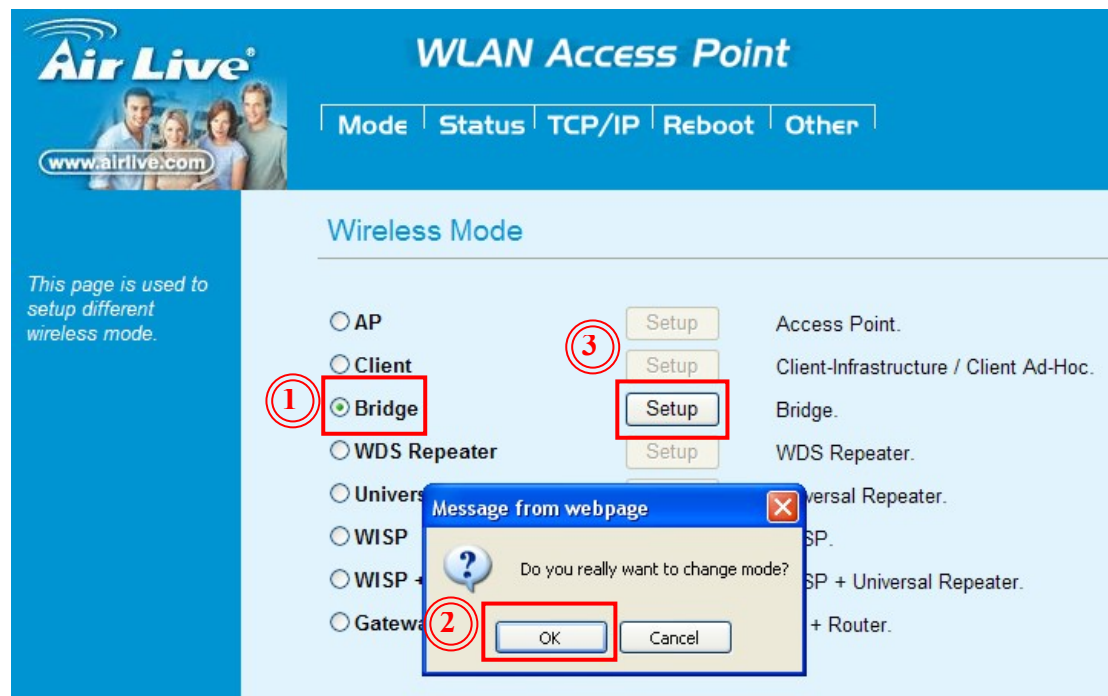
WLAN2 Current WDS Nodes

Name	MAC Address	Security
-	-	-

3. WH-5420CPE Settings

Step 1. Change the 5420CPE to Bridge Mode.

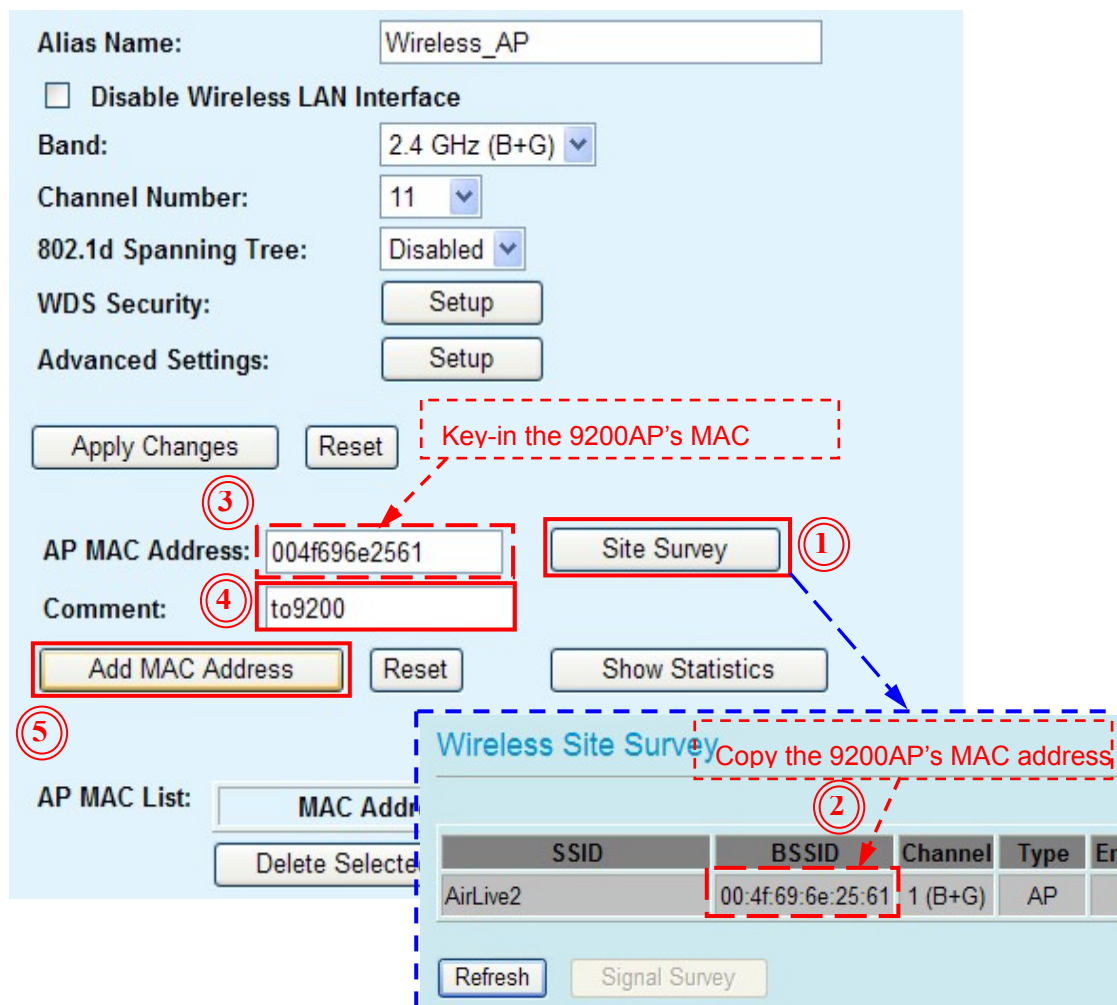
1. In PC3, type the WH-5420CPE's IP address into the web browser's address field to access the device. (default IP is 192.168.100.252)
2. Press the "Mode" button then select "Bridge" ① → "OK" button ② to change operation mode with WDS Bridge Mode.
3. After changed mode, please press the "Setup" button to into the "Bridge mode Settings" page. ③



Step 2. Site survey and connect with 9200AP.

1. In the "Bridge mode Settings" page, please press the "Site Survey" button to site survey the signal in your environment. ①
2. It will show the site survey result of the "Wireless Site Survey" dialog window. You can see the SSID with WH-9200AP's Radio2, please copy its MAC address ②. (In our sample, the SSID of WH-9200AP's Radio2 is "AirLive2")
3. Then enter the MAC address of WH-9200AP's Radio2 in "AP MAC Address" field ③ and enter any name for your own in "Comment" field. ④

4. Press the “Add MAC Address” button to add the WDS connection in WH-5420CPE.



Alias Name:

☐ Disable Wireless LAN Interface

Band:

Channel Number:

802.1d Spanning Tree:

WDS Security:

Advanced Settings:

AP MAC Address:

Comment:

AP MAC List:

Wireless Site Survey

SSID	BSSID	Channel	Type	Encryption
AirLive2	00:4f:69:6e:25:61	1 (B+G)	AP	

6. Press “Setup” button of “WDS Security” to show the “WDS Security Setup” dialog box. ⑥

In our sample, we use these parameters:

Encryption: WEP 64bits ⑦

WEP Key Format: Hex(10 characters) ⑧

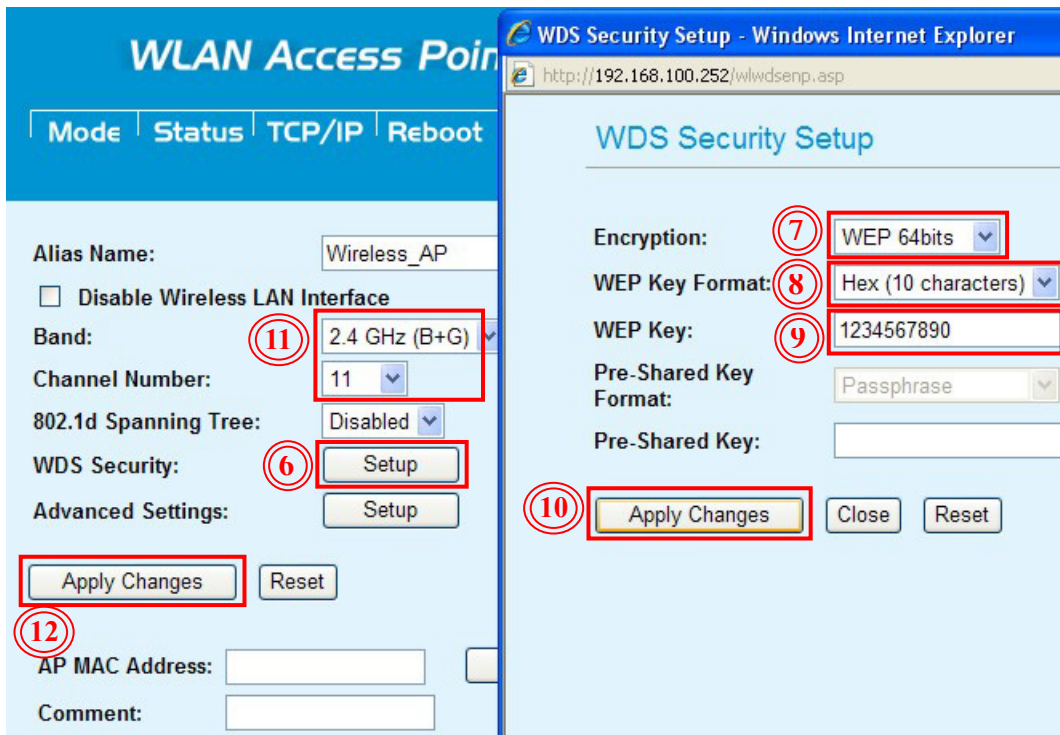
WEP Key string: 1234567890 ⑨

Remember press “Apply Changes” button to save the WDS Security settings ⑩

(If you want to use other encryptions, you must use the same as WH-9200AP Radio2’s encryptions.)

7. Check if the radio band is “2.4GHz (B+G)” and the channel number is “11” ⑪, please press “Apply Change” button to save the settings. ⑫

8. You must reboot the device to apply all the settings.



The screenshot shows the 'WLAN Access Point' configuration page in a web browser. The 'WDS Security Setup' tab is active. Numbered callouts indicate the following steps:

- 6: Click the 'Setup' button under 'WDS Security'.
- 7: Select 'WEP 64bits' for 'Encryption'.
- 8: Select 'Hex (10 characters)' for 'WEP Key Format'.
- 9: Enter '1234567890' for 'WEP Key'.
- 10: Click the 'Apply Changes' button.
- 11: Select '2.4 GHz (B+G)' for 'Band'.
- 12: Click the 'Apply Changes' button at the bottom of the page.

Step 3. Check the connection.

After system reboot, you can ping the PC1 from PC3 to check if the connection was successful.

```
E:\Documents and Settings\Administrator>ping 192.168.1.101

Pinging 192.168.1.101 with 32 bytes of data:

Reply from 192.168.1.101: bytes=32 time=1ms TTL=128
Reply from 192.168.1.101: bytes=32 time=1ms TTL=128
Reply from 192.168.1.101: bytes=32 time=2ms TTL=128
Reply from 192.168.1.101: bytes=32 time=3ms TTL=128

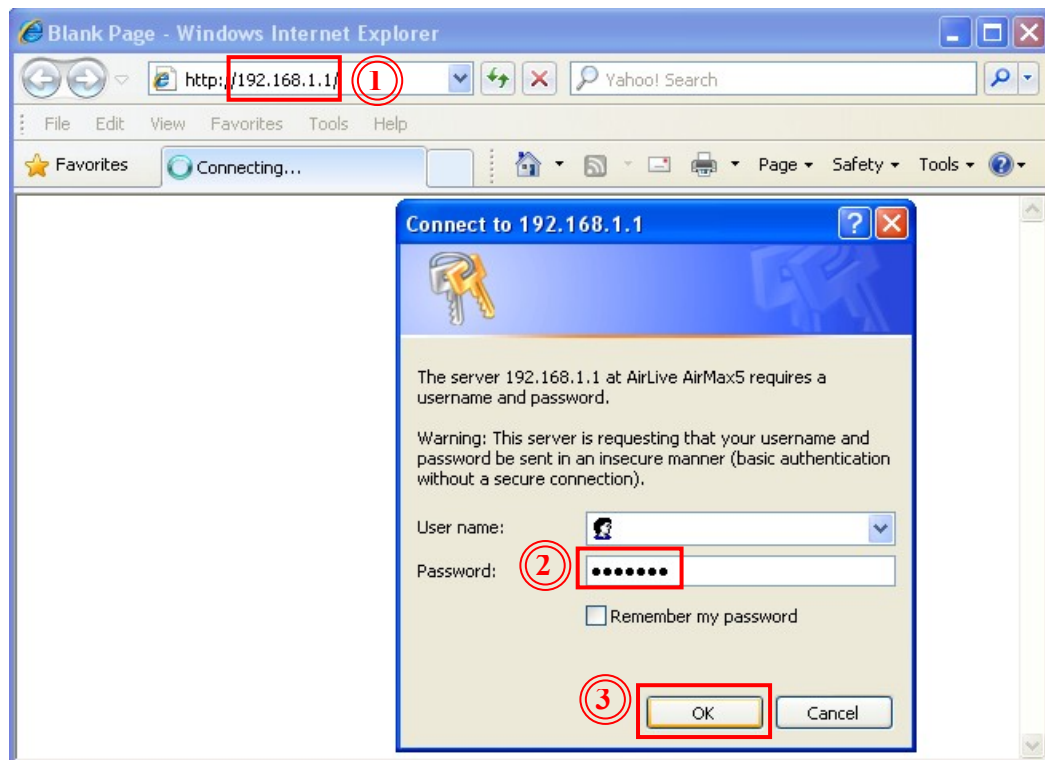
Ping statistics for 192.168.1.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms
```

If you can't ping the PC1, please check the firewall is already disable of PC1's OS.

4. AirMax5 Settings

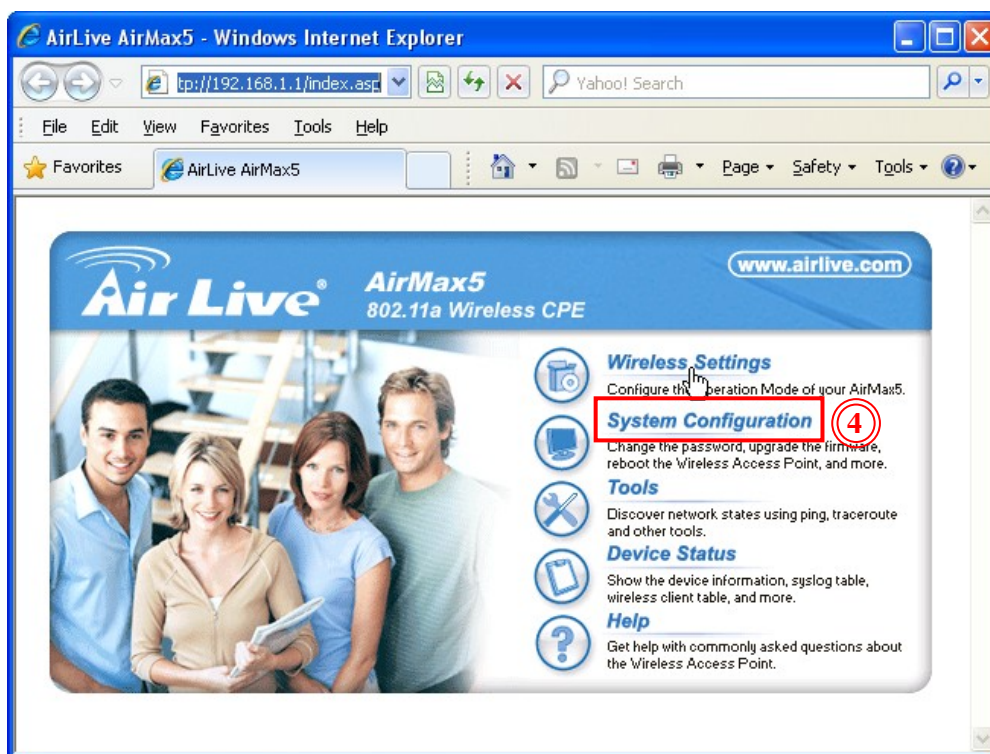
Step 1. Login the device and change its IP.

1. In the PC2, type the AirMax5's IP address into the web browser's address field to access the device. ① (default IP is 192.168.1.1)
2. Then Key-in the password to login the device. ② (default User name and password are "airlive")

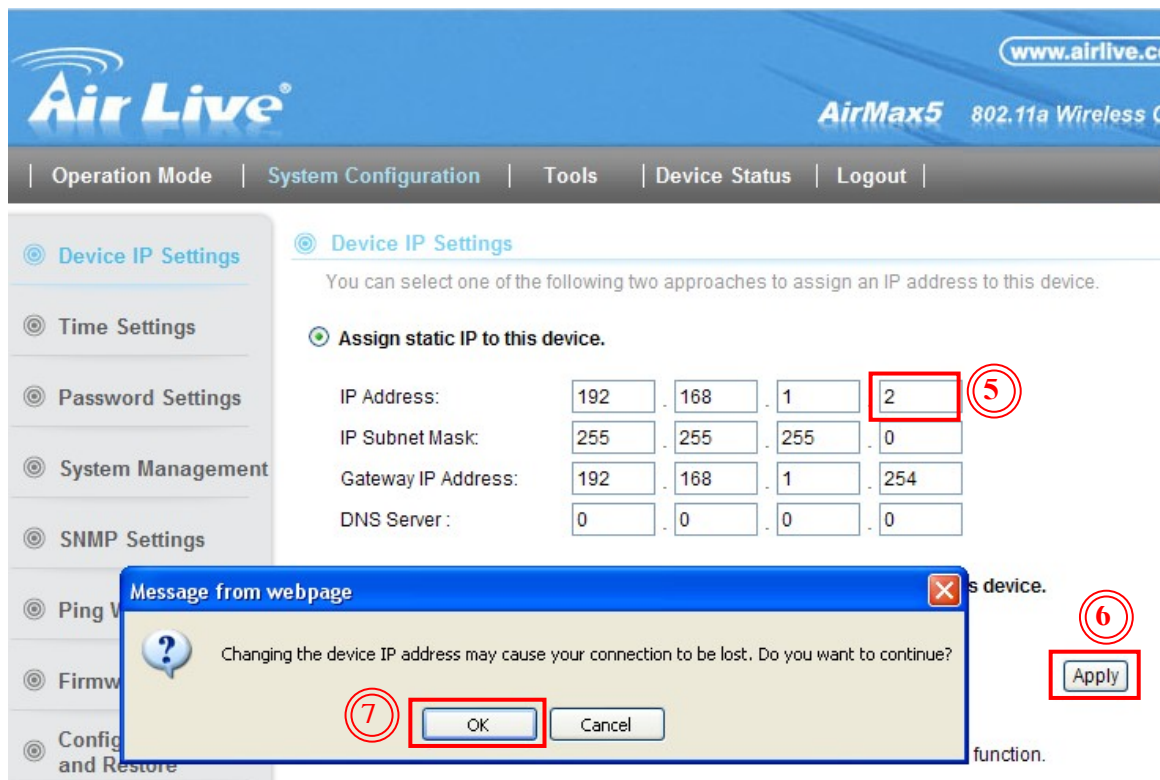


3. If your AirMax5's IP is the same as WH-9200AP's IP, you have to change another IP address to avoid the conflict. The same IP addresses can't exist in one LAN.

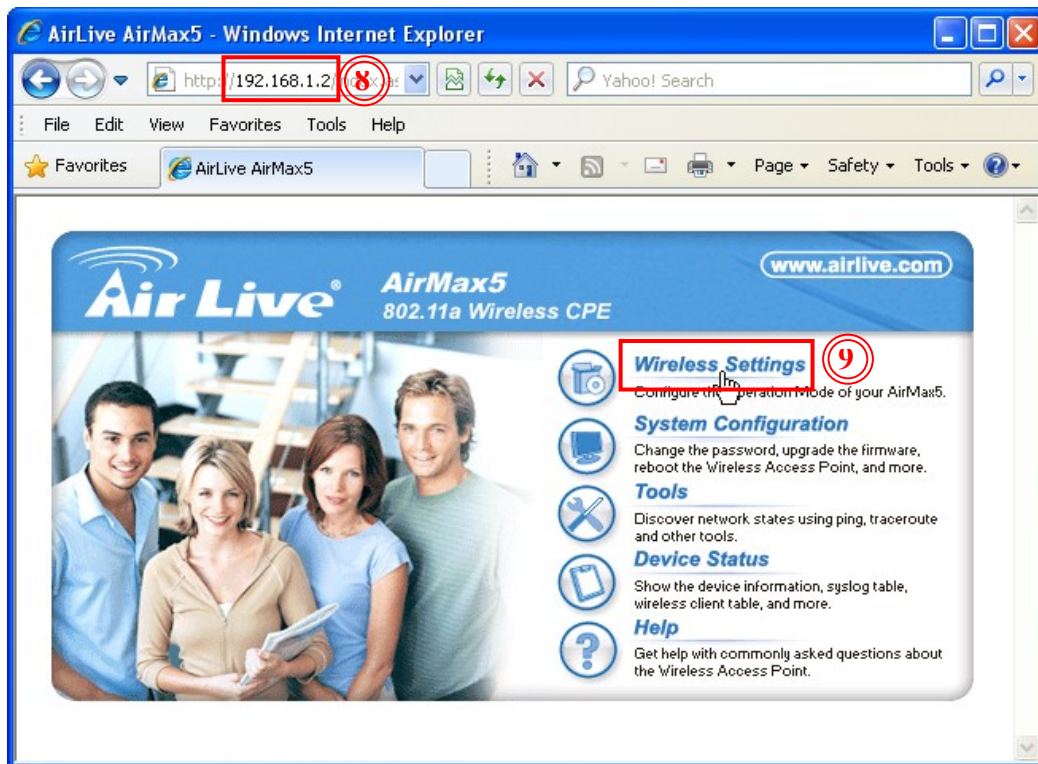
In this case, please press the "System configuration" button to go to the "Device IP Settings" page. ④



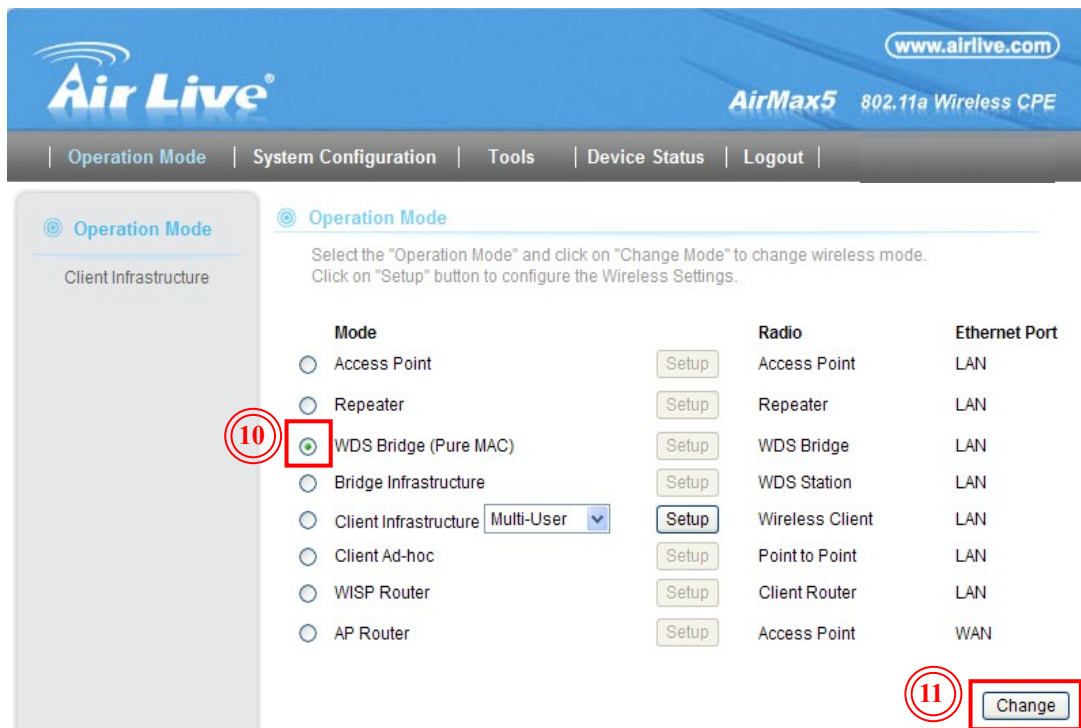
4. In our sample, we change the device's IP to 192.168.1.2^⑤ → press "Apply"^⑥ → "OK".^⑦



5. Access the device as new IP ⑧ then press the “Wireless Settings” button ⑨.



6. Then press the “Setup” button of “WDS Bridge (Pure MAC)” mode ⑩ → press “Change” button to change the operation mode. ⑪



Step 2. Site survey and connect with 9200AP.

1. After changing the operation mode, please press “Setup” button of “WDS Bridge (Pure MAC)” to into the Wireless Settings page of bridge mode.
2. Check the “Radio Mode”, “Channel” and “Channel Width” were the same as WH-9200AP.

(In our sample, we using 11a, channel 36 and the channel width is 20MHz.)

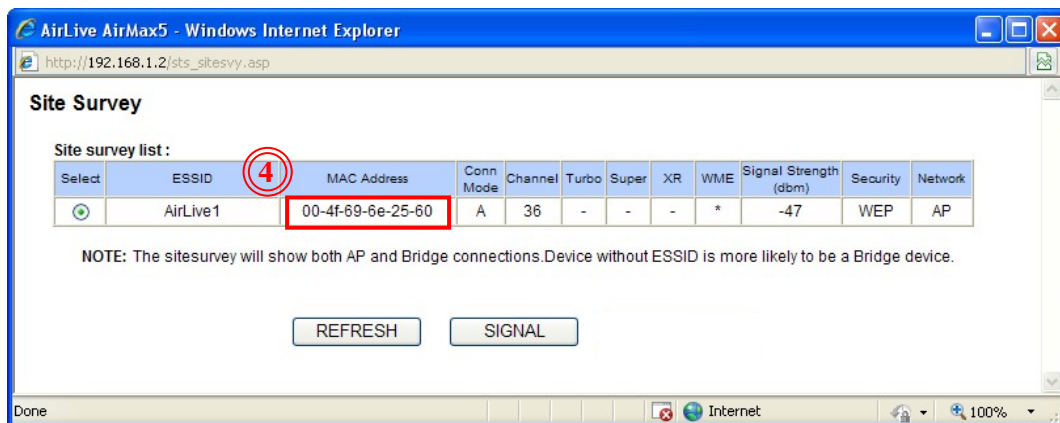
3. Enter the distance between WH-9200AP and AirMax5 in “Distance” field ^① then press “Apply” button to save the distance setting. ^②

After configured successfully, please press “Site Survey” button to site survey the signal in your environment. ^③

Wireless Settings

Regulatory Domain:	United States
WDS Site Survey:	^③ Site Survey
Radio Mode:	11a
SuperA Option:	<input checked="" type="checkbox"/> Bursting <input checked="" type="checkbox"/> Compression <input checked="" type="checkbox"/> Fast Frames
Channel:	36 (5180MHz)
Channel Width:	Normal (20MHz)
Distance:	^① 2000 meters
Antenna Setting:	Vertical
Transmit Power:	24dBm (Approximate TX Output Power)
DFS Control:	Disable
Advanced Settings:	Setup
WDS Setting:	Setup
RSSI LED Thresholds:	Setup
	^② Apply

4. Then it will show the site survey result of the “Site Survey” dialog window. You can see the ESSID with WH-9200AP’s radio1, then please copy its MAC address. ^④
(In our sample the ESSID is “AirLive1” of WH-9200AP’s Radio1)



5. Then come back to “Wireless Settings” page → Press “Setup” button of WDS Setting. ⑤

Wireless Settings

Regulatory Domain: United States

WDS Site Survey: Site Survey

Radio Mode: 11a

SuperA Option: ☒ Bursting ☒ Compression ☒ Fast Frames

Channel: 36 (5180MHz)

Channel Width: Normal (20MHz)

Distance: 2000 meters

Antenna Setting: Vertical

Transmit Power: 24dBm (Approximate TX Output Power)

DFS Control: Disable

Advanced Settings: Setup

WDS Setting: Setup ⑤

RSSI LED Thresholds: Setup

Apply

6. It will show the “WDS Settings” dialog window.

We should be setting the encryption first.

In this case, we use these parameters:

WEP Key number: WEP Key 1

WEP Key Format: WEP64-Hex

WEP Key string: 1234567890 ⑥

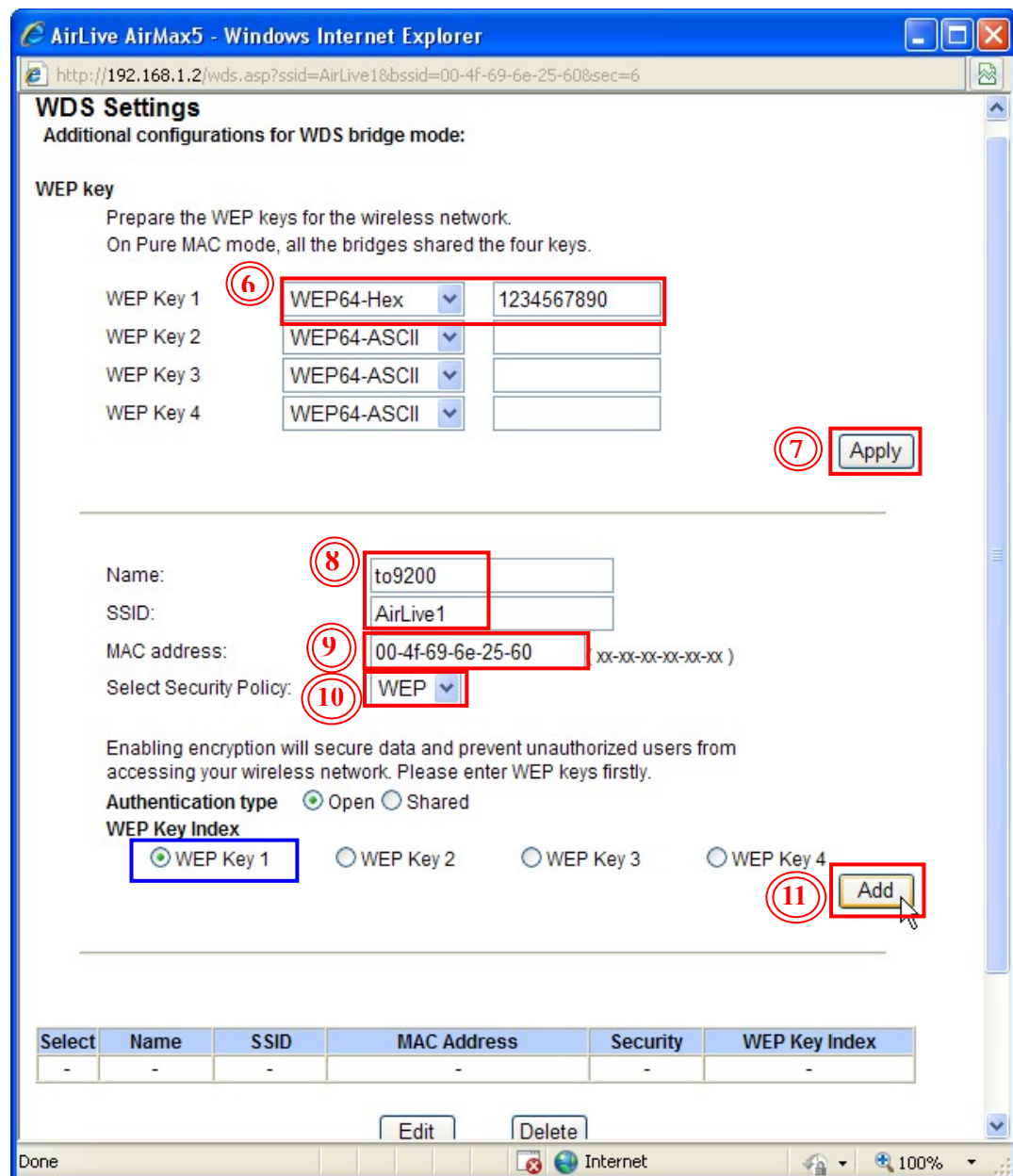
Remember press “Apply” button to save the encryption settings. ⑦

Then, enter any “Name” and “SSID” for your own in these field, ⑧ then

paste the WH-9200AP’s MAC address in the “MAC address” field. ⑨

Select the “WEP” with “Select Security Policy” field, ⑩ then confirm the

“WEP Key Index” is using “WEP Key 1” → press “Add” button to add the WDS connection of WH-9200AP’s Radio 1 in AirMax5. ⑪



WDS Settings
Additional configurations for WDS bridge mode:

WEP key
Prepare the WEP keys for the wireless network.
On Pure MAC mode, all the bridges shared the four keys.

WEP Key 1 ⑥ WEP64-Hex 1234567890
WEP Key 2 WEP64-ASCII
WEP Key 3 WEP64-ASCII
WEP Key 4 WEP64-ASCII

⑦ **Apply**

Name: ⑧ to9200
SSID: ⑧ AirLive1
MAC address: ⑨ 00-4f-69-6e-25-60 (xx-xx-xx-xx-xx-xx)
Select Security Policy: ⑩ WEP

Enabling encryption will secure data and prevent unauthorized users from accessing your wireless network. Please enter WEP keys firstly.

Authentication type ☒ Open ☐ Shared

WEP Key Index
⑪ ☒ WEP Key 1 ☐ WEP Key 2 ☐ WEP Key 3 ☐ WEP Key 4 **Add**

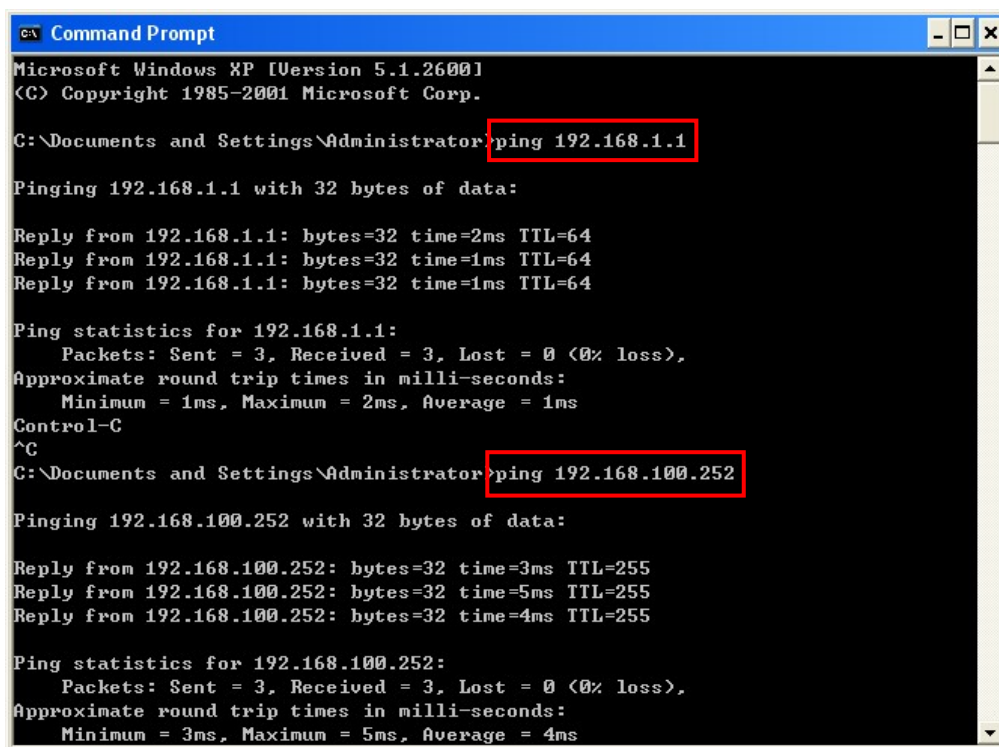
Select	Name	SSID	MAC Address	Security	WEP Key Index
-	-	-	-	-	-

Edit Delete

After configured successfully, the AirMax5 will connect with WH-9200AP's Radio1 automatic.

Step 3. Check the connections.

After configured successfully, you can ping WH-9200AP, WH-5420CPE and PC3's IP from PC2 to check if the connection was successful.



```
CA Command Prompt
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

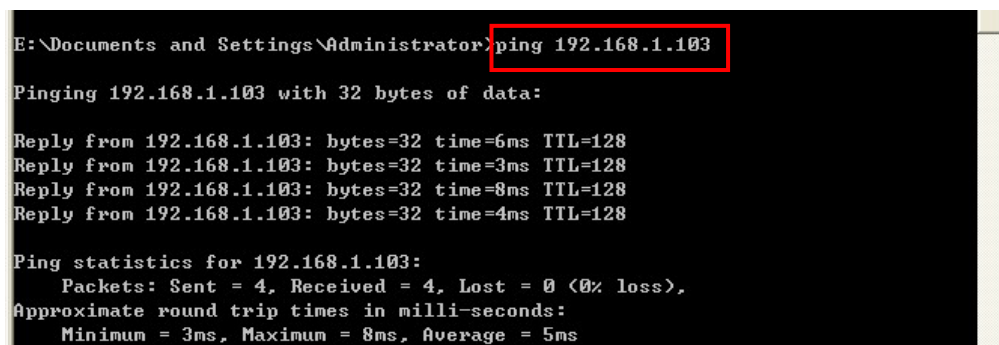
Reply from 192.168.1.1: bytes=32 time=2ms TTL=64
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.1.1:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
Control-C
^C
C:\Documents and Settings\Administrator>ping 192.168.100.252

Pinging 192.168.100.252 with 32 bytes of data:

Reply from 192.168.100.252: bytes=32 time=3ms TTL=255
Reply from 192.168.100.252: bytes=32 time=5ms TTL=255
Reply from 192.168.100.252: bytes=32 time=4ms TTL=255

Ping statistics for 192.168.100.252:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 5ms, Average = 4ms
```



```
E:\Documents and Settings\Administrator>ping 192.168.1.103

Pinging 192.168.1.103 with 32 bytes of data:

Reply from 192.168.1.103: bytes=32 time=6ms TTL=128
Reply from 192.168.1.103: bytes=32 time=3ms TTL=128
Reply from 192.168.1.103: bytes=32 time=8ms TTL=128
Reply from 192.168.1.103: bytes=32 time=4ms TTL=128

Ping statistics for 192.168.1.103:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 8ms, Average = 5ms
```

If you can't ping the PC3, please check the firewall is already disable of PC3's OS.