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# User's Guide

# **Dray** Tek

# VigorAP 710 802.11n Access Point User's Guide

Version: 2.0 Firmware Version: V1.2.0 (For future update, please visit DrayTek web site) Date: January 26, 2017



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# Safety Instructions and Approval

Safety	• Read the installation guide thoroughly before you set up the modem.
Instructions	• The modem is a complicated electronic unit that may be repaired only be authorized and qualified personnel. Do not try to open or repair the modem yourself.
	<ul> <li>Do not place the modem in a damp or humid place, e.g. a bathroom.</li> <li>The modem should be used in a sheltered area, within a temperature range of +5 to +40 Celsius.</li> </ul>
	<ul> <li>Do not expose the modem to direct sunlight or other heat sources. The housing and electronic components may be damaged by direct sunlight or heat sources.</li> <li>Do not deploy the cable for LAN connection outdoor to prevent electronic shock hazards.</li> </ul>
	<ul> <li>Keep the package out of reach of children.</li> <li>When you want to dispose of the modem, please follow local regulations on conservation of the environment.</li> </ul>
Warranty	We warrant to the original end user (purchaser) that the modem will be free from any defects in workmanship or materials for a period of one (1) year from the date of purchase from the dealer. Please keep your purchase receipt in a safe place as it serves as proof of date of purchase. During the warranty period, and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, we will, at our discretion, repair or replace the defective products or components, without charge for either parts or labor, to whatever extent we deem necessary tore-store the product to proper operating condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal value, and will be offered solely at our discretion. This warranty will not apply if the product is modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions. The warranty does not cover the bundled or licensed software of other vendors. Defects which do not significantly affect the usability of the product will not be covered by the warranty. We reserve the right to revise the manual and online documentation and to make changes from time to time in the contents hereof without obligation to notify any person of such revision or changes.
Be a Registered Owner	Web registration is preferred. You can register your Vigor modem via http://www.draytek.com.
Firmware & Tools Updates	Due to the continuous evolution of DrayTek technology, all modems will be regularly upgraded. Please consult the DrayTek web site for more information on newest firmware, tools and documents.
	http://www.draytek.com



#### **European Community Declarations**

Manufacturer: DrayTek Corp.

Address:No. 26, Fu Shing Road, Hukou Township, Hsinchu Industrial Park, Hsinchu County, Taiwan 303Product:VigorAP 710

DrayTek Corp. declares that VigorAP 710 is in compliance with the following essential requirements and other relevant provisions of R&TTE Directive 1999/5/EEC, ErP 2009/125/EC and RoHS 2011/65/EU.

The product conforms to the requirements of Electro-Magnetic Compatibility (EMC) Directive 2004/108/EC by complying with the requirements set forth in EN55022/Class B and EN55024/Class B.

The product conforms to the requirements of Low Voltage (LVD) Directive 2006/95/EC by complying with the requirements set forth in EN60950-1.

#### **Federal Communication Commission Interference Statement**

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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 may accept any interference received, including interference that may cause undesired operation.

The antenna/transmitter should be kept at least 20 cm away from human body.

This product is designed for 2.4GHz WLAN network throughout the EC region and Switzerland with restrictions in France.



Please visit http://www.draytek.com/user/SupportDLRTTECE.php

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

#### FCC RF Radiation Exposure Statement

- 1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- 2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.



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http://gplsource.draytek.com

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Version 2, June 1991

For any question, please feel free to contact DrayTek technical support at support@draytek.com for further information.

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#### **1.1 Introduction**

Thank you for purchasing this VigorAP 710, the concurrent dual band wirelessaccess point offering high-speed data transmission. With this high cost-efficiency VigorAP 710, computers and wireless devices which are compatible with 802.11n/802.11a can connect to existing wired Ethernet network via this VigorAP 710, at the speed of 300Mbps.



Easy install procedures allows any computer users to setup a network environment in very short time - within minutes, even inexperienced users. Just follow the instructions given in this user manual, you can complete the setup procedure and release the power of this access point all by yourself!



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#### **1.2 LED Indicators and Connectors**

Before you use the Vigor modem, please get acquainted with the LED indicators and connectors first.



LED	Status	Explanation
ACT	Off	The system is not ready or is failed.
	Blinking	The system is ready and can work normally.
Repeater	On	The Repeater mode is on.
	Blinking	The Repeater mode is off.
LAN	On	LAN is connected.
	Off	LAN is disconnected.
	Blinking	Data is transmitting (sending/receiving).
SSID1 – SSID4	On	The function of SSID is on.
	Off	The function of SSID is off.
WLAN ON/OFF/WPS (Green LED)	On (Green)	Press the button and release it within 2 seconds. When the wireless function is ready, the green LED will be on.
	Off	Press the button and release it within 2 seconds to turn off the WLAN function. When the wireless function is not ready, the LED will be off.
	Blinking (Green)	Data is transmitting (sending/receiving).
WLAN ON/OFF/WPS (Orange LED)	Blinking (Orange)	<ul><li>When WPS function is enabled by web user interface, press this button for more than 2 seconds to wait for client's device making network connection through WPS.</li><li>When the orange LED blinks with 1 second cycle for 2 minutes, it means that the AP is waiting for wireless client to connect with it.</li></ul>

	Interface	Description
	LAN	Connecter for xDSL / Cable modem or router.
	Factory Reset	Restore the default settings. Usage: Turn on the router. Press the button and keep for more than 6 seconds. Then the router will restart with the factory default configuration.
Factory Reset	PWR	PWR: Connecter for a power adapter.
OF PWR		ON/OFF: Power switch.

#### **1.3 Hardware Installation**

This section will guide you to install the VigorAP 710 through hardware connection and configure the device's settings through web browser.

Before starting to configure VigorAP 710, you have to connect your devices correctly.

- 1. Connect a computer to VigorAP710.
- 2. Connect the A/C power adapter to the wall socket, and then connect it to the PWR connector of the access point.
- 3. Power on VigorAP 710.
- 4. Check all LEDs on the front panel. **ACT** LED should be steadily on, **SSID** LEDs should be on if the access point is correctly connected to the computer.

(For the detailed information of LED status, please refer to section 1.2.)





After the network connection is built, the next step you should do is setup VigorAP 710 with proper network parameters, so it can work properly in your network environment.

Before you can connect to the access point and start configuration procedures, your computer must be able to get an IP address automatically (use dynamic IP address). If it's set to use static IP address, or you're unsure, please follow the following instructions to configure your computer to use dynamic IP address:

For the default IP address of this AP is set "192.168.1.2", we recommend you to use "192.168.1.X (except 2)" in the field of IP address on this section for your computer. *If the operating system of your computer is...* 

Windows 7	- please go to section 2.1
Windows 2000	- please go to section 2.2
Windows XP	- please go to section 2.3
Windows Vista	- please go to section 2.4

#### 2.1 Windows 7 IP Address Setup

Click **Start** button (it should be located at lower-left corner of your computer), then click Control Panel. Double-click **Network and Internet**, and the following window will appear. Click **Network and Sharing Center**.



Next, click Change adapter settings and click Local Area Connection.





Then, select Internet Protocol Version 4 (TCP/IPv4) and click Properties.

🖞 Local Area Connection Properties
Networking Sharing
Connect using:
Realtek RTL8139/810x Family Fast Ethemet NIC
Configure This connection uses the following items:
Client for Microsoft Networks QoS Packet Scheduler File and Printer Sharing for Microsoft Networks File and Printer Sharing for Microsoft Networks File and Printer Sharing for Microsoft Networks Intermet Protocol Version 6 (TCP/IPv6). Intermet Protocol Version 4 (TCP/IPv6).
Install Uninstall Properties
Description Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
OK Cancel

Under the General tab, click **Use the following IP address.** Then input the following settings in respective field and click **OK** when finish.

IP address: 192.168.1.9

Subnet Mask: 255.255.255.0

Internet Protocol Version 4 (TCP/IPv4	I) Properties
General	
You can get IP settings assigned autr this capability. Otherwise, you need for the appropriate IP settings.	
Obtain an IP address automatic	ally
Ose the following IP address: –	:
IP address:	192.168.1.9
Subnet mask:	255.255.255.0
Default gateway:	192.168.1.1
Obtain DNS server address auto	omatically
Ose the following DNS server ad	dresses:
Preferred DNS server:	168 . 95 1 . 1
<u>A</u> lternate DNS server:	• •
Validate settings upon exit	Advanced
	OK Cancel
	****

#### 2.2 Windows 2000 IP Address Setup

Click **Start** button (it should be located at lower-left corner of your computer), then click control panel. Double-click **Network and Dial-up Connections** icon, double click **Local Area Connection**, and **Local Area Connection Properties** window will appear. Select **Internet Protocol (TCP/IP)**, then click **Properties**.

Local Area Connection	n Properties	<u>?</u> ×
General		
Connect using:		
🗒 Realtek RTL80	)29(AS) PCI Ethernet Ad	apter
		Configure
Components checked	d are used by this conne	ction:
<ul> <li>Client for Micr</li> <li>File and Printe</li> <li>Internet Proto</li> </ul>	er Sharing for Microsoft N	Vetworks
***		*********
Install	<u>U</u> ninstall	P <u>r</u> operties
Description		
wide area network	ol Protocol/Internet Prot protocol that provides co rconnected networks.	
Sho <u>w</u> icon in task	bar when connected	
	0	K Cancel

Select Use the following IP address, then input the following settings in respective field and click **OK** when finish.

IP address: 192.168.1.9

Subnet Mask: 255.255.255.0

ternet Protocol (TCP/IP) Pro	operties 🤗
General	
	d automatically if your network supports eed to ask your network administrator for
Obtain an IP address auto	rgatically.
$\square^{\mathbb{C}}$ Use the following IP address	• <b>*</b> :
[P address:	
S <u>u</u> bnet mask:	
Default gateway:	
Obtain DNS server addres     O Use the following DNS ser     Ereferred DNS server:	
Alternate DNS server:	· · · ·
	Ad <u>v</u> anced
	OK Cancel



#### 2.3 Windows XP IP Address Setup

Click **Start** button (it should be located at lower-left corner of your computer), then click control panel. Double-click **Network and Internet Connections** icon, click **Network Connections**, and then double-click **Local Area Connection**, **Local Area Connection Status** window will appear, and then click **Properties**.

Local	Area Connection Properties	2
General	Authentication Advanced	
Connec	t using:	
	MD PCNET Family PCI Ethernet Ad	Configure
This c <u>o</u>	nnection uses the following items:	
	File and Printer Sharing for Microsoft Netwo QoS Packet Scheduler Internet Frotocol (TCP/IP)	uks
		Properties
wide	iption smission Control Protocol/Internet Protocol. 1 area network protocol that provides commur ss diverse interconnected networks.	
Sho	w icon in notification area when connected	
🔽 Noti	ly <u>m</u> e when this connection has limited or no	connectivity
-	OK	Cancel

Select **Use the following IP address**, then input the following settings in respective field and click **OK** when finish:

IP address: 192.168.1.9

Subnet Mask: 255.255.255.0.

Internet Protocol (TCP/IP) Pr	operties 🛛 🛛 🛛
General	
	automatically if your network supports d to ask your network administrator for
Obtain an IP address automa	ıtically
O Use the following IP address	]
IP address:	192.168.1.9
S <u>u</u> bnet mas	255 . 255 . 255 . 0
Default gateway:	· · ·
Obtain DNS server address a	utomatically
Output Server → Output Ser	r addresses:
Preferred DNS server:	
Alternate DNS server:	
	Advanced
	OK Cancel
	*********

#### 2.4 Windows Vista IP Address Setup

Click **Start** button (it should be located at lower-left corner of your computer), then click control panel. Click **View Network Status and Tasks**, then click **Manage Network Connections.** Right-click **Local Area Netwrok, then select 'Properties'. Local Area Connection Properties** window will appear, select **Internet Protocol Version 4 (TCP / IPv4)**, and then click **Properties**.



Select **Use the following IP address**, then input the following settings in respective field and click **OK** when finish:

IP address: 192.168.1.9

Subnet Mask: 255.255.255.0.

ieneral	
this capability. Otherwise, you	d automatically if your network supports need to ask your network administrator
for the appropriate IP settings.	
🔘 Obtain an IP address auto	matically
• Use the following IP addre	SS:
IP at s:	192.168.1.9
onet mask:	255 . 255 . 255 . 0
Default gateway:	În e s
Obtain DNS server addres	a sutamaticallu
Use the following DNS server	
Preferred DNS server:	
Alternate DNS server:	Grab sele of Region
	<b>.</b>
	Advanced



#### 2.5 Accessing to Web User Interface

All functions and settings of this access point must be configured via web user interface. Please start your web browser (e.g., IE, Firefox, Google Chrome).

- 1. Make sure your PC connects to the VigorAP 710 correctly.
- 2. Open a web browser on your PC and type http://192.168.1.2. A pop-up window will open to ask for username and password. Pease type "admin/admin" on Username/Password and click Log In.

	Required
The server http://19 The server says: Vi	92.168.1.2:80 requires a username and password. igorAP710.
User Name:	admin
Password:	****

Note 1: You may either simply set up your computer to get IP dynamically from the router or set up the IP address of the computer to be in the same subnet as **the IP** address of VigorAP 710.

- If there is no DHCP server on the network, then VigorAP 710 will have an IP address of 192.168.1.2.
- If there is DHCP available on the network, then VigorAP 710 will receive it's IP address via the DHCP server.
- 3. The **Main Screen** will pop up.

<b>Dray</b> Tek	VigorAP 710	
	System Status	
Quick Start Wizard Online Status Operation Mode LAN Central AP Management Wireless LAN	Model     : VigorAP710       Device Name     : VigorAP710       Firmware Version     : 1.2.0       Build Date/Time     : 16709 Tue Jan 3 1       System Uptime     : 0.0 006.43 1       Operation Mode     : AP	7/47/46 CST 2017
RADIUS Setting Applications Mobile Device Management System Maintenance Diagnostics	System           Memory Total         : 62328 kB           Memory Left         : 31264 kB           Cached         : 19652 kB / 62328 kB	LAN           MAC Address         :00:50:7F:F1:00:14           IP Address         :192.168.1.11           IP Mask         :255.255.255.0
Support Area FAQ/Application Note Product Registration All Rights Reserved.	Wireless           MAC Address         :00:50:7F:F1:00:14           SSID         :DrayTek           Channel         :11           Driver Version         :2.7.2.0	
	WARNING: Your AP is still set to default passwor	rd. You should change it via System Maintenance menu.
Admin mode AP Mode		

**Note:** If you fail to access to the web configuration, please go to "Trouble Shooting" for detecting and solving your problem. For using the device properly, it is necessary for you to change the password of web configuration for security and adjust primary basic settings.

#### 2.6 Changing Password

- 1. Please change the password for the original security of the modem.
- 2. Go to System Maintenance page and choose Administrator Password.

System Maintenance >> Administration Password

Account	admin
Password	••••
Confirm Password	
Password Strength:	Weak Medium Strong
Strong password requirements: 1. Have at least one upper-case letter - 2. Including non-alphanumeric characte	
Note : Authorization Account can contair Authorization Password can conta	n only a-z A-Z 0-9 , ~ ` ! @ \$ % ^ * () _ + = { } []   ; < > . ? ain only a-z A-Z 0-9 , ~ ` ! @ # \$ % ^ & * () _ + = { } []   \ ; < > . ? / OK Cancel

- 3. Enter the new login password on the field of **Password**. Then click **OK** to continue.
- 4. Now, the password has been changed. Next time, use the new password to access the Web User Interface for this modem.

Authentication	Required
The server http://1 The server says: V	92.168.1.2:80 requires a username and password. igorAP710.
User Name:	
Password:	*****
	Log In Cancel

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#### 2.7 Quick Start Wizard

Quick Start Wizard will guide you to configure 2.4G wireless setting and other corresponding settings for Vigor Access Point step by step.

#### 2.7.1 Configuring Wireless Settings – General

This page displays general settings for the operation mode selected.

Quic	Quick Start Wizard >> Operation Mode				
✓	Wireless LAN(2.4GHz)				
	Operation Mode :	AP	*		
		VigorAP acts as a bride network, and exchang			vired Ethernet
	Operatio	n Mode		Wireless(2.4GHz)	) xt > Cancel

Available settings are explained as follows:

Item	Description
Wireless LAN (2.4GHz)	Check the box to enable WLAN 2.4GHz for VigorAP. <b>Operation Mode</b> - There are four operation modes for wireless connection. Settings for each mode are different. AP AP AP Bridge-Point to Point AP Bridge-WDS Mode Universal Repeater

After finishing this web page configuration, please click **Next** to continue.



#### 2.7.2 Configuring Wireless Settings based on the Operation Mode

In this page, the advanced settings will vary according to the operation mode chosen on 2.7.1.

#### Settings for AP

When you choose AP as the operation mode for wireless LAN (2.4GHz), you will need to configure the following page.

-			
Channel :	2462MHz (Channel 11) 💌		
Channer.	2402MHz (Channel II) 🚩		
Main SSID :	DrayTek		
Security Key:	•••••		
🗹 Enable Guest Wir	eless		
SSID:			
Security K	ey:		
🗹 Enable	Bandwidth Limit		
U	oload Limit 💿	0	Kbps
Download Limit 💽 💦 🛛 🗤 Kbps			Кbps
🗹 Enable	Station Control		
Co	onnection Time 💿	0	Min(s)
Reconnection Time		Min(s)	
Operation Mode		Wireless(2.4	GHz)
		< Back	Next > Cancel

Available settings are explained as follows:

Quick Start Wizard >> Wireless LAN (2.4GHz)

Item	Description	
Channel	Means the channel frequency of the wireless LAN. The default channel is 6. You may switch channel if the selected channel is under serious interference. If you have no idea of choosing the frequency, please select <b>AutoSelect</b> to let system determine for you. 2462MHz (Channel 11) AutoSelect 2412MHz (Channel 1) 2417MHz (Channel 2) 2422MHz (Channel 3) 2427MHz (Channel 4) 2432MHz (Channel 5) 2437MHz (Channel 6) 2442MHz (Channel 6) 2442MHz (Channel 7) 2447MHz (Channel 8) 2452MHz (Channel 10) 2467MHz (Channel 12) 2472MHz (Channel 13)	
Main SSID	Set a name for VigorAP 902 to be identified.	
Security Key	Type <b>8~63</b> ASCII characters, such as 012345678(or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde").	



Enable Guest	Check the box to enable the <b>guest</b> wireless setting.
Wireless	Such feature is especially useful for free Wi-Fi service. For example, a coffee shop offers free Wi-Fi service for its guests for one hour every day.
	<b>SSID</b> – Set a name for VigorAP which can be identified and connected by wireless guest.
	<b>Security Key</b> – Set <b>8~63</b> ASCII characters or <b>8~63</b> ASCII characters which can be used for logging into VigorAP 710 by wireless guest.
	<b>Enable Bandwidth Limit</b> – Check the box to define the maximum speed of the data uploading/downloading which will be used for the guest connecting to Vigor device with the same SSID.
	• <b>Upload Limit</b> – Scroll the radio button to choose the value you want.
	• <b>Download Limit</b> –Scroll the radio button to choose the value you want.
	<b>Enable Station Control</b> – Check the box to set the duration for the guest connecting /reconnecting to Vigor device.
	• <b>Connection Time</b> –Scroll the radio button to choose the value you want.
	• <b>Reconnection Time</b> –Scroll the radio button to choose the value you want.

#### Settings for AP Bridge-Point to Point

When you choose AP Bridge-Point to Point, after clicking **Next**, you will need to configure the following page.

Quick Start Wizard >> Wireless LAN (2.4GHz)	
AP Discovery: Display	
Note: Enter the configuration of APs which VigorAP v	vant to connect.
Phy Mode : HTMIX	
Security: <pre> Disabled WEP TKIP AES Key : Peer Mac Address: </pre> <pre> Peer Mac Address: </pre>	
Operation Mode	Wireless(2.4GHz)

Item	Description
AP Discovery	Click this button to open the AP Discovery dialog. VigorAP 710



	can scan all regulatory channels and find working APs in the neighborhood.
Phy Mode	Data will be transmitted via HTMIX communication channel. Each access point should be setup to the same <b>Phy</b> mode for
	connecting with each other.
Security	Select WEP, TKIP or AES as the encryption algorithm. Type the key number if required.
Peer MAC Address	Type the peer MAC address for the access point that VigorAP 710 connects to.

#### Settings for AP Bridge-WDS

When you choose AP Bridge-WDS, after clicking **Next**, you will need to configure the following page.

Quick Start Wizard >> Wireless LAN (2.4GHz)		
AP Discovery :	Display	
Remote AP	,	AP want to connect. address to connect VigorAP WDS.
Phy Mode : HTMIX		
Security :		
💿 Disabled 🄇	)WEP ○TKIP ○AES	
Key :		
Peer Mac Address	s:	
Main SSID :	DrayTek	
Security Key:	•••••	
(	Operation Mode	Wireless(2.4GHz)       < Back

Item	Description	
AP Discovery	Click this button to open the AP Discovery dialog. VigorAP 710 can scan all regulatory channels and find working APs in the neighborhood.	
Phy Mode	Data will be transmitted via HTMIX communication channel.	
	Each access point should be setup to the same <b>Phy</b> mode for connecting with each other.	
Security	Select WEP, TKIP or AES as the encryption algorithm. Type the key number if required.	
Peer MAC Address	Type the peer MAC address for the access point that VigorAP 710 connects to.	
Main SSID	Set a name for VigorAP 710 to be identified.	
Security Key	Type <b>8~63</b> ASCII characters, such as 012345678(or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde").	

#### **Settings for Universal Repeater**

When you choose AP Bridge-Universal Repeater, after clicking **Next**, you will need to configure the following page.

Quick Start Wizard >>	Wireless LAN (2.4GHz)	
Universal Repeater Pa	rameters	
Please input the SSID	you want to connect to : [	P Discovery
SSID		
MAC Address (Optic	onal)	
Channel		2462MHz (Channel 11) 💌
Security Mode		WPA2/PSK 💌
Encryption Type		AES 💌
Security Key		
Note: If Channel is i	modified,the Channel set	ting of AP would also be changed.
Use the same SSID	) and Security Key as above	
SSID :	DrayTek	
Security Key:	•••••	
🗹 Enable Guest Wire	eless	
SSID:		
Security Ke	y:	
Enable	Bandwidth Limit	
Enable	Station Control	
0	vation Mada	
Ope	eration Mode	Wireless(2.4GHz)

Item	Description	
AP Discovery	Click this button to open the AP Discovery dialog. VigorAP 710 can scan all regulatory channels and find working APs in the neighborhood.	
SSID	Means the identification of the wireless LAN. SSID can be any text numbers or various special characters.	
MAC Address (Optional)	Type the MAC address for the access point.	
Channel	Choose the channel of frequency of the wireless LAN. You may switch channel if the selected channel is under serious interference. If you have no idea of choosing the frequency, simply use the default setting.	
Security Mode	There are several modes provided for you to choose. Each mode will bring up different parameters (e.g., WEP keys, Pass Phrase) for you to configure. WPA/PSK Open Shared WPA/PSK WPA2/PSK	
Encryption Type for Open/Shared	This option is available when Open/Shared is selected as Security Mode.	

	Choose None to disable the WEP Encryption. Data sent to the AP will not be encrypted. To enable WEP encryption for data transmission, please choose WEP. None WEP WEP WEP Keys - Four keys can be entered here, but only one key can be selected at a time. The format of WEP Key is restricted to 5 ASCII characters or 10 hexadecimal values in 64-bit encryption level, or restricted to 13 ASCII characters or 26 hexadecimal values in 128-bit encryption level. The allowed content is the ASCII characters from 33(!) to 126(~) except '#' and ','. Hex MASCII Hex
Encryption Type for WPA/PSK and WPA2/PSK	This option is available when <b>WPA/PSK</b> or <b>WPA2/PSK</b> is selected as <b>Security Mode</b> . Select <b>TKIP</b> or <b>AES</b> as the algorithm for WPA.
Security Key	Type <b>8~63</b> ASCII characters, such as 012345678(or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde"). Such feature is available for <b>WPA/PSK or WPA2/PSK</b> mode.
Use the same SSID and Security Key as above	In general, under the network environment, same SSID and security key can be used for the host (wireless client) and the repeater (VigorAP 710) in Universal Repeater mode. Check it to use the same SSID and security key configured as above. <b>SSID</b> - SSID can be any text numbers or various special characters. For VigorAP 710 is set as "Repeater", the purpose of the device is to extend the Wi-Fi service. Therefore, the characters set here will be regarded as "main SSID". Other wireless client can receive the wireless signal from VigorAP 710 by using the SSID configured here. <b>Security</b> - Set 8~63 ASCII characters or 64 Hexadecimal digits which can be used for logging into VigorAP 710 by other wireless client.
Enable Guest	Check the box to enable the <b>guest</b> wireless setting.
Wireless	Such feature is especially useful for free Wi-Fi service. For example, a coffee shop offers free Wi-Fi service for its guests for one hour every day.
	<b>SSID</b> – Set a name for VigorAP which can be identified and connected by wireless guest.
	<b>Security Key</b> – Set <b>8~63</b> ASCII characters or <b>8~63</b> ASCII characters which can be used for logging into VigorAP 710 by



wireless guest.	
<b>Enable Bandwidth Limit</b> – Check the box to define the maximum speed of the data uploading/downloading which will be used for the guest connecting to Vigor device with the same SSID.	
• <b>Upload Limit</b> – Scroll the radio button to choose the value you want.	
• <b>Download Limit</b> –Scroll the radio button to choose the value you want.	
<b>Enable Station Control</b> – Check the box to set the duration for the guest connecting /reconnecting to Vigor device.	
• <b>Connection Time</b> –Scroll the radio button to choose the value you want.	
• <b>Reconnection Time</b> –Scroll the radio button to choose the value you want.	

After finishing this web page configuration, please click **Next** to continue.

#### 2.7.3 Finishing the Wireless Settings Wizard

When you see this page, it means the wireless setting wizard is almost finished. Just click **Finish** to save the settings and complete the setting procedure.

#### Quick Start Wizard

/igoi	r Wizard Setup is now finished!
	Basic settings for AP710 is completed.
	Press Finish button to save and finish the wizard setup. Note that the configuration process takes a few seconds to complete.

< Back Finish Cancel

#### 2.8 Online Status

The online status shows the LAN status, Station Link Status for such device.

Online Status

System Status System Uptime: 0d 00:32					
LAN Status					
IP Address	TX Packets	RX Packets	TX Bytes	RX Bytes	
192.168.1.2	576	244	43778	12654	
Universal Repeate	erStatus				
IP		Gateway	SSID		Channel
10.28.60.13		10.28.60.254	DrayTek286	Onnn	11
Mac		Security Mode	TX Packets		RX Packets
00:1d:aa:ae:8c:68		WPA2PSK	153394		17430

Detailed explanation is shown below:

Item	Description
IP Address	Displays the IP address of the LAN interface.
TX Packets	Displays the total transmitted packets at the LAN interface.
RX Packets	Displays the total number of received packets at the LAN interface.
TX Bytes	Displays the total transmitted size at the LAN interface.
RX Bytes	Displays the total number of received size at the LAN interface.



This chapter will guide users to execute advanced (full) configuration. As for other examples of application, please refer to chapter 5.

- 1. Open a web browser on your PC and type **http://192.168.1.2.** The window will ask for typing username and password.
- 2. Please type "admin/admin" on Username/Password for administration operation.

Now, the **Main Screen** will appear. Be aware that "Admin mode" will be displayed on the bottom left side.

Model         : VigorAP710           Device Name         : VigorAP710           Firmware Version         : 1.2.0           Buil Date/Time         : r6709 Tue Jan 3 17:47:46 CST 2017           System Uptime         : 0.0 00:94:3           Operation Mode         : AP           Memory Total         : 6228 kB           Memory Left         : 31264 kB           Cached         : 19652 kB / 62328 kB           Memory Left         : 10652 kB / 62328 kB           Memory Carbiel         : 00:50:7F:F1:00:14           IP Address         : 02:50:255.255.0           MAC Address         : 00:50:7F:F1:00:14           SID         : DrayTek           Channel         : 11           Driver Version         : 2.7.2.0           WARNING: Your AP is still set to default password. You should change it via System Maintenance	System Status	
Memory Total         : 62328 kB         MAC Address         : 00:50:7F:F1:00:14           Memory Left         : 13264 kB         IP Address         : 192:168.1.11           Cached         : 19652 kB / 6328 kB         IP Mask         : 255:255.255.0           MAC Address         : 00:50:7F:F1:00:14         SSID         : DrayTek           Channel         : 11         Driver Version         : 2.7.2.0	Device Name Firmware Version Build Date/Time System Uptime	: VigorAP710 : 1.2.0 : r6709 Tue Jan 3 17:47:46 CST 2017 : 0d 00:04:43
Channel : 11 Driver Version : 2.7.2.0	Memory Total         : 62328 k           Memory Left         : 31264 k           Cached         : 19652 k           Memory         : Wireless           MAC Address         : 00:50:7	(8)         MAC Address         : 00:50:7F:F1:00:14           (8)         IP Address         : 192.168.1.11           IP Mask         : 255.255.255.0
	Channel : 11 Driver Version : 2.7.2.0	

#### 3.1 Operation Mode

This page provides several available modes for you to choose for different conditions. Click any one of them and click **OK**. The system will configure the required settings automatically.

**Operation Mode Configuration** 

#### Wireless LAN (2.4GHz)

● AP :

VigorAP acts as a bridge between wireless devices and wired Ethernet network, and exchanges data between them.

O AP Bridge-Point to Point :

VigorAP will connect to another VigorAP which uses the same mode, and all wired Ethernet clients of both VigorAPs will be connected together.

#### O AP Bridge-Point to Multi-Point :

VigorAP will connect to up to four VigorAPs which uses the same mode, and all wired Ethernet clients of every VigorAPs will be connected together.

#### O AP Bridge-WDS :

VigorAP will connect to up to four VigorAPs which uses the same mode, and all wired Ethernet clients of every VigorAPs will be connected together.

- This mode is still able to accept wireless clients.
- 🔘 Universal Repeater :

VigorAP can act as a wireless repeater; it can be Station and AP at the same time.

(	ЭΚ	

Item	Description
AP	This mode allows wireless clients to connect to access point and exchange data with the devices connected to the wired network.
AP Bridge-Point to Point	This mode can establish wireless connection with another VigorAP 710 using the same mode, and link the wired network which these two VigorAP 710s connected together. Only one access point can be connected in this mode.
AP Bridge-Point to Multi-Point	This mode can establish wireless connection with other VigorAP 710s using the same mode, and link the wired network which these VigorAP 710s connected together. Up to 4 access points can be connected in this mode.
AP Bridge-WDS	This mode is similar to AP Bridge to Multi-Point, but access point is not work in bridge-dedicated mode, and will be able to accept wireless clients while the access point is working as a wireless bridge.
Universal Repeater	This product can act as a wireless range extender that will help you to extend the networking wirelessly. The access point can act as Station and AP at the same time. It can use Station function to connect to a Root AP and use AP function to service all wireless clients within its coverage.



**Note:** The **Wireless LAN** settings will be changed according to the **Operation Mode** selected here. For the detailed information, please refer to the section of **Wireless LAN**.

#### 3.2 LAN

Local Area Network (LAN) is a group of subnets regulated and ruled by modem.

LAN General Setup

Click LAN to open the LAN settings page and choose General Setup.

**Note:** Such page will be changed according to the **Operation Mode** selected. The following screen is obtained by choosing **AP** as the operation mode.

#### LAN >> General Setup

Ethernet TCP / IP and DH	CP Setup	
LAN IP Network Configu	Iration	DHCP Server Configuration
Enable DHCP Client		🔘 Enable Server 💿 Disable Server
IP Address	192.168.1.2	🔘 Relay Agent
Subnet Mask	255.255.255.0	Primary DNS Server
Default Gateway		Secondary DNS Server
		Trust DHCP Server IP for WLAN
📃 Enable Manager	ment VLAN	
VLAN ID	0	
	ОК	Cancel

Item	Description
LAN IP Network Configuration	<b>Enable DHCP Client</b> – When it is enabled, VigorAP 710 will be treated as a client and can be managed / controlled by AP Management server offered by Vigor router (e.g., Vigor2860).
	• <b>IP Address</b> – Type in private IP address for connecting to a local private network (Default: 192.168.1.2).
	• Subnet Mask – Type in an address code that determines the size of the network. (Default: 255.255.255.0/ 24)
	• <b>Default Gateway</b> - In general, it is not really necessary to specify a gateway for VigorAP 710. However, if it is required, simply type an IP address as the gateway for VigorAP 710. It will be convenient for the access point acquiring more service (e.g., accessing NTP server) from Vigor router.
	<b>Enable Management VLAN</b> – VigorAP 710 supports tag-based VLAN for wireless clients accessing Vigor device. Only the clients with the specified VLAN ID can access into VigorAP 710.
	• VLAN ID – Type the number as VLAN ID tagged on the

	transmitted packet. "0" means no VALN tag.
DHCP Server	DHCP stands for Dynamic Host Configuration Protocol. DHCP
Configuration	server can automatically dispatch related IP settings to any local user configured as a DHCP client.
	<b>Enable Server -</b> Enable Server lets the modem assign IP address to every host in the LAN.
	• Start IP Address - Enter a value of the IP address pool for the DHCP server to start with when issuing IP addresses. If the 1st IP address of your modem is 192.168.1.2, the starting IP address must be 192.168.1.3 or greater, but smaller than 192.168.1.254.
	• End IP Address - Enter a value of the IP address pool for the DHCP server to end with when issuing IP addresses.
	• Subnet Mask - Type in an address code that determines the size of the network. (Default: 255.255.255.0/ 24)
	• <b>Default Gateway</b> - Enter a value of the gateway IP address for the DHCP server.
	• Lease Time - It allows you to set the leased time for the specified PC.
	• <b>Primary DNS Server</b> - You must specify a DNS server IP address here because your ISP should provide you with usually more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default DNS Server IP address: 194.109.6.66 to this field.
	• Secondary DNS Server - You can specify secondary DNS server IP address here because your ISP often provides you more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default secondary DNS Server IP address: 194.98.0.1 to this field.
	<b>Relay Agent -</b> Specify which subnet that DHCP server is located the relay agent should redirect the DHCP request to.
	• DHCP Server IP Address for Relay Agent - It is available when Enable Relay Agent is selected. Set the IP address of the DHCP server you are going to use so the Relay Agent can help to forward the DHCP request to the DHCP server.
	• <b>Primary DNS Server</b> - You must specify a DNS server IP address here because your ISP should provide you with usually more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default DNS Server IP address: 194.109.6.66 to this field.
	• Secondary DNS Server - You can specify secondary DNS server IP address here because your ISP often provides you more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default secondary DNS Server IP address: 194.98.0.1 to this field.
	<b>Disable Server -</b> Disable Server lets you manually or use other DHCP server to assign IP address to every host in the LAN.



• <b>Primary DNS Server</b> - You must specify a DNS server IP address here because your ISP should provide you with usually more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default DNS Server IP address: 194.109.6.66 to this field.
• Secondary DNS Server - You can specify secondary DNS server IP address here because your ISP often provides you more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default secondary DNS Server IP address: 194.98.0.1 to this field.
• <b>Trust DHCP Server IP for WLAN</b> –There is no right for such VigorAP to assign IP address for wireless LAN user. However, you can specify another valid DHCP server on other VigorAP to make the wireless LAN client obtaining the IP address from the designated DHCP server.
Specify a DHCP server in such field. All the IP addresses of the devices on LAN of VigorAP will be assigned via such specified server. It is used to avoid IP assignment interference due to multiple DHCP servers in one LAN.

After finishing this web page configuration, please click  $\mathbf{OK}$  to save the settings.

#### 3.3 Central AP Management

Such menu allows you to configure VigorAP device to be managed by Vigor router.



#### 3.3.1 General Setup

Central AP Management >> General Setup

Vigor AP Manegemet

Enable AP Management
 Enable Auto Provision
 Note: LAN-B cannot support APM feature.

UK	J Cancer J

Available settings are explained as follows:

Item	Description
Enable AP Management	Check the box to enable the function of AP Management (APM).
Enable Auto Provision	VigorAP 710 can be controlled under Central AP Management in Vigor2860 series. When both Vigor2860 series and VigorAP 710 have such feature enabled, once VigorAP 710 is registered to Vigor2860 series, the <b>WLAN profile</b> pre-configured on Vigor2860 series will be applied to VigorAP 710 immediately. Thus, it is not necessary to configure VigorAP 710 separately.

#### 3.3.2 APM Log

This page will display log information related to wireless stations connected to VigorAP 710 and central AP management.

Such information also will be delivered to Vigor router (e.g., Vigor2860 or Vigor2925 series) and be shown on **Central AP Management>>Event Log** of Vigor router.
#### Central AP Management >> APM Log

ation					<u>Clear</u>	<u>Refresh</u>		Line wrap
kernel:	20:02:af:a5:67:22	had	associated suc	cce:	ssfully			
kernel:	20:02:af:a5:67:22	had	disassociated.	•				
	kernel:	kernel: 20:02:af:a5:67:22	kernel: 20:02:af:a5:67:22 had	kernel: 20:02:af:a5:67:22 had associated suc		kernel: 20:02:af:a5:67:22 had associated successfully	kernel: 20:02:af:a5:67:22 had associated successfully	kernel: 20:02:af:a5:67:22 had associated successfully

### 3.3.3 Function Support List

Click the **Client** tab to list the AP management functions that the Access Points support under different firmware versions.

#### Central AP Management >> Function Support List

Client	
	Model Name
Function Name	AP710
	1.2.0
Register	
DHCP	V
Static IP	V
Profile	
2.4GHz	V
5GHz	
AP Mode	V
Repeater Mode	V
Client Disable Auto Provision	V
WLAN Enable/Disable	V
Limit Client	V
Airtime Fairness	V
Band Steering	
Fast Roaming	V
Station List	

**Note:** DrayTek central wireless management (AP Management) lets control, efficiency, monitoring and security of your company-wide wireless access easier to be managed. Inside the web user interface, we call "central wireless management" as Central AP Management which supports mobility, client monitoring/reporting and load-balancing to multiple APs. For central wireless management, you will need a Vigor2860 or Vigor2925 series router; there is no per-node licensing or subscription required. With the unified user interface of Vigor2860 Combo WAN series and Vigor2925 Triple WAN series, the multiple deployment of VigorAP 710 can be clear at the first sight. For multiple wireless clients, to apply the AP Load Balancing to the multiple APs will manage wireless traffic with smooth flow and enhanced efficiency.



### 3.3.4 Overload Management

Load Balance can help to distribute the traffic for all of the access points (e.g., VigorAP 710) registered to Vigor router. Thus, the bandwidth will not be occupied by certain access points.

However, traffic overload might be occurred if too many wireless stations connected to VigorAP 710 for data incoming and outgoing. Therefore, "Force Overload Disassociation" is required to terminate the network connection of the client's station to release network traffic. When the function of "Force Overload Disassociation" in web user interface of Vigor router (e.g., Vigor2860 or Vigor2925 series) is enabled, wireless clients specified in **black list** of such web page will be disassociated to solve the problem of traffic overload.

The following web page is used to configure white list and black list for wireless stations.

	MAC	Address Filter of Forc	e Overload Disassociation	I
	Index	MAC Address	Comment	
White List				<b>A</b>
				-
Black List				*
				-
Client's MAC	Address :	<u>: : :</u> : : [		
		White List 🔻		
C	comment :			
	A	dd Delete	Edit Cancel	
hen force ove	erload disass	ociation is enabled,	clients in black list will b	e disassociated first

Central AP Management >> Overload Management

Available settings are explained as follows:

Item	Description
White List/Black List	Display the information (such as index number, MAC address and comment) for all of the members in White List/Black List.
	Wireless stations listed in Black List will be forcefully disconnected first when traffic overload occurs and "Force Overload Disassociation" is enabled.
Client's MAC Address	Specify the MAC Address of the remote/local client.
Apply to	<b>White List</b> – MAC address listed inside Client's MAC Address will be categorized as one of members in White List.
	<b>Black List</b> - MAC address listed inside Client's MAC Address will be categorized as one of members in Black List.
Add	Add a new MAC address into the White List/Black List.
Delete	Delete the selected MAC address in the White List/Black List.
Edit	Edit the selected MAC address in the White List/Black List.

Clear All

ОК



Cancel

Give up the configuration.

### 3.3.5 Status of Settings

Load Balance can help to distribute the traffic for all of the access points (e.g., VigorAP710s) registered to Vigor 2860 or Vigor2925 series. This web page displays the settings related to Load Balance for VigorAP 710. In which, By Station Number, By Traffic and Force Overload Disassociation indicate settings configured in Vigor 2860 or Vigor2925 series.

#### Central AP Management >> Status of Settings

Function Name	Status	Value
Load Balance		
By Station Number	×	
Max WLAN(2.4GHz) Station Number		64
By Traffic	×	
Upload Limit		None
Download Limit		None
Force Overload Disassociation	×	
Force Overload Disassociation By		None
RSSI Threshold		-50
Rogue AP Detection		
Rogue AP Detection	×	

"X" means the function is not enabled or VigorAP 710 has not registered to any Vigor router yet.

Below shows a setting example for Load Balance settings configured in Vigor 2860 or Vigor 2925 series.

Enable: 🗹 Mode: 🗹 ( Overload Detected By )	By Station Number Maximum Station Number: Wireless LAN (2.4GHz) 64 (3-64) Wireless LAN (5GHz) 64 (3-64)
V	By Traffic Upload Limit 256K V OK bps (Default unit: K) Download Limit 512K V OK bps (Default unit: K)
Force Overload Disassociation:	None

OK Cancel

**Dray** Tek

# **3.4 General Concepts for Wireless LAN**

The VigorAP 710 is equipped with a wireless LAN interface compliant with the standard IEEE 802.11n draft 2 protocol. To boost its performance further, the VigorAP 710 is also loaded with advanced wireless technology to lift up data rate up to 300 Mbps\*. Hence, you can finally smoothly enjoy stream music and video.

**Note**: \* The actual data throughput will vary according to the network conditions and environmental factors, including volume of network traffic, network overhead and building materials.

In an Infrastructure Mode of wireless network, VigorAP 710 plays a role as an Access Point (AP) connecting to lots of wireless clients or Stations (STA). All the STAs will share the same Internet connection via VigorAP 710. The **General Setup** will set up the information of this wireless network, including its SSID as identification, located channel etc.

### **Security Overview**

WEP (Wired Equivalent Privacy) is a legacy method to encrypt each frame transmitted via radio using either a 64-bit or 128-bit key. Usually access point will preset a set of four keys and it will communicate with each station using only one out of the four keys.

WPA (Wi-Fi Protected Access), the most dominating security mechanism in industry, is separated into two categories: WPA-personal or called WPA Pre-Share Key (WPA/PSK), and WPA-Enterprise or called WPA/802.1x.

In WPA-Personal, a pre-defined key is used for encryption during data transmission. WPA applies Temporal Key Integrity Protocol (TKIP) for data encryption while WPA2 applies AES. The WPA-Enterprise combines not only encryption but also authentication.

Since WEP has been proved vulnerable, you may consider using WPA for the most secure connection. You should select the appropriate security mechanism according to your needs. No matter which security suite you select, they all will enhance the over-the-air data protection and /or privacy on your wireless network. The VigorAP 710 is very flexible and can support multiple secure connections with both WEP and WPA at the same time.

### **WPS Introduction**

**WPS (Wi-Fi Protected Setup)** provides easy procedure to make network connection between wireless station and wireless access point (VigorAP 710) with the encryption of WPA and WPA2.

It is the simplest way to build connection between wireless network clients and VigorAP 710. Users do not need to select any encryption mode and type any long encryption passphrase to setup a wireless client every time. He/she only needs to press a button on wireless client, and WPS will connect for client and VigorAP 710 automatically.



### Note: Such function is available for the wireless station with WPS supported.

There are two methods to do network connection through WPS between AP and Stations: pressing the *Start PBC* button or using *PIN Code*.

On the side of VigorAP 710 series which served as an AP, press **WPS** button once on the front panel of VigorAP 710 or click **Start PBC** on web configuration interface. On the side of a station with network card installed, press **Start PBC** button of network card.



If you want to use PIN code, you have to know the PIN code specified in wireless client. Then provide the PIN code of the wireless client you wish to connect to the VigorAP 710.



# 3.5 Wireless LAN Settings for AP Mode

When you choose **AP** as the operation mode, the Wireless LAN menu items will include General Setup, Security, Access Control, WPS, Advanced Setting, AP Discovery, WMM Configuration, Bandwidth Management, Airtime Fairness, Station Control, Roaming, and Station List.

Wireless LAN
General Setup
Security
Access Control
WPS
Advanced Setting
AP Discovery
WMM Configuration
Bandwidth Management
Airtime Fairness
Station Control
Roaming
Station List

**Note:** The **Wireless LAN** settings will be changed according to the **Operation Mode** selected in section 3.1.

### 3.5.1 General Setup

By clicking the **General Setup**, a new web page will appear so that you could configure the SSID and the wireless channel. Please refer to the following figure for more information.

#### Wireless LAN >> General Setup

Genera	l Sett	ing ( IEE	E 802.	11)			
🗹 Er	hable	e Wirele	ess LA	N			
	Enable Limit Client (3-64) 64 (default: 64)						
	Enable Limit Client per SSID (3-64 default: 64)						
	Мос	te :		[	Mixed(11b+11	lg+11n) 💌	
	Cha	annel :		[	2462MHz (Channel 1: 💟		
	Exte	ension	Chan	nel :	2442MHz (Cha	annel 7) 💌	
	E	Enable	Hide SSID		SSID	Isolate Member(	VLAN ID (0:Untagged)
	1			Dray	(Tek		0
	2						0
	З						0
	4						0
	Isolate Member: Wire			Wire	ent SSID from less clients (st other.		ed. the same SSID cannot access for
						ок Са	ancel

Item	Description
Enable Wireless LAN	Check the box to enable wireless function.

Enable Limit Client	Check the box to set the maximum number of wireless stations which try to connect Internet through Vigor router. The number you can set is from 3 to 64.
Mode	At present, VigorAP 710 can connect to 11b only, 11g only, 11n only, Mixed (11b+11g), Mixed (11g+11n) and Mixed (11b+11g+11n) stations simultaneously. Simply choose Mixed (11b+11g+11n) mode. Mixed(11b+11g+11n) 11b Only 11g Only 11n Only Mixed(11b+11g) Mixed(11b+11g) Mixed(11b+11g+11n)
Channel	Means the channel of frequency of the wireless LAN. You may switch channel if the selected channel is under serious interference. If you have no idea of choosing the frequency, please select <b>AutoSelect</b> to let system determine for you. 2437MHz (Channel 6) AutoSelect 2412MHz (Channel 1) 2417MHz (Channel 2) 2422MHz (Channel 3) 2427MHz (Channel 3) 2427MHz (Channel 4) 2432MHz (Channel 5) 2437MHz (Channel 5) 2447MHz (Channel 6) 2442MHz (Channel 7) 2447MHz (Channel 8) 2452MHz (Channel 9) 2457MHz (Channel 10) 2462MHz (Channel 11) 2467MHz (Channel 12) 2472MHz (Channel 13)
Extension Channel	With 802.11n, there is one option to double the bandwidth per channel. The available extension channel options will be varied according to the <b>Channel</b> selected above. Configure the extension channel you want.
Enable	SSID #1 is enabled in default. SSID #2 ~ #4 can be enabled manually.
Hide SSID	Check it to prevent from wireless sniffing and make it harder for unauthorized clients or STAs to join your wireless LAN. Depending on the wireless utility, the user may only see the information except SSID or just cannot see any thing about VigorAP 710 while site surveying. The system allows you to set three sets of SSID for different usage.
SSID	Set a name for VigorAP 710 to be identified. Default settings are DrayTek.
Isolate Member	Check this box to make the wireless clients (stations) with the



	same SSID not accessing for each other.	
VLAN ID	VLAN IDType the value for such SSID. Packets transferred from such SSID to LAN will be tagged with the number.	
	If your network uses VLANs, you can assign the SSID to a VLAN on your network. Client devices that associate using the SSID are grouped into this VLAN. The VLAN ID range is from 3 to 4095. The VLAN ID is 0 by default, it means disabling the VLAN function for the SSID.	

# **Dray** Tek

# 3.5.2 Security

This page allows you to set security with different modes for SSID 1, 2, 3 and 4 respectively. After configuring the correct settings, please click **OK** to save and invoke it.

By clicking the **Security Settings**, a new web page will appear so that you could configure the settings.

Wireless	LAN	>>	Security	Settinas

SSID 1	SSID 2	SSID 3	SSID 4				
SSI	D	DrayTek					
Mo	de	Mixed(\	VPA+WPA2)	/PSK	*		
Set WPA	up <u>RADIUS Server</u>	it 802.1x is e	nabled.				
WP	A Algorithms	🔿 ткір	○ AES	⊙ TKIP/	AES		
Pas	s Phrase	•••••	•••••		]		
Key	Renewal Interval	3600 9	econds				
WEP							
0	Key 1 :					Hex	v .
۲	Key 2 :					Hex	ur -
0	Кеу 3:					Hex	v .
0	Кеу 4 :					Hex	4
802	2.1× WEP	$\bigcirc$ Disab	ole O Ena	ble			
		ОК	Ca	incel			

Item	Description
Mode	There are several modes provided for you to choose.
	Disable Disable WEP WPA/PSK WPA2/PSK Mixed(WPA+WPA2)/PSK WEP/802.1x WPA/802.1x WPA2/802.1x
	Mixed(WPA+WPA2)/802.1x Disable - The encryption mechanism is turned off.
	<b>WEP</b> - Accepts only WEP clients and the encryption key should be entered in WEP Key.
	WPA/PSK or WPA2/PSK or Mixed (WPA+WPA2)/PSK - Accepts only WPA clients and the encryption key should be entered in PSK. The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication.
	WEP/802.1x - The built-in RADIUS client feature enables

	VigorAP 710 to assist the remote dial-in user or a wireless station and the RADIUS server in performing mutual authentication. It enables centralized remote access authentication for network management.
	The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. Select WPA, WPA2 or Auto as WPA mode.
	<b>WPA/802.1x</b> - The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication.
	<b>WPA2/802.1x</b> - The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication.
WPA Algorithms	Select TKIP, AES or TKIP/AES as the algorithm for WPA. Such feature is available for <b>WPA2/802.1x</b> , <b>WPA/802.1x</b> , <b>WPA/PSK or WPA2/PSK or Mixed (WPA+WPA2)/PSK</b> mode.
Pass Phrase	Type either <b>8~63</b> ASCII characters, such as 012345678 or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde". Such feature is available for <b>WPA/PSK or WPA2/PSK or</b> <b>Mixed (WPA+WPA2)/PSK</b> mode.
Key Renewal Interval	WPA uses shared key for authentication to the network. However, normal network operations use a different encryption key that is randomly generated. This randomly generated key that is periodically replaced. Enter the renewal security time (seconds) in the column. Smaller interval leads to greater security but lower performance. Default is 3600 seconds. Set 0 to disable re-key. Such feature is available for WPA2/802.1,WPA/802.1x, WPA/PSK or WPA2/PSK or Mixed (WPA+WPA2)/PSK mode.
Key 1 – Key 4	Four keys can be entered here, but only one key can be selected at a time. The format of WEP Key is restricted to 5 ASCII characters or 10 hexadecimal values in 64-bit encryption level, or restricted to 13 ASCII characters or 26 hexadecimal values in 128-bit encryption level. The allowed content is the ASCII characters from 33(!) to 126(~) except '#' and ','. Such feature is available for <b>WEP</b> mode.

Click the link of **RADIUS Server** to access into the following page for more settings.



RADIUS Server	
Use internal RADIUS Server	
IP Address	0
Port	1812
Shared Secret	DrayTek
Session Timeout	0
	ОК

Available settings are explained as follows:

Item	Description
Use internal RADIUS Server	There is a RADIUS server built in VigorAP 710 which is used to authenticate the wireless client connecting to the access point. Check this box to use the internal RADIUS server for wireless security.
	Besides, if you want to use the external RADIUS server for authentication, do not check this box.
	Please refer to the section, <b>3.9 RADIUS Setting</b> to configure settings for internal server of VigorAP 710.
<b>IP Address</b>	Enter the IP address of external RADIUS server.
Port	The UDP port number that the external RADIUS server is using. The default value is 1812, based on RFC 2138.
Shared Secret	The external RADIUS server and client share a secret that is used to authenticate the messages sent between them. Both sides must be configured to use the same shared secret.
Session Timeout	Set the maximum time of service provided before re-authentication. Set to zero to perform another authentication immediately after the first authentication has successfully completed. (The unit is second.)

After finishing this web page configuration, please click **OK** to save the settings.

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# 3.5.3 Access Control

For additional security of wireless access, the **Access Control** facility allows you to restrict the network access right by controlling the wireless LAN MAC address of client. Only the valid MAC address that has been configured can access the wireless LAN interface. By clicking the **Access Control**, a new web page will appear, as depicted below, so that you could edit the clients' MAC addresses to control their access rights (deny or allow).

SSID 1	SSID 2	SSID 3	SSID 4	
	9	SID: DrayTek		
	F	Policy: Disable		<b>*</b>
		MAG	Address Filter	
	Index	<	MAC /	Address
Client's MAC Address : : : : : : : : : : : : : : : : : :				
OK Cancel				
Backup ACL Cfg : Backup		Upload From Fil Restore	e: Choose File	No file chosen

Wireless LAN >> Access Control

Item	Description	
Policy	Select to enable any one of the following policy or disable the policy. Choose Activate MAC address filter to type in the MAC addresses for other clients in the network manually. Choose Blocked MAC address filter, so that all of the devices with the MAC addresses listed on the MAC Address Filter table will be blocked and cannot access into VigorAP 710. Activate MAC address filter Clienter Disable Activate MAC address filter Blocked MAC address filter	
MAC Address Filter	Display all MAC addresses that are edited before.	
Client's MAC Address	Manually enter the MAC address of wireless client.	
Add	Add a new MAC address into the list.	
Delete	Delete the selected MAC address in the list.	
Edit	Edit the selected MAC address in the list.	

Cancel	Give up the access control set up.
Backup	Click it to store the settings (MAC addresses on MAC Address Filter table) on this page as a file.
Restore	Click it to restore the settings (MAC addresses on MAC Address Filter table) from an existed file.

### 3.5.4 WPS

Open Wireless LAN>>WPS to configure the corresponding settings.

📃 Enable WPS 🔍	
----------------	--

Wi-Fi Protected Setup Information

WPS Configured	Yes
WPS SSID	DrayTek
WPS Auth Mode	Mixed(WPA+WPA2)/PSK
WPS Encrypt Type	TKIP/AES

#### Device Configure

Configure via Push Button	Start PBC
Configure via Client PinCode	Start PIN
Status: Not used	

Status: Not used

Note: WPS can help your wireless client automatically connect to the Access point.

🗅: WPS is Disabled.

🝳: WPS is Enabled.

↔: Waiting for WPS requests from wireless clients.

Item	Description		
Enable WPS	Check this box to enable WPS setting.		
WPS Configured	Display related system information for WPS. If the wireless security (encryption) function of VigorAP 710 is properly configured, you can see 'Yes' message here.		
WPS SSID	Display current selected SSID.		
WPS Auth Mode	Display current authentication mode of the VigorAP 710. Only WPA2/PSK and WPA/PSK support WPS.		
WPS Encrypt Type	Display encryption mode (None, WEP, TKIP, AES, etc.) of VigorAP 710.		
Configure via Push Button	Click <b>Start PBC</b> to invoke Push-Button style WPS setup procedure. VigorAP 710 will wait for WPS requests from wireless clients about two minutes. The WPS LED on VigorAP 710 will blink fast when WPS is in progress. It will return to normal condition after two minutes. (You need to setup WPS within two minutes)		
Configure via Client PinCode	Type the PIN code specified in wireless client you wish to connect, and click <b>Start PIN</b> button. The WLAN LED on		



VigorAP 710 will blink fast when WPS is in progress. It will return to normal condition after two minutes. (You need to setup WPS within two minutes).

### 3.5.5 Advanced Setting

This page is to determine which algorithm will be selected for wireless transmission rate.

#### Wireless LAN >> Advanced Setting

Channel Width	🔿 20 MHz 💿 Auto 20/40 MHz 🔿 40 MHz				
Packet-OVERDRIVE <sup>TM</sup> Tx Burst	Enable      ODisable (For 11g mode only)				
Antenna	⊙ 2T2R ◯ 1T1R				
Tx Power	⊙ 100% ○80% ○60% ○30% ○20% ○10%				
Rate Adaptation Algorithm	💿 New 🔘 Old				
Fragment Length (256 - 2346)	2346 bytes				
RTS Threshold (1 - 2347)	2347 bytes				
Country Code	(Reference)				
Auto Channel Filtered Out List	1 2 3 4 5 6 7 8 9 10 11 12 13				
MAC Clone	○Enable ⊙Disable				
	SSIDs and the Wireless client.Please notice that the last is must be a multiple of 8.				

OK Cancel

ſ

Item	Description			
Channel Width	<b>20 MHZ-</b> the device will use 20MHz for data transmission and receiving between the AP and the stations.			
	<b>Auto 20/40 MHZ</b> – the device will use 20MHz or 40MHz for data transmission and receiving according to the station capability. Such channel can increase the performance for data transmission.			
	<b>40 MHZ-</b> the device will use 40MHz for data transmission and receiving between the AP and the stations.			
Packet-OVERDRIVE	This feature can enhance the performance in data transmission about 40%* more (by checking <b>Tx Burs</b> t). It is active only when both sides of Access Point and Station (in wireless client) invoke this function at the same time. That is, the wireless client must support this feature and invoke the function, too.			
	<b>Note:</b> Vigor N61 wireless adapter supports this function. Therefore, you can use and install it into your PC for matching with Packet-OVERDRIVE (refer to the following picture of Vigor N61 wireless utility window, choose <b>Enable</b> for <b>TxBURST</b> on the tab of <b>Option</b> ).			

	Vigor N61 802.11n Wireless USB Adapter Utility				
	Configuration Status Option About				
	General Setting <ul> <li>Auto launch when Windows gtart up</li> <li>Remember mini status position</li> <li>Auto hyde mini status</li> <li>General Setting</li> <li>Disable Radio</li> <li>Fragmentation Threshold : 2346</li> <li>RTS Threshold : 2347</li> <li>Frequency : 802.11b/gh-2.4GH </li> </ul> Group Roaming         Ad-hoc           WLAN type to connect <ul> <li>Ohrstructure and Ad-hoc getwork</li> <li>Infrastructure and Ad-hoc getwork</li> <li>Ad-hoc network only</li> <li>Automatically connect to non-preferred networks</li> </ul> OK         Cancel				
Antenna	VigorAP 710 can be attached with two antennas to have good data transmission via wireless connection. However, if you have only one antenna attached, please choose 1T1R.				
Tx Power	The default setting is the maximum (100%). Lowering down the value may degrade range and throughput of wireless.				
Rate Adaptation Algorithm	Wireless transmission rate is adapted dynamically. Usually, performance of "new" algorithm is better than "old".				
Fragment Length	Set the Fragment threshold of wireless radio. Do not modify default value if you don't know what it is, default value is 2346.				
RTS Threshold	<ul><li>Minimize the collision (unit is bytes) between hidden stations to improve wireless performance.</li><li>Set the RTS threshold of wireless radio. Do not modify default value if you don't know what it is, default value is 2347.</li></ul>				
Country Code	VigorAP broadcasts country codes by following the 802.11d standard. However, some wireless stations will detect / scan the country code to prevent conflict occurred. If conflict is detected, wireless station will be warned and is unable to make network connection. Therefore, changing the country code to ensure successful network connection will be necessary for some clients.				
Auto Channel Filtered Out List	The selected wireless channels will be discarded if <b>AutoSelect</b> is selected as <b>Channel</b> selection mode in <b>Wireless LAN&gt;&gt;General Setup</b> .				
MAC Clone	Click <b>Enable</b> and manually enter the MAC address of the device with SSID 1. The MAC address of other SSIDs will change based on this MAC address.				

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### 3.5.6 AP Discovery

VigorAP 710 can scan all regulatory channels and find working APs in the neighborhood. Based on the scanning result, users will know which channel is clean for usage. Also, it can be used to facilitate finding an AP for a WDS link. Notice that during the scanning process (about 5 seconds), no client is allowed to connect to Vigor.

This page is used to scan the existence of the APs on the wireless LAN. Please click **Scan** to discover all the connected APs.

index	SSID	BSSID	RSSI	Channel	Encryption	Authentication	Mode	Ch. Width
1	Draytek	00:1d:aa:f7:c1:20	34%	1	NONE		11b/g	20
2	staffs_5F	00:1d:aa:3d:af:d6	100%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
3	quests	02:1d:aa:3c:af:d6	100%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
4	staffs	02:1d:aa:3d:af:d6	100%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
5	Bigsun	00:c0:ca:8b:00:85	29%	1	AES	WPA/PSK	11b/g/n	20
6	staffs	00:1d:aa:9c:fb:28	50%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
7	staffs_6F	00:1d:aa:b0:bc:90	100%	6	AES	WPA2/PSK	11b/g/n	20
8	staffs	02:1d:aa:b0:bc:90	96%	6	AES	WPA2/PSK	11b/g/n	20
9	guests	06:1d:aa:b0:bc:90	100%	6	AES	WPA2/PSK	11b/g/n	20
10	guests	0a:1d:aa:9d:68:ac	91%	8	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	40
11	staffs	02:1d:aa:9d:68:ac	81%	8	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	40
12	ACS 2 test	00:1d:aa:80:06:b8	65%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
13	DrayTek_Ia	00:1d:aa:00:00:00	86%	11	NONE		11b/g/n	20
14	rd8-AP800	00:1d:aa:2a:5b:70	70%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	40
15	DrayTek-LA	00:1d:aa:2a:5b:71	65%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	40

Scan

See Channel Interference

Note: During the scanning process (about 5 seconds), no station is allowed to connect with the AP.

Each item is explained as follows:

Item	Description	
Enable AP Monitor Mode	This function can help to get and keep the records of APs detected by such device after clicking Scan.	
	In general, only the available AP will be detected by Vigor device. Once the AP is unavailable, it will be deleted from the Access Point List immediately. However, if such function is enabled, the system will keep the record of the AP (once detected by Vigor device) until it is available for Vigor device again.	
SSID	Display the SSID of the AP scanned by VigorAP 710.	
BSSID	Display the MAC address of the AP scanned by VigorAP 710.	
RSSI	Display the signal strength of the access point. RSSI is the abbreviation of Receive Signal Strength Indication.	
Channel	Display the wireless channel used for the AP that is scanned by VigorAP 710.	
Encryption	Display the encryption mode for the scanned AP.	
Authentication	Display the authentication type that the scanned AP applied.	
Mode	Display the wireless connection mode that the scanned AP used.	
Ch. Width	Display the channel width that the scanned AP used.	
Scan	It is used to discover all the connected AP. The results will be shown on the box above this button	



<b>Channel Statistics</b>	It displays the statistics for the channels used by APs.		
Channel Interference	Access into <b>Diagnostics&gt;&gt;Interference Monitor</b> for viewing interference status for channel(s).		

# 3.5.7 WMM Configuration

WMM is an abbreviation of Wi-Fi Multimedia. It defines the priority levels for four access categories derived from 802.1d (prioritization tabs). The categories are designed with specific types of traffic, voice, video, best effort and low priority data. There are four accessing categories - AC\_BE, AC\_BK, AC\_VI and AC\_VO for WMM.

1M Capable			🔿 Enable 💿	Disable		
WMM Parameters of Access Point						
	Aifsn	CWMin	CWMax	Тхор	ACM	AckPolicy
AC_BE	3	15 💌	63 💌	0		
AC_BK	7	15 💌	102: 💙	0		
AC_VI	1	7 💌	15 💌	94		
AC_VO	1	3 💌	7 💌	47		
MM Parameter	s of Station					
	Aifsn		CWMin	CWMax	Тхо	p ACM
AC_BE	3	] [	15 💌	102: 💌	0	
AC_BK	7	] [	15 💌	1023 💌	0	
AC_VI	2	] [	7 💌	15 💌	94	
AC_VO	2	] [	3 💌	7 💌	47	

Item	Description
WMM Capable	To apply WMM parameters for wireless data transmission, please click the <b>Enable</b> radio button.
Aifsn	It controls how long the client waits for each data transmission. Please specify the value ranging from 1 to 15. Such parameter will influence the time delay for WMM accessing categories. For the service of voice or video image, please set small value for AC_VI and AC_VO categories For the service of e-mail or web browsing, please set large value for AC_BE and AC_BK categories.
CWMin/CWMax	<b>CWMin</b> means contention Window-Min and <b>CWMax</b> means contention Window-Max. Please specify the value ranging from 1 to 15. Be aware that CWMax value must be greater than CWMin or equals to CWMin value. Both values will influence the time delay for WMM accessing categories. The difference between AC_VI and AC_VO categories must be smaller; however, the difference between AC_BE and AC_BK categories must be greater.
Тхор	It means transmission opportunity. For WMM categories of AC_VI and AC_VO that need higher priorities in data

	transmission, please set greater value for them to get highest transmission opportunity. Specify the value ranging from 0 to 65535.
ACM	It is an abbreviation of Admission control Mandatory. It can restrict stations from using specific category class if it is checked.
	<b>Note:</b> VigorAP 710 provides standard WMM configuration in the web page. If you want to modify the parameters, please refer to the Wi-Fi WMM standard specification.
AckPolicy	"Uncheck" (default value) the box means the AP router will answer the response request while transmitting WMM packets through wireless connection. It can assure that the peer must receive the WMM packets.
	"Check" the box means the AP router will not answer any response request for the transmitting packets. It will have better performance with lower reliability.

### 3.5.8 Bandwidth Management

The downstream or upstream from FTP, HTTP or some P2P applications will occupy large of bandwidth and affect the applications for other programs. Please use Bandwidth Management to make the bandwidth usage more efficient.

#### Wireless LAN >> Bandwidth Management

	D 1	SSID 2	SSID 3	SSID 4		
	SSID		DrayTe	k		
I	Per Static	n Bandwidth Li	nit			
	Enable					
	Upload	Limit	User d	efined 💌	К	bps (Default unit : K)
	Downlo	ad Limit	User d	efined 💌	К	bps (Default unit : K)
	Auto A	ljustment	$\checkmark$			
	Total U	pload Limit	User d	efined 💌	К	bps (Default unit : K)
	Total D	ownload Limit	User d	efined 💌	К	bps (Default unit : K)
te:	station.	-				eing sent from a wireless available bandwidth.

Item	Description		
SSID	Display the specific SSID name.		
Enable	Check this box to enable the bandwidth management for clients.		
Upload Limit	Define the maximum speed of the data uploading which will be used for the wireless stations connecting to VigorAP with the same SSID.		
	Use the drop down list to choose the rate. If you choose <b>User defined</b> , you have to specify the rate manually.		
Download Limit	Define the maximum speed of the data downloading which will		



	<ul><li>be used for the wireless station connecting to VigorAP with the same SSID.</li><li>Use the drop down list to choose the rate. If you choose User defined, you have to specify the rate manually.</li></ul>
Auto Adjustment	Check this box to have the bandwidth limit determined by the system automatically.
Total Upload Limit	When Auto Adjustment is checked, the value defined here will be treated as the total bandwidth shared by all of the wireless stations with the same SSID for data uploading.
Total Download Limit	When Auto Adjustment is checked, the value defined here will be treated as the total bandwidth shared by all of the wireless stations with the same SSID for data downloading.

### 3.5.9 Airtime Fairness

Airtime fairness is essential in wireless networks that must support critical enterprise applications.

Most of the applications are either symmetric or require more downlink than uplink capacity; telephony and email send the same amount of data in each direction, while video streaming and web surfing involve more traffic sent from access points to clients than the other way around. This is essential for ensuring predictable performance and quality-of-service, as well as allowing 802.11n and legacy clients to coexist on the same network. Without airtime fairness, offices using mixed mode networks risk having legacy clients slow down the entire network or letting the fastest client(s) crowd out other users.

With airtime fairness, every client at a given quality-of-service level has equal access to the network's airtime.

The wireless channel can be accessed by only one wireless station at the same time.

The principle behind the IEEE802.11 channel access mechanisms is that each station has *equal probability* to access the channel. When wireless stations have similar data rate, this principle leads to a fair result. In this case, stations get similar channel access time which is called airtime.

However, when stations have various data rate (e.g., 11g, 11n), the result is not fair. The slow stations (11g) work in their slow data rate and occupy too much airtime, whereas the fast stations (11n) become much slower.

Take the following figure as an example, both Station A(11g) and Station B(11n) transmit data packets through VigorAP 710. Although they have equal probability to access the wireless channel, Station B(11n) gets only a little airtime and waits too much because Station A(11g) spends longer time to send one packet. In other words, Station B(fast rate) is obstructed by Station A(slow rate).

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To improve this problem, Airtime Fairness is added for VigorAP 710. Airtime Fairness function tries to assign *similar airtime* to each station (A/B) by controlling TX traffic. In the following figure, Station B(11n) has higher probability to send data packets than Station A(11g). By this way, Station B(fast rate) gets fair airtime and it's speed is not limited by Station A(slow rate).



It is similar to automatic Bandwidth Limit. The dynamic bandwidth limit of each station depends on instant active station number and airtime assignment. Please note that Airtime Fairness of 2.4GHz and 5GHz are independent. But stations of different SSIDs function together, because they all use the same wireless channel. IN SPECIFIC ENVIRONMENTS, this function can reduce the bad influence of slow wireless devices and improve the overall wireless performance.

Suitable environment:

- (1) Many wireless stations.
- (2) All stations mainly use download traffic.
- (3) The performance bottleneck is wireless connection.

Wireless LAN >> Airtime Fairness

Enable Airtime Fairness
Triggering Client Number (2-64) 2 (default: 2)
Note : Please enable or disable this function according to the real situation and user experience. It is NOT suitable for all environments.
OK Cancel

Item	Description
Enable Airtime	Try to assign similar airtime to each wireless station by

Fairness	controlling TX traffic. <b>Airtime Fairness</b> – Click the link to display the following screen of airtime fairness note.
	Winless Artime Painess - Google Channe
	Airtime Fairness Note:  Airtime is the time where a wireless station occupies the wireless channel. Airtime Fairness function tries to assign similar airtime to each station by controlling TX traffic. IN SPECIFIC ENVIRONMENTS, this function can reduce the bad influence of slow wireless devices and improve the overall wireless performance.  Suitable environment : (1) Many wireless stations. (2) All stations mainly use download traffic. (3) The performance bit states connection.  Triggering Client Number: Airtime Fairness function is applied only when active station number achieves this number.
	<b>Triggering Client Number</b> –Airtime Fairness function is applied only when active station number achieves this number.

**Note**: Airtime Fairness function and Bandwidth Limit function should be mutually exclusive. So their webs have extra actions to ensure these two functions are not enabled simultaneously.

### 3.5.10 Station Control

Station Control is used to specify the duration for the wireless client to connect and reconnect VigorAP. If such function is not enabled, the wireless client can connect VigorAP until it shuts down.

Such feature is especially useful for free Wi-Fi service. For example, a coffee shop offers free Wi-Fi service for its guests for one hour every day. Then, the connection time can be set as "1 hour" and reconnection time can be set as "1 day". Thus, the guest can finish his job within one hour and will not occupy the wireless network for a long time.

Note: Up to 300 Wireless Station records are supported by VigorAP.

#### Wireless LAN >> Station Control

SSID 1	SSID 2	SSID 3	SSID 4
SSID		DrayTek	
Enable			
Connec	tion Time	1 hour	*
Reconn	ection Time	1 day	*
Display I	All Station Contro	<u>l List</u>	

Note: Once the feature is enabled, the connection time quota will apply to each wireless client (identified by MAC address).

OK [
------

Item	Description
SSID	Display the SSID that the wireless station will use it to connect with Vigor router.
Enable	Check the box to enable the station control function.
<b>Connection Time /</b>	Use the drop down list to choose the duration for the wireless client connecting /reconnecting to Vigor router. Or,

Reconnection Time	type the duration manually when you choose User defined.		
Display All Station Control List	All the wireless stations connecting to Vigor router by using such SSID will be listed on Station Control List.		

After finishing all the settings here, please click **OK** to save the configuration.

# 3.5.11 Roaming

The network signal for a single wireless access point might be limited by its coverage range. Therefore, if you want to expand the wireless network in a large exhibition with a quick method, you can install multiple access points with enabling the Roaming feature for each AP to reach the purpose of expanding wireless signals seamlessly.

These access points connecting for each other shall be verified by pre-authentication. This page allows you to enable the roaming feature and the pre-authentication.

Wireless LAN (2.4GHz) >> Roaming	

AP-assisted Client Roaming Parameters	
Minimum Basic Rate	1 V Mbps
Disable RSSI Requirement	
Strictly Minimum RSSI	-73 dBm (42 %) (Default: -73)
Minimum RSSI	-66 dBm (60 %) (Default: -66)
with Adjacent AP RSSI over	5 dBm (Default: 5)
Fast Roaming(WPA/802.1x)	
🔲 Enable	
PMK Caching : Cache Period	10 minute(s) (10 ~ 600) (Default: 10)
Pre-Authentication	
	OK Cancel

Item	Description
AP-assisted Client Roaming Parameters	When the link rate of wireless station is too low or the signal received by the wireless station is too worse, VigorAP 710 will automatically detect (based on the link rate and RSSI requirement) and cut off the network connection for that wireless station to assist it to connect another Wireless AP to get better signal.
	Minimum Basic Rate – Check the box to use the drop down list

	<ul> <li>to specify a basic rate (Mbps). When the link rate of the wireless station is below such value, VigorAP 710 will terminate the network connection for that wireless station.</li> <li>Disable RSSI Requirement - If it is selected, VigorAP will not terminate the network connection based on RSSI.</li> <li>Strictly Minimum RSSI - VigorAP uses RSSI (received signal strength indicator) to decide to terminate the network connection of wireless station. When the signal strength is below the value (dBm) set here, VigorAP 710 will terminate the network connection for that wireless station.</li> </ul>
	<ul> <li>Minimum RSSI - When the signal strength of the wireless station is below the value (dBm) set here and adjacent AP (must be DrayTek AP and support such feature too) with higher signal strength value (defined in the field of With Adjacent AP RSSI over) is detected by VigorAP 710, VigorAP 710 will terminate the network connection for that wireless station. Later, the wireless station can connect to the adjacent AP (with better RSSI).</li> <li>With Adjacent AP RSSI over – Specify a value as a threshold.</li> </ul>
Fast Roaming (WPA/802.1x)	<ul> <li>Enable – Check the box to enable fast roaming configuration.</li> <li>PMK Caching: Cache Period - Set the expire time of WPA2</li> <li>PMK (Pairwise master key) cache. PMK Cache manages the list from the BSSIDs in the associated SSID with which it has pre-authenticated. Such feature is available for WPA2/802.1 mode.</li> <li>Pre-Authentication - Enables a station to authenticate to multiple APs for roaming securer and faster. With the pre-authentication procedure defined in IEEE 802.11i specification, the pre-four-way-handshake can reduce handoff delay perceivable by a mobile node. It makes roaming faster and more secure. (Only valid in WPA2)</li> <li>Enable - Enable IEEE 802.1X Pre-Authentication.</li> <li>Disable IEEE 802.1X Pre-Authentication.</li> </ul>
	<b>Disable</b> - Disable IEEE 802.1X Pre-Authentication.

### 3.5.12 Station List

**Station List** provides the knowledge of connecting wireless clients now along with its status code. Each tab (general, advanced, control, neighbor) will display different status information (including MAC address, Vendor, SSID, Auth, Encrypt, Tx/Rx Rate, Hostname, RSSI, Link Speed, BW, PSM, WMM, PHMd, MCS, Connection Time, Reconnection Time, Approx. Distance, Visit Time, and so on).

Wireless LAN >> Station List

#### Station List

				General	Advanced	Control	Neighbor
Index	MAC	Address	Vendor	RSSI	Approx. Distance	SSID V	'isit Time
1 (	C8:FF:	28:FC:2A:C1	LiteonTe	50%(-70d	Bm) 17.78m	N/A	0d: 0h: 🗸
2 I	DA:Al:	19:48:1C:1B	Google	44%(-72d	Bm) 22.39m	N/A	0d:0h:
з і	DA:Al:	19:B6:59:B5	Google	89%(-55d	Bm) 3.16m	N/A	Od:Oh:
4 (	00:50:	7F:F0:BD:2B	DrayTek	89% (−55d	Bm) 3.16m	N/A	0d:0h:
5 (	04:C2:	3E:3F:8F:01	HTC	81%(-58d	Bm) 4.47m	N/A	0d:0h:
6 i	AO:A8:	CD:22:91:24	Intel	42%(-73d	Bm) 25.12m	N/A	0d:0h:
7 I	DA:Al:	19:A3:F1:44	Google	91%(-54d	Bm) 2.82m	N/A	0d:0h:
8 (	00:03:	7F:00:01:00	AtherosC	86%(-56d	Bm) 3.55m	N/A	ld:19h 🗸
				Refr	esh)		
Add to	Acces	<u>s Control</u> :					

Note: 1. Approx. Distance is calculated by actual signal strength of device detected. Inaccuracy might occur based on barrier encountered.

2. Due to the differences in signal strength for different devices, the calcuated value of approximate distance also might be different.

3. Trademarks and brand names are the properties of their respective owners.

#### Add

Available settings are explained as follows:

Item	Description		
MAC Address	Display the MAC Address for the connecting client.		
Refresh	Click this button to refresh the status of station list.		
Add to Access Control	<b>Client's MAC Address</b> - For additional security of wireless access, the Access Control facility allows you to restrict the network access right by controlling the wireless LAN MAC address of client. Only the valid MAC address that has been configured can access the wireless LAN interface.		
Add	Click this button to add current typed MAC address into <b>Access Control</b> .		

#### General

Display general information (e.g., MAC Address, SSID, Auth, Encrypt, TX/RX Rate) for the station.

#### Advanced

Display more information (e.g., AID, PSM, WMM, RSSI PhMd, BW, MCS, Rate) for the station.

#### Control



Display connection and reconnection time of the wireless stations.

### Neighbor

Display more information for the neighboring wireless stations.

# 3.6 Wireless LAN Settings for AP Bridge-Point to Point/AP Bridge-Point to Multi-Point Mode

When you choose AP Bridge-Point to Point or Point-to Multi-Point Mode as the operation mode, the Wireless LAN menu items will include General Setup, Advanced Setting, AP Discovery and WDS AP Status.



AP Bridge-Point to Point allows VigorAP 710 to connect to **another** VigorAP 710 which uses the same mode. All wired Ethernet clients of both VigorAP 710s will be connected together.

Point-to Multi-Point Mode allows VigorAP 710 to connect up to **four** VigorAP 710s which uses the same mode. All wired Ethernet clients of every VigorAP 710 will be connected together.

### 3.6.1 General Setup

By clicking the **General Setup**, a new web page will appear so that you could configure the Phy mode, security, Tx Burst and choose proper mode. Please refer to the following figure for more information.

#### Wireless LAN >> General Setup

General Setting ( IEEE 802.11 )					
🗹 Enable Wireless LAN					
📃 Enable Limit Clier	nt per SSID (3-64 default: 64)				
Mode :	Mixed(11b+11g+11n) 💌				
Channel :	2462MHz (Channel 1: 💌				
Extension Channel :	2442MHz (Channel 7) 💌				
	Note: Enter the configuration of APs which AP710 want to connect.				
PHY Mode : HTMIX	PHY Mode : HTMIX				
Security :					
⊙ Disabled ○WEP ○ TKIP ○ AES					
Key :					
Peer MAC Address :					
	OK Cancel				

Item	Description
<b>Enable Wireless LAN</b> Check the box to enable wireless function.	
Enable Limit Client per SSID	Define the maximum number of wireless stations per SSID which try to connect to Internet through Vigor device. The number you can set is from 3 to 64.

Mode	At present, VigorAP 710 can connect to 11b only, 11g only, 11n only, Mixed (11b+11g), Mixed (11g+11n) and Mixed (11b+11g+11n) stations simultaneously. Simply choose Mixed (11b+11g+11n) mode.		
Channel	Means the channel of frequency of the wireless LAN. The default channel is 11. You may switch channel if the selected channel is under serious interference. If you have no idea of choosing the frequency, please select <b>AutoSelect</b> to let system determine for you.           2462MHz (Channel 11)         AutoSelect         AutoSelect         2412MHz (Channel 1)         2422MHz (Channel 1)         2422MHz (Channel 1)         2422MHz (Channel 1)         2432MHz (Channel 3)         24247MHz (Channel 4)         2432MHz (Channel 5)         2437MHz (Channel 6)         2442MHz (Channel 7)         2452MHz (Channel 8)         2452MHz (Channel 10)         2467MHz (Channel 11)         2467MHz (Channel 12)         2457MHz (Channel 13)		
Extension Channel	With 802.11n, there is one option to double the bandwidth per channel. The available extension channel options will be varied according to the <b>Channel</b> selected above.		
Rate	If you choose 11g Only, 11b Only or 11n Only, such feature will be available for you to set data transmission rate.		
PHY Mode	Data will be transmitted via communication channel, HTMIX.		
Security	Select WEP, TKIP or AES as the encryption algorithm. Type the key number if required.		
Peer MAC Address	Type the peer MAC address for the access point that VigorAP 710 connects to.		

# 3.6.2 Advanced Setting

This page is to determine which algorithm will be selected for wireless transmission rate.

#### Wireless LAN >> Advanced Setting

Channel Width		🔘 20 MHz 💿 Auto 20/40 MHz 🔘 40 MHz		
Packet-OVERDRIVE <sup>TM</sup> Tx Burst		○Enable ⊙Disable (For 11g mode only)		
Antenna		⊙2T2R ○1T1R		
Tx Power		⊙100% ○80% ○60% ○30% ○20% ○10%		
Rate Adaptatio	on Algorithm	💿 New 🔘 Old		
Fragment Leng	gth (256 - 2346)	2346 bytes		
RTS Threshold	(1 - 2347)	2347 bytes		
Country Code		( <u>Reference</u> )		
Auto Channel I	Filtered Out List	1 2 3 4 5 6 7 8 9 10 11 12 13		
MAC Clone		○Enable		
MAC Clone:		SSIDs and the Wireless client.Please notice that the last s must be a multiple of 8.		
		OK Cancel		

Item	Description		
Channel Width	<ul> <li>20 MHZ - AP will use 20Mhz for data transmission and receiving between the AP and the stations.</li> <li>Auto 20/40 MHZ - AP will use 20Mhz or 40Mhz for data transmission and receiving according to the station capability. Such channel can increase the performance for data transmission.</li> <li>40 MHZ - AP will use 40Mhz for data transmission and</li> </ul>		
Packet-OVERDRIVE	receiving between the AP and the stations. This feature can enhance the performance in data transmission about 40%* more (by checking <b>Tx Burs</b> t). It is active only when both sides of Access Point and Station (in wireless client) invoke this function at the same time. That is, the wireless client must support this feature and invoke the function, too.		
	<b>Note:</b> Vigor N61 wireless adapter supports this function. Therefore, you can use and install it into your PC for matching with Packet-OVERDRIVE (refer to the following picture of Vigor N61 wireless utility window, choose <b>Enable</b> for <b>TxBURST</b> on the tab of <b>Option</b> ).		

	Vigor N61 802.11n Wireless USB Adapter Utility		
	Configuration Status Option About		
Antenna	VigorAP 710 can be attached with two antennas to have good		
	data transmission via wireless connection. However, if you have only one antenna attached, please choose 1T1R.          2T2R           2T2R           2T2R           1T1R		
Tx Power	The default setting is the maximum (100%). Lowering down the value may degrade range and throughput of wireless. 100% 100% 80% 60% 30% 20% 10%		
Rate Adaptation Algorithm	Wireless transmission rate is adapted dynamically. Usually, performance of "new" algorithm is better than "old".		
Fragment Length	Set the Fragment threshold of wireless radio. Do not modify default value if you don't know what it is, default value is 2346.		
RTS Threshold	Minimize the collision (unit is bytes) between hidden stations to improve wireless performance. Set the RTS threshold of wireless radio. Do not modify default value if you don't know what it is, default value is 2347.		
Country Code	VigorAP broadcasts country codes by following the 802.11d standard. However, some wireless stations will detect / scan the country code to prevent conflict occurred. If conflict is detected, wireless station will be warned and is unable to make network connection. Therefore, changing the country code to ensure successful network connection will be necessary for some clients.		
Auto Channel Filtered Out List	The selected wireless channels will be discarded if <b>AutoSelect</b> is selected as <b>Channel</b> selection mode in <b>Wireless</b> <b>LAN&gt;&gt;General Setup</b> .		
MAC Clone	Click <b>Enable</b> and manually enter the MAC address of the device with SSID 1. The MAC address of other SSIDs will change based on this MAC address.		

### 3.6.3 AP Discovery

VigorAP 710 can scan all regulatory channels and find working APs in the neighborhood. Based on the scanning result, users will know which channel is clean for usage. Also, it can be used to facilitate finding an AP for a WDS link. Notice that during the scanning process (about 5 seconds), no client is allowed to connect to VigorAP 710.

This page is used to scan the existence of the APs on the wireless LAN. Yet, only the AP which is in the same channel of VigorAP 710 can be found. Please click Scan to discover all the connected APs.

Wireless I	AN >>	Access	Point	Discovery

Select	Index	SSID	BSSID	RSSI	Channe	el Encryption	Authentication	Mode	Ch. Width
$\bigcirc$	1	staffs	00:1d:aa:9c:fb:28	50%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
Ō	2	Bigsun	00:c0:ca:8b:00:85	34%	1	AES	WPA/PSK	11b/g/n	20
$\bigcirc$	3	Draytek	00:1d:aa:f7:c1:20	34%	1	NONE		11b/g	20
Õ	4	staffs_5F	00:1d:aa:3d:af:d6	100%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
$\bigcirc$	5	guests	02:1d:aa:3c:af:d6	100%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
$\bigcirc$	6	staffs	02:1d:aa:3d:af:d6	100%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
$\bigcirc$	7	henry-1	00:1d:aa:3d:4f:16	5%	2	NONE		11b/g/n	20
$\bigcirc$	8	DrayTek	00:1d:aa:f5:ae:c0	60%	6	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	40
$\bigcirc$	9	staffs_6F	00:1d:aa:b0:bc:90	100%	6	AES	WPA2/PSK	11b/g/n	20
$\bigcirc$	10	staffs	02:1d:aa:b0:bc:90	100%	6	AES	WPA2/PSK	11b/g/n	20
$\bigcirc$	11	guests	06:1d:aa:b0:bc:90	100%	6	AES	WPA2/PSK	11b/g/n	20
$\bigcirc$	12	staffs_4F	00:1d:aa:9d:68:ac	81%	8	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	40
$\circ$	13	staffs	02:1d:aa:9d:68:ac	86%	8	TKIP/AES	Mistaffs (WPA+WPA2)/PSK	11b/g/n	40
$\bigcirc$	14	guests	0a:1d:aa:9d:68:ac	96%	8	TKIP/AES	Nince (WPA+WPA2)/PSK	11b/g/n	40
$\bigcirc$	15	ACS 2 test	00:1d:aa:80:06:b8	55%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
$\circ$	16	RD8_ACS_TE	00:1d:aa:f7:a9:00	91%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20



Note: During the scanning process (about 5 seconds), no station is allowed to connect with the AP.

AP's MAC Address	:	]:: [	: : : : : : : : : : : : : : : : : : : :	AP's SSID	
Add to WDS Settings: Add					

Item	Description
Enable AP Monitor Mode	This function can help to get and keep the records of APs detected by such device after clicking Scan.
	In general, only the available AP will be detected by Vigor device. Once the AP is unavailable, it will be deleted from the Access Point List immediately. However, if such function is enabled, the system will keep the record of the AP (once detected by Vigor device) until it is available for Vigor device again.
SSID	Display the SSID of the AP scanned by VigorAP 710.
BSSID	Display the MAC address of the AP scanned by VigorAP 710.
RSSI	Display the signal strength of the access point. RSSI is the abbreviation of Receive Signal Strength Indication.
Channel	Display the wireless channel used for the AP that is scanned by VigorAP 710.
Encryption	Display the encryption mode for the scanned AP.
Authentication	Display the authentication type that the scanned AP applied.



Mode	Display the wireless connection mode that the scanned AP used.
Ch. Width	Display the channel width that the scanned AP used.
Scan	It is used to discover all the connected AP. The results will be shown on the box above this button
Channel Interference	Access into <b>Diagnostics</b> >>Interference Monitor for viewing interference status for channel(s).
AP's MAC Address	If you want the found AP applying the WDS settings, please type in the AP's MAC address.
AP's SSID	To specify an AP to be applied with WDS settings, you can specify MAC address or SSID for the AP. Here is the place that you can type the SSID of the AP.
Add	Type the MAC address of the AP. Click <b>Add</b> . Later, the MAC address of the AP will be added and be shown on WDS settings page.

# 3.6.4 WDS AP Status

VigorAP 710 can display the status such as MAC address, physical mode, power save and bandwidth for the working AP connected with WDS. Click **Refresh** to get the newest information.

#### Wireless LAN >> WDS AP Status

AID	MAC Address	802.11 Physical Mode	Power Save	Bandwidth	
1	00:50:7F:C9:76:0C	ССК	OFF	20M	

Refresh

**Dray** Tek

# 3.7 Wireless LAN Settings for AP Bridge-WDS Mode

When you choose AP Bridge-WDS as the operation mode, the Wireless LAN menu items will include General Setup, Security, Access Control, WPS, Advanced Setting, AP Discovery, WDS AP Status, WMM Configuration, Airtime Fairness, Station Control, Roaming and Station List.

Central AP Management
Wireless LAN
General Setup
Security
Access Control
WPS
Advanced Setting
AP Discovery
WDS AP Status
WMM Configuration
Bandwidth Management
Airtime Fairness
Station Control
Roaming
Station List
DADILIC Cotting

### 3.7.1 General Setup

By clicking the **General Setup**, a new web page will appear so that you could configure the Phy mode, security, Tx Burst and choose proper mode. Please refer to the following figure for more information.

Wireless LAN >> General Setup

General Setting ( IEEE 802.11 )		
🗹 Enable Wireless LAN		
📃 Enable Limit Clien	t (3-64) 64 (defa	ult: 64)
🔲 Enable Limit Clien	t per SSID (3-64 def	ault: 64)
Mode :	Mixed(11b+11g+11	n) 💌
Channel :	2462MHz (Channel	1: 🕶
Extension Channel :	2442MHz (Channel	7) 💌
Enable Hide SSID		olate Isolate VLAN ID LAN Member(0:Untagged)
1 📃 Dra	уТек	
2		
3		0
4		0
Note:Enter the configu		AP710 want to connect. · SSID1 MAC address to connect AP710
		1
1. Security:		3. Security:
⊙Disabled ○WE Key :	P OTKIP OAES	Oisabled OWEP OTKIP OAES     Key :
Peer MAC Address :		Peer MAC Address :
	:	
2. Security:		4. Security:
⊙Disabled ○WE	P OTKIP OAES	⊙Disabled ○WEP ○TKIP ○AES
Key :		Key :
Peer MAC Address :	:	Peer MAC Address :
	ОК	Cancel

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Available settings are explained as follows:
--

Item	Description
Enable Wireless LAN	Check the box to enable wireless function.
Enable Limit Client	Check the box to set the maximum number of wireless stations which try to connect Internet through Vigor router. The number you can set is from 3 to 64.
Enable Limit Client per SSID	Define the maximum number of wireless stations per SSID which try to connect to Internet through Vigor device. The number you can set is from 3 to 64.
Mode	At present, VigorAP 710 can connect to 11b only, 11g only, 11n only, Mixed (11b+11g), Mixed (11g+11n) and Mixed (11b+11g+11n) stations simultaneously. Simply choose Mixed (11b+11g+11n) w (11b+11g+11n) w 11b Only 11g Only 11g Only 11n Only Mixed(11b+11g) II Mixed(11b+11g+11n)
Channel	Means the channel of frequency of the wireless LAN. You may switch channel if the selected channel is under serious interference. If you have no idea of choosing the frequency, please select <b>AutoSelect</b> to let system determine for you. 2437MHz (Channel 6) 2412MHz (Channel 1) 2417MHz (Channel 1) 2422MHz (Channel 2) 2422MHz (Channel 3) 2427MHz (Channel 4) 2432MHz (Channel 5) 2437MHz (Channel 6) 2442MHz (Channel 7) 2447MHz (Channel 8) 2452MHz (Channel 9) 2457MHz (Channel 10) 2462MHz (Channel 11) 2467MHz (Channel 12) 2472MHz (Channel 13)
Extension Channel	With 802.11n, there is one option to double the bandwidth per channel. The available extension channel options will be varied according to the <b>Channel</b> selected above. Configure the extension channel you want.
Enable	SSID #1 is enabled in default. SSID #2 ~ #4 can be enabled manually.
Hide SSID	Check it to prevent from wireless sniffing and make it harder for unauthorized clients or STAs to join your wireless LAN. Depending on the wireless utility, the user may only see the information except SSID or just cannot see any thing about VigorAP 710 while site surveying. The system allows you to set

	three sets of SSID for different usage.
SSID	Set a name for VigorAP 710 to be identified. Default setting is DrayTek.
Isolate LAN	Check this box to make the wireless clients (stations) with the same SSID not accessing for wired PC in LAN.
Isolate Member	Check this box to make the wireless clients (stations) with the same SSID not accessing for each other.
VLAN ID	Type the value for such SSID. Packets transferred from such SSID to LAN will be tagged with the number.
	If your network uses VLANs, you can assign the SSID to a VLAN on your network. Client devices that associate using the SSID are grouped into this VLAN. The VLAN ID range is from 3 to 4095. The VLAN ID is 0 by default, it means disabling the VLAN function for the SSID.
Rate	If you choose 11g Only, 11b Only or 11n Only, such feature will be available for you to set data transmission rate.
PHY Mode	Data will be transmitted via communication channel, HTMIX.
Security	Select WEP, TKIP or AES as the encryption algorithm.
Peer MAC Address	Four peer MAC addresses are allowed to be entered in this page at one time.

# 3.7.2 Security

This page allows you to set security with different modes for SSID 1, 2, 3 and 4 respectively. After configuring the correct settings, please click **OK** to save and invoke it.

By clicking the **Security Settings**, a new web page will appear so that you could configure the settings.

SSID 1	SSID 2	SSID 3	SSID 4		
SSIC	i .	DrayTek			
Mod	Э	Mixed(V	VPA+WPA2	)/PSK 🛛 💌	
	up <u>RADIUS Server</u>	if 802.1x is ei	nabled.		
WPA					
WPA	Algorithms	🔘 ТКІР	🔘 AES	⊙ TKIP/AE	S
Pass	Phrase	•••••	•••••		
Кеу	Renewal Interval	3600 s	econds		
WEP					
0	(ey 1 :				Hex 💌
۰ ا	(ey 2 :				Hex 💌
0 1	(еуЗ:				Hex 💌
0 1	(ey 4 :				Hex 💌
802.	1× WEP	○ Disab	ile O Ena	ble	

Wireless LAN >> Security Settings

Item	Description
Mode	There are several modes provided for you to choose.
	Disable 💌
	Disable
	WEP WEA/DEV
	WPA/PSK WPA2/PSK
	Mixed(WPA+WPA2)/PSK WEP/802.1x WPA/802.1x WPA2/802.1x Mixed(WPA+WPA2)/802.1x
	<b>Disable</b> - The encryption mechanism is turned off.
	<b>WEP</b> - Accepts only WEP clients and the encryption key should be entered in WEP Key.
	<b>WPA/PSK or WPA2/PSK or Mixed (WPA+WPA2)/PSK -</b> Accepts only WPA clients and the encryption key should be entered in PSK. The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication.
	WEP/802.1x - The built-in RADIUS client feature enables

	VigorAP 710 to assist the remote dial-in user or a wireless station and the RADIUS server in performing mutual authentication. It enables centralized remote access authentication for network management.
	The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. Select WPA, WPA2 or Auto as WPA mode.
	<b>WPA/802.1x</b> - The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication.
	<b>WPA2/802.1x</b> - The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication.
WPA Algorithms	Select TKIP, AES or TKIP/AES as the algorithm for WPA. Such feature is available for <b>WPA2/802.1x</b> , <b>WPA/802.1x</b> , <b>WPA/PSK or WPA2/PSK or Mixed (WPA+WPA2)/PSK</b> mode.
Pass Phrase	Type either <b>8~63</b> ASCII characters, such as 012345678 or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde". Such feature is available for <b>WPA/PSK or WPA2/PSK or</b> <b>Mixed (WPA+WPA2)/PSK</b> mode.
Key Renewal Interval	WPA uses shared key for authentication to the network. However, normal network operations use a different encryption key that is randomly generated. This randomly generated key that is periodically replaced. Enter the renewal security time (seconds) in the column. Smaller interval leads to greater security but lower performance. Default is 3600 seconds. Set 0 to disable re-key. Such feature is available for WPA2/802.1,WPA/802.1x, WPA/PSK or WPA2/PSK or Mixed (WPA+WPA2)/PSK mode.
Key 1 – Key 4	Four keys can be entered here, but only one key can be selected at a time. The format of WEP Key is restricted to 5 ASCII characters or 10 hexadecimal values in 64-bit encryption level, or restricted to 13 ASCII characters or 26 hexadecimal values in 128-bit encryption level. The allowed content is the ASCII characters from 33(!) to 126(~) except '#' and ','. Such feature is available for <b>WEP</b> mode.

Click the link of **RADIUS Server** to access into the following page for more settings.


RADIUS Server		
Use internal RADIUS Server		
IP Address	0	
Port	1812	
Shared Secret	DrayTek	
Session Timeout	0	
	ОК	

Available settings are explained as follows:

Item	Description	
Use internal RADIUS Server	There is a RADIUS server built in VigorAP 710 which is used to authenticate the wireless client connecting to the access point. Check this box to use the internal RADIUS server for wireless security.	
	Besides, if you want to use the external RADIUS server for authentication, do not check this box.	
	Please refer to the section, <b>3.9 RADIUS Setting</b> to configure settings for internal server of VigorAP 710.	
<b>IP Address</b>	Enter the IP address of external RADIUS server.	
Port	The UDP port number that the external RADIUS server is using. The default value is 1812, based on RFC 2138.	
Shared Secret	The external RADIUS server and client share a secret that is used to authenticate the messages sent between them. Both sides must be configured to use the same shared secret.	
Session Timeout	Set the maximum time of service provided before re-authentication. Set to zero to perform another authentication immediately after the first authentication has successfully completed. (The unit is second.)	

After finishing this web page configuration, please click **OK** to save the settings.

**Dray** Tek

# 3.7.3 Access Control

For additional security of wireless access, the **Access Control** facility allows you to restrict the network access right by controlling the wireless LAN MAC address of client. Only the valid MAC address that has been configured can access the wireless LAN interface. By clicking the **Access Control**, a new web page will appear, as depicted below, so that you could edit the clients' MAC addresses to control their access rights (deny or allow).

0010 1	0010 0	0010.0	0010 4		
SSID 1	SSID 2	SSID 3	SSID 4		
	9	SID: DrayTek			
	F	olicy: Disable		*	
		МА	C Address Filter		
	Inde>			ddress	
	Inder	,		.uuross	
					1
Client's MAC Address :					
Add Delete Edit Cancel Limit: 256 entries		-			
		ОК	Cance	2	
Backup ACL Cfg	:	Upload From Fi	le: Choose File	No file chosen	
Backup		Restore			

Wireless LAN >> Access Control

Item	Description	
Policy	Select to enable any one of the following policy or disable the policy. Choose Activate MAC address filter to type in the MAC addresses for other clients in the network manually. Choose Blocked MAC address filter, so that all of the devices with the MAC addresses listed on the MAC Address Filter table will be blocked and cannot access into VigorAP 710. Activate MAC address filter Clienter Disable Activate MAC address filter Blocked MAC address filter	
MAC Address Filter	Display all MAC addresses that are edited before.	
Client's MAC Address	Manually enter the MAC address of wireless client.	
Add	Add a new MAC address into the list.	
Delete	Delete the selected MAC address in the list.	
Edit	Edit the selected MAC address in the list.	



Cancel	Give up the access control set up.
Backup	Click it to store the settings (MAC addresses on MAC Address Filter table) on this page as a file.
Restore	Click it to restore the settings (MAC addresses on MAC Address Filter table) from an existed file.

# 3.7.4 WPS

Open Wireless LAN>>WPS to configure the corresponding settings.

Wireless LAN >> WPS (Wi-Fi Protected Setup)

Wi-Fi Protected Setup Informatic	n	
WPS Configured	Yes	
WPS SSID	DrayTek	
WPS Auth Mode	Mixed(WPA+WPA2)/PSK	
WPS Encrypt Type	TKIP/AES	

Device Configure

Configure via Push Button	Start PBC
Configure via Client PinCode	Start PIN
Status: Not used	

Note: WPS can help your wireless client automatically connect to the Access point.

🗅 : WPS is Disabled.

😳: WPS is Enabled.

Waiting for WPS requests from wireless clients.

Item	Description
Enable WPS	Check this box to enable WPS setting.
WPS Configured	Display related system information for WPS. If the wireless security (encryption) function of VigorAP 710 is properly configured, you can see 'Yes' message here.
WPS SSID	Display current selected SSID.
WPS Auth Mode	Display current authentication mode of the VigorAP 710r. Only WPA2/PSK and WPA/PSK support WPS.
WPS Encrypt Type	Display encryption mode (None, WEP, TKIP, AES, etc.) of VigorAP 710.
Configure via Push Button	Click <b>Start PBC</b> to invoke Push-Button style WPS setup procedure. VigorAP 710 will wait for WPS requests from wireless clients about two minutes. The WPS LED on VigorAP 710 will blink fast when WPS is in progress. It will return to normal condition after two minutes. (You need to setup WPS within two minutes)
Configure via Client PinCode	Type the PIN code specified in wireless client you wish to connect, and click <b>Start PIN</b> button. The WLAN LED on VigorAP 710 will blink fast when WPS is in progress. It will



return to normal condition after two minutes. (You need to setup WPS within two minutes).

# 3.7.5 Advanced Setting

This page is to determine which algorithm will be selected for wireless transmission rate.

Channel Width	ו	🔘 20 MHz 💿 Auto 20/40 MHz 🔘 40 MHz
Packet-OVERD	RIVE <sup>TM</sup> Tx Burst	◯Enable ⊙Disable (For 11g mode only)
Antenna		⊙2T2R ○1T1R
Tx Power		⊙100% ○80% ○60% ○30% ○20% ○10%
Rate Adaptati	on Algorithm	💿 New 🔘 Old
Fragment Len	gth (256 - 2346)	2346 bytes
RTS Threshold	(1 - 2347)	2347 bytes
Country Code		( <u>Reference</u> )
Auto Channel Filtered Out List              1             2		
MAC Clone		◯Enable ⊙Disable
MAC Clone:	Set the MAC address of SSIDs and the Wireless client.Please notice that the last byte of this MAC address must be a multiple of 8.	
		OK Cancel

Wireless LAN >> Advanced Setting

Item	Description
Channel Width	<b>20 MHZ-</b> the AP will use 20Mhz for data transmission and receiving between the AP and the stations.
	Auto 20/40 MHZ– the AP will use 20Mhz or 40Mhz for data transmission and receiving according to the station capability. Such channel can increase the performance for data transmission.
	<b>40 MHZ-</b> the AP will use 40Mhz for data transmission and receiving between the AP and the stations.
Packet-OVERDRIVE	This feature can enhance the performance in data transmission about 40%* more (by checking <b>Tx Burs</b> t). It is active only when both sides of Access Point and Station (in wireless client) invoke this function at the same time. That is, the wireless client must support this feature and invoke the function, too.
	<b>Note:</b> Vigor N61 wireless adapter supports this function. Therefore, you can use and install it into your PC for matching with Packet-OVERDRIVE (refer to the following picture of Vigor N61 wireless utility window, choose <b>Enable</b> for <b>TxBURST</b> on the tab of <b>Option</b> ).

	Vigor N61 802.11n Wireless USB Adapter Utility	X		
	Configuration Status Option About			
	General Setting	Advance Setting		
	🔽 Auto launch when Windows start up	Disable Radio		
	Remember mini status position	Fragmentation Threshold : 2346		
	Auto <u>h</u> ide mini status	RTS Threshold : 2347		
	Set <u>m</u> ini status always on top	Frequency : 802.11b/g/n - 2.4GH 💌		
	Enable IP Setting and Proxy Setting in Profile	Ad-hoc Channel:		
	Group Roaming Ad-hoc	Power Save Mode:		
	Action	Tx Burst : Disable		
	WLAN type to connect ③ Infrastructure and A4-hoc getwork ③ Infrastructure getwork only			
	Ad-hoc network only			
	Automatically connect to non-preferred networks			
	OK Cancel Apply			
	OK Cancel Apply			
Antenna	VigorAP 710 can be attached with two antennas to have good			
	data transmission via wireless connection. However, if you			
	have only one antenna attac			
	have only one antenna attac	filed, please enouse 1111.		
	2T2R 🔽	2728		
	2T2R			
Tx Power	The default setting is the maximum (100%). Lowering down			
IXFOWER				
	the value may degrade rang	e and throughput of wireless.		
	100%			
	100% 🚩			
	100%			
	80%			
	60%			
	30%			
	20%			
	10%			
Rate Adaptation	Wireless transmission rate	is adapted dynamically. Usually,		
Algorithm	performance of "new" algorithm is better than "old".			
8				
Fragment Length	Set the Fragment threshold	of wireless radio. Do not modify		
2 0	default value if you don't know what it is, default value is 2346.			
RTS Threshold	Minimize the collision (unit is bytes) between hidden stations			
	to improve wireless perform			
	Set the RTS threshold of wireless radio. Do not modify default			
	value if you don't know wh	at it is, default value is 2347.		
0 4 0 1	X' ADI 1 (	1 1 6 11 : 1 000 11 1		
Country Code	VigorAP broadcasts country codes by following the 802.11d			
		vireless stations will detect / scan		
	the country code to prevent	conflict occurred. If conflict is		
		ill be warned and is unable to mal		
	-			
		Fore, changing the country code to		
		connection will be necessary for		
	some clients.			
	The calcoted wineless share	ale will be discorded if Anta Cala		
Auto Channel	The selected wireless channels will be discarded if <b>AutoSelect</b>			
		. 1 * **** *		
	is selected as Channel sele	ction mode in Wireless		
		ction mode in Wireless		
Auto Channel Filtered Out List	is selected as <b>Channel</b> sele <b>LAN&gt;&gt;General Setup</b> .			
	is selected as <b>Channel</b> sele <b>LAN&gt;&gt;General Setup</b> . Click <b>Enable</b> and manually	r enter the MAC address of the AC address of other SSIDs will		



change based on	this MAC address.
-----------------	-------------------

# 3.7.6 AP Discovery

VigorAP 710 can scan all regulatory channels and find working APs in the neighborhood. Based on the scanning result, users will know which channel is clean for usage. Also, it can be used to facilitate finding an AP for a WDS link. Notice that during the scanning process (about 5 seconds), no client is allowed to connect to Vigor.

This page is used to scan the existence of the APs on the wireless LAN. Yet, only the AP which is in the same channel of VigorAP 710 can be found. Please click **Scan** to discover all the connected APs.

Wireless LAN >> Access Point Discovery

Select	Index	SSID	BSSID	RSSI	Channe	I Encryption	Authentication	Mode	Ch. Width
$\bigcirc$	1		14:a3:64:11:b6:a5	29%	1	AES	WPA2/PSK	11b/g/n	20
Õ	2	staffs_5F	00:1d:aa:3d:af:d6	100%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
0	З	guests	02:1d:aa:3c:af:d6	100%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
Õ	4	staffs	02:1d:aa:3d:af:d6	100%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
0	5	staffs	00:1d:aa:9c:fb:28	44%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20
$\bigcirc$	6	staffs_6F	00:1d:aa:b0:bc:90	91%	6	AES	WPA2/PSK	11b/g/n	20
0	7	staffs	02:1d:aa:b0:bc:90	91%	6	AES	WPA2/PSK	11b/g/n	20
$\bigcirc$	8	guests	06:1d:aa:b0:bc:90	91%	6	AES	WPA2/PSK	11b/g/n	20
0	9	staffs_4F	00:1d:aa:9d:68:ac	96%	8	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	40
Õ	10	DrayTek_Ia	00:1d:aa:00:00:00	96%	11	NONE		11b/g/n	20
0	11	DrayTek-LA	00:50:7f:52:2f:59	91%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	40

See Channel Interference

Note: During the scanning process (about 5 seconds), no station is allowed to connect with the AP.



Each item is explained as follows:

Item	Description
Enable AP Monitor Mode	This function can help to get and keep the records of APs detected by such device after clicking Scan.
	In general, only the available AP will be detected by Vigor device. Once the AP is unavailable, it will be deleted from the Access Point List immediately. However, if such function is enabled, the system will keep the record of the AP (once detected by Vigor device) until it is available for Vigor device again.
SSID	Display the SSID of the AP scanned by VigorAP 710.
BSSID	Display the MAC address of the AP scanned by VigorAP 710.
RSSI	Display the signal strength of the access point. RSSI is the abbreviation of Receive Signal Strength Indication.
Channel	Display the wireless channel used for the AP that is scanned by VigorAP 710.
Encryption	Display the encryption mode for the scanned AP.
Authentication	Display the authentication type that the scanned AP applied.
Mode	Display the wireless connection mode that the scanned AP



	used.
Ch. Width	Display the channel width that the scanned AP used.
Scan	It is used to discover all the connected AP. The results will be shown on the box above this button
Channel Interference	Access into <b>Diagnostics&gt;&gt;Interference Monitor</b> for viewing interference status for channel(s).
AP's MAC Address	If you want the found AP applying the WDS settings, please type in the AP's MAC address.
AP's SSID	To specify an AP to be applied with WDS settings, you can specify MAC address or SSID for the AP. Here is the place that you can type the SSID of the AP.
Add	Click <b>Add</b> . Later, the MAC address of the AP will be added and be shown on WDS settings page.

## 3.7.7 WDS AP Status

VigorAP 710 can display the status such as MAC address, physical mode, power save and bandwidth for the working AP connected with WDS. Click **Refresh** to get the newest information.

WDS	۸D	liet
**03	AI	LISU

AID	MAC Address	802.11 Physical Mode	Power Save	Bandwidth
1	00:50:7F:C9:76:0C	ССК	OFF	20M

# Refresh

# 3.7.8 WMM Configuration

WMM is an abbreviation of Wi-Fi Multimedia. It defines the priority levels for four access categories derived from 802.1d (prioritization tabs). The categories are designed with specific types of traffic, voice, video, best effort and low priority data. There are four accessing categories - AC\_BE, AC\_BK, AC\_VI and AC\_VO for WMM.

Wireless	LAN >	>> WMM	Configuration

/MM Capable 💿 Enable 💿 Disable								
WMM Parameters of Access Point								
	Aifsn	CWMin	CWMax	Тхор	ACM	AckPolicy		
AC_BE	3	15 💌	63 💌	0				
AC_BK	7	15 💌	102: 💙	0				
AC_VI	1	7 💌	15 💌	94				
AC_VO	1	3 💌	7 💌	47				
VMM Parameters of Station								
	Aifsn	C	WMin	CWMax	Тхор	ACM		
AC_BE	3	15	5 💌	1023 💌	0			
АС_ВК	7	15	5 💌	1023 💌	0			
AC_VI	2	7	*	15 💌	94			
AC_VO	2	3	~	7 💌	47			

Item	Description			
WMM Capable	To apply WMM parameters for wireless data transmission, please click the <b>Enable</b> radio button.			
Aifsn	It controls how long the client waits for each data transmission. Please specify the value ranging from 1 to 15. Such parameter will influence the time delay for WMM accessing categories. For the service of voice or video image, please set small value for AC_VI and AC_VO categories For the service of e-mail or web browsing, please set large value for AC_BE and AC_BK categories.			
CWMin/CWMax	<b>CWMin</b> means contention Window-Min and <b>CWMax</b> means contention Window-Max. Please specify the value ranging from			



	1 to 15. Be aware that CWMax value must be greater than CWMin or equals to CWMin value. Both values will influence the time delay for WMM accessing categories. The difference between AC_VI and AC_VO categories must be smaller; however, the difference between AC_BE and AC_BK categories must be greater.
Тхор	It means transmission opportunity. For WMM categories of AC_VI and AC_VO that need higher priorities in data transmission, please set greater value for them to get highest transmission opportunity. Specify the value ranging from 0 to 65535.
ACM	It is an abbreviation of Admission control Mandatory. It can restrict stations from using specific category class if it is checked. <b>Note:</b> VigorAP710 provides standard WMM configuration in the web page. If you want to modify the parameters, please refer to the Wi-Fi WMM standard specification.
AckPolicy	"Uncheck" (default value) the box means the AP router will answer the response request while transmitting WMM packets through wireless connection. It can assure that the peer must receive the WMM packets. "Check" the box means the AP router will not answer any
	response request for the transmitting packets. It will have better performance with lower reliability.

**Dray** Tek

## 3.7.9 Bandwidth Management

The downstream or upstream from FTP, HTTP or some P2P applications will occupy large of bandwidth and affect the applications for other programs. Please use Bandwidth Management to make the bandwidth usage more efficient.

SS	ID 1	SSID 2	SSID 3	SSID 4			
	SSID			!k			
Per Station Bandwidth Limit			mit				
	Enable	9	<b>~</b>				
	Upload Limit			defined 💌	К	bps (Default unit : K	0
	Download Limit			defined 💌	К	bps (Default unit : K	)
	Auto Adjustment		$\checkmark$	$\checkmark$			
	Total Upload Limit		User	defined 💌	К	bps (Default unit : K	0
Total Download Limit			128K	*		bps	
Note:	<ul> <li>new 1. Download : Traffic going to any station. Upload : Traffic being sent from a wireless station.</li> <li>2. Allow auto adjustment could make the best utilization of available bandwidth.</li> </ul>						

Wireless LAN >> Bandwidth Management

OK Cancel

Item	Description
SSID	Display the specific SSID name.
Enable	Check this box to enable the bandwidth management for clients.
Upload Limit	Define the maximum speed of the data uploading which will be used for the wireless stations connecting to VigorAP with the same SSID.
	Use the drop down list to choose the rate. If you choose <b>User defined</b> , you have to specify the rate manually.
Download Limit	Define the maximum speed of the data downloading which will be used for the wireless station connecting to VigorAP with the same SSID.
	Use the drop down list to choose the rate. If you choose <b>User defined</b> , you have to specify the rate manually.
Auto Adjustment	Check this box to have the bandwidth limit determined by the system automatically.
Total Upload Limit	When Auto Adjustment is checked, the value defined here will be treated as the total bandwidth shared by all of the wireless stations with the same SSID for data uploading.
Total Download Limit	When Auto Adjustment is checked, the value defined here will be treated as the total bandwidth shared by all of the wireless stations with the same SSID for data downloading.

After finishing this web page configuration, please click **OK** to save the settings.

## 3.7.10 Airtime Fairness

Airtime fairness is essential in wireless networks that must support critical enterprise applications.

Most of the applications are either symmetric or require more downlink than uplink capacity; telephony and email send the same amount of data in each direction, while video streaming and web surfing involve more traffic sent from access points to clients than the other way around. This is essential for ensuring predictable performance and quality-of-service, as well as allowing 802.11n and legacy clients to coexist on the same network. Without airtime fairness, offices using mixed mode networks risk having legacy clients slow down the entire network or letting the fastest client(s) crowd out other users.

With airtime fairness, every client at a given quality-of-service level has equal access to the network's airtime.

The wireless channel can be accessed by only one wireless station at the same time.

The principle behind the IEEE802.11 channel access mechanisms is that each station has *equal probability* to access the channel. When wireless stations have similar data rate, this principle leads to a fair result. In this case, stations get similar channel access time which is called airtime.

However, when stations have various data rate (e.g., 11g, 11n), the result is not fair. The slow stations (11g) work in their slow data rate and occupy too much airtime, whereas the fast stations (11n) become much slower.

Take the following figure as an example, both Station A(11g) and Station B(11n) transmit data packets through VigorAP 710. Although they have equal probability to access the wireless channel, Station B(11n) gets only a little airtime and waits too much because Station A(11g) spends longer time to send one packet. In other words, Station B(fast rate) is obstructed by Station A(slow rate).



To improve this problem, Airtime Fairness is added for VigorAP 710. Airtime Fairness function tries to assign *similar airtime* to each station (A/B) by controlling TX traffic. In the following figure, Station B(11n) has higher probability to send data packets than Station A(11g). By this way, Station B(fast rate) gets fair airtime and it's speed is not limited by Station A(slow rate).

**Dray** Tek

Station A	11g	Packet						Packet					
Station B	11n		Ρ	P	P	P	P		Ρ	P	Ρ	-	Time

It is similar to automatic Bandwidth Limit. The dynamic bandwidth limit of each station depends on instant active station number and airtime assignment. Please note that Airtime Fairness of 2.4GHz and 5GHz are independent. But stations of different SSIDs function together, because they all use the same wireless channel. IN SPECIFIC ENVIRONMENTS, this function can reduce the bad influence of slow wireless devices and improve the overall wireless performance.

Suitable environment:

- (1) Many wireless stations.
- (2) All stations mainly use download traffic.
- (3) The performance bottleneck is wireless connection.

Wireless LAN >> Airtime Fairness

Enable Airtime Fairness
Triggering Client Number (2-64) 2 (default: 2)
Note : Please enable or disable this function according to the real situation and user experience. It is NOT suitable for all environments.
OK Cancel

Available settings are explained as follows:

Item	Description					
Enable Airtime Fairness	Try to assign similar airtime to each wireless station by controlling TX traffic.					
	<b>Airtime Fairness</b> – Click the link to display the following screen of airtime fairness note.					
	Wareless Artime Fairness - Google Chrome					
	<ul> <li>172.17.3.110/wireless/ap_af_note.asp</li> <li>Airtime Fairness Note:         <ul> <li>Airtime Fairness Note:</li> <li>Airtime is the time where a wireless station occupies the wireless channel. Airtime Fairness function tries to assign similar airtime to each station by controlling TX traffic. IN SPECIFIC ENVIRONMENTS, this function can reduce the bad influence of slow wireless devices and improve the overall wireless performance.</li> <li>Suitable environment : (1) Many wireless stations. (2) All stations mainly use download traffic. (3) The performance bottleneck is wireless connection.</li> <li>Traggering Client Number: Airtime Fairness function is applied only when active station number achieves this number.</li> </ul> </li> </ul>					

After finishing this web page configuration, please click **OK** to save the settings.



**Note**: Airtime Fairness function and Bandwidth Limit function should be mutually exclusive. So their webs have extra actions to ensure these two functions are not enabled simultaneously.

## 3.7.11 Station Control

Station Control is used to specify the duration for the wireless client to connect and reconnect VigorAP. If such function is not enabled, the wireless client can connect VigorAP until it shuts down.

Such feature is especially useful for free Wi-Fi service. For example, a coffee shop offers free Wi-Fi service for its guests for one hour every day. Then, the connection time can be set as "1 hour" and reconnection time can be set as "1 day". Thus, the guest can finish his job within one hour and will not occupy the wireless network for a long time.

Note: Up to 300 Wireless Station records are supported by VigorAP.

#### Wireless LAN >> Station Control

	CCID 2	CCID 2	CCID 4
SSID 1	SSID 2	SSID 3	SSID 4
SSID		DrayTek	
Enable			
Connec	tion Time	1 hour	*
Reconn	ection Time	1 day	*
<b>Display</b>	All Station Contro	<u>l List</u>	

Note: Once the feature is enabled, the connection time quota will apply to each wireless client (identified by MAC address).

ОК	Cancel
	Cancer

Item	Description					
SSID	Display the SSID that the wireless station will use it to connect with Vigor router.					
Enable	Check the box to enable the station control function.					
Connection Time / Reconnection Time	Use the drop down list to choose the duration for the wireless client connecting /reconnecting to Vigor router. Or, type the duration manually when you choose <b>User defined</b> . 1 day 1440 min User defined 30 min 1 hour 2 hours 4 hours 4 hours 5 days 5 days 6 days 7 days					
Display All Station Control List	All the wireless stations connecting to Vigor router by using such SSID will be listed on Station Control List.					



After finishing all the settings here, please click **OK** to save the configuration.

## 3.7.12 Roaming

The network signal for a single wireless access point might be limited by its coverage range. Therefore, if you want to expand the wireless network in a large exhibition with a quick method, you can install multiple access points with enabling the Roaming feature for each AP to reach the purpose of expanding wireless signals seamlessly.

These access points connecting for each other shall be verified by pre-authentication. This page allows you to enable the roaming feature and the pre-authentication.

#### Wireless LAN (2.4GHz) >> Roaming

1 • Mbps
-73 dBm (42 %) (Default: -73)
-66 dBm (60 %) (Default: -66)
5 dBm (Default: 5)
10 minute(s) (10 ~ 600) (Default: 10)

Item	Description
AP-assisted Client Roaming Parameters	When the link rate of wireless station is too low or the signal received by the wireless station is too worse, VigorAP 710 will automatically detect (based on the link rate and RSSI requirement) and cut off the network connection for that wireless station to assist it to connect another Wireless AP to get better signal.
	<b>Minimum Basic Rate</b> – Check the box to use the drop down list to specify a basic rate ( <b>Mbps</b> ). When the link rate of the wireless station is below such value, VigorAP 710 will terminate the network connection for that wireless station.
	<b>Disable RSSI Requirement -</b> If it is selected, VigorAP will not terminate the network connection based on RSSI.
	<b>Strictly Minimum RSSI</b> - VigorAP uses RSSI (received signal strength indicator) to decide to terminate the network connection of wireless station. When the signal strength is below the value ( <b>dBm</b> ) set here, VigorAP 710 will terminate the network connection for that wireless station.
	Minimum RSSI - When the signal strength of the wireless station is below the value (dBm) set here and adjacent AP (must be DrayTek AP and support such feature too) with higher signal strength value (defined in the field of With Adjacent AP RSSI over) is detected by VigorAP 710, VigorAP 710 will terminate the network connection for that wireless station. Later, the



	wireless station can connect to the adjacent AP (with better RSSI).		
	• With Adjacent AP RSSI over – Specify a value as a threshold.		
Fast Roaming	<b>Enable</b> – Check the box to enable fast roaming configuration.		
(WPA/802.1x)	<b>PMK Caching: Cache Period -</b> Set the expire time of WPA2 PMK (Pairwise master key) cache. PMK Cache manages the list from the BSSIDs in the associated SSID with which it has pre-authenticated. Such feature is available for <b>WPA2/802.1</b> mode.		
	<b>Pre-Authentication -</b> Enables a station to authenticate to multiple APs for roaming securer and faster. With the pre-authentication procedure defined in IEEE 802.11i specification, the pre-four-way-handshake can reduce handoff delay perceivable by a mobile node. It makes roaming faster and more secure. (Only valid in WPA2)		
	<b>Enable</b> - Enable IEEE 802.1X Pre-Authentication.		
	<b>Disable</b> - Disable IEEE 802.1X Pre-Authentication.		

### 3.7.13 Station List

**Station List** provides the knowledge of connecting wireless clients now along with its status code. Each tab (general, advanced, control, neighbor) will display different status information (including MAC address, Vendor, SSID, Auth, Encrypt, Tx/Rx Rate, Hostname, RSSI, Link Speed, BW, PSM, WMM, PHMd, MCS, Connection Time, Reconnection Time, Approx. Distance, Visit Time, and so on).

Wireless	LAN	>>	Station	List

Station	List

			General	Advanced	Control	Neighbor
MAC	Address	Vendor	RSSI	Approx. Distance	SSID V	'isit Time
8:FF:	28:FC:2A:C1	LiteonTe	34% (-76d)	Bm) 35.48m	N/A	0d:0h:
0:26:	C7:40:C8:64	Intel	26% (-79dl	Bm) 50.12m	N/A	0d:0h:
0:5A:	3A:AB:18:F2	ASUStekC	63% (−65dl	Bm) 10.00m	N/A	0d:0h:
0:00:	OB:04:CE:5A	Intel	60%(-66dl	Bm) 11.22m	N/A	0d:0h:
0:1F:	3C:76:96:DE	Intel	60% (-66ପା	Bm) 11.22m	N/A	0d:0h:
8:C6:	63:DC:32:E6	Apple	50% (-70dl	Bm) 17.78m	N/A	0d:0h:
4:0B:	1A:B6:6E:7D	HTC	89% (−55dl	Bm) 3.16m	N/A	0d:0h:
8:FF:	28:26:B0:E1	LiteonTe	44% (-72di	Bm) 22.39m	N/A	0d:0h:
			Refre	esh		
Acces	s Control :					
MAC	Address :		:			
	8: FF: 0: 26: 0: 5A: 0: 00: 1F: 8: C6: 4: 0B: 8: FF: 8: FF:	D:26:C7:40:C8:64 D:5A:3A:AB:18:F2 D:00:0B:04:CE:5A D:1F:3C:76:96:DE B:C6:63:DC:32:E6 4:0B:1A:B6:6E:7D	8: FF: 28: FC: 2A: C1 LiteonTe D: 26: C7: 40: C8: 64 Intel D: 5A: 3A: AB: 18: F2 ASUStekC D: 00: OB: 04: CE: 5A Intel D: 1F: 3C: 76: 96: DE Intel 8: C6: 63: DC: 32: E6 Apple 4: OB: 1A: E6: 6E: 7D HTC 8: FF: 28: 26: E0: E1 LiteonTe Access Control:	MAC Address         Vendor         RSSI           3:FF:28:FC:2A:C1         LiteonTe         34%(-76d)           0:26:C7:40:C8:64         Intel         26%(-79d)           0:5A:3A:AB:18:F2         ASUStekC         63%(-65d)           0:00:0B:04:CE:5A         Intel         60%(-66d)           0:1F:3C:76:96:DE         Intel         60%(-66d)           0:06:63:DC:32:E6         Apple         50%(-70d)           4:0B:1A:B6:6E:7D         HTC         89%(-55d)           8:FF:28:26:B0:E1         LiteonTe         44%(-72d)	MAC Address         Vendor         RSSI         Approx. Distance           8:FF:28:FC:2A:C1         LiteonTe         34%(-76dBm)         35.48m           0:26:C7:40:C8:64         Intel         26%(-79dBm)         50.12m           0:5A:3A:AB:18:F2         ASUStekC         63%(-65dBm)         10.00m           0:00:0B:04:CE:5A         Intel         60%(-66dBm)         11.22m           0:1F:3C:76:96:DE         Intel         60%(-66dBm)         17.78m           8:C6:63:DC:32:E6         Apple         50%(-70dBm)         17.78m           4:0B:1A:B6:6E:7D         HTC         89%(-55dBm)         3.16m           8:FF:28:26:B0:E1         LiteonTe         44%(-72dBm)         22.39m	MAC Address         Vendor         RSSI         Approx. Distance         SSID         W           3: FF:28: FC:2A:C1         LiteonTe         34% (-76dBm)         35.48m         N/A           0:26: C7:40:C8:64         Intel         26% (-79dBm)         50.12m         N/A           0:5A: 3A:AB:18: F2         ASUStekC         63% (-65dBm)         10.00m         N/A           0:00:0B:04: CE: 5A         Intel         60% (-66dBm)         11.22m         N/A           0:1F: 3C: 76: 96: DE         Intel         60% (-66dBm)         17.78m         N/A           3:C6: 63: DC: 32: E6         Apple         50% (-70dBm)         17.78m         N/A           4:0B: LA: B6: 6E: 7D         HTC         89% (-55dBm)         3.16m         N/A           8: FF: 28: 26: B0: E1         LiteonTe         44% (-72dBm)         22.39m         N/A

2. Due to the differences in signal strength for different devices, the calcuated value of

approximate distance also might be different.

3. Trademarks and brand names are the properties of their respective owners.

Add

	Item	Description
--	------	-------------



MAC Address	Display the MAC Address for the connecting client.
SSID	Display the SSID that the wireless client connects to.
Auth	Display the authentication that the wireless client uses for connection with such AP.
Encrypt	Display the encryption mode used by the wireless client.
Tx Rate/Rx Rate	Display the transmission /receiving rate for packets.
Refresh	Click this button to refresh the status of station list.
Add to Access Control	<b>Client's MAC Address</b> - For additional security of wireless access, the Access Control facility allows you to restrict the network access right by controlling the wireless LAN MAC address of client. Only the valid MAC address that has been configured can access the wireless LAN interface.
Add	Click this button to add current typed MAC address into Access Control.

#### General

Display general information (e.g., MAC Address, SSID, Auth, Encrypt, TX/RX Rate) for the station.

#### Advanced

Display more information (e.g., AID, PSM, WMM, RSSI PhMd, BW, MCS, Rate) for the station.

#### Control

Display connection and reconnection time of the wireless stations.

#### Neighbor

Display more information for the neighboring wireless stations.

# **3.8 Wireless LAN Settings for Universal Repeater Mode**

When you choose Universal Repeater as the operation mode, the Wireless LAN menu items will include General Setup, Security, Access Control, WPS, Advanced Setting, AP Discovery, Universal Repeater, WMM Configuration, Airtime Fairness, Station Control, Roaming and Station List.

Wireless LAN
General Setup
Security
Access Control
WPS
Advanced Setting
AP Discovery
Universal Repeater
WMM Configuration
Bandwidth Management
Airtime Fairness
Station Control
Roaming
Station List

Wireless LAN >> General Setup

## 3.8.1 General Setup

By clicking the **General Setup**, a new web page will appear so that you could configure the SSID and the wireless channel.

Please refer to the following figure for more information.

General	Sett	ting ( IEE	E 802.	.11)					
🗹 En	able	e Wirele	ess LA	N					
		Enable	: Limit	Client	t (3-64) 64 (a	lefault: (	54)		
		Enable	Limit	Client	t per SSID (3-64	default:	64)		
	Мос	de :			Mixed(11b+11g+11n) 💌				
	Cha	annel :			2462MHz (Chan	nel 1: 🔽			
	Ext	ension	Chan	nel :	I : 2442MHz (Channel 7) 💙				
	Enable Hide			SSID		e Isolate Member	VLAN ID (0:Untagged)		
	1			Dray	(Tek			0	
	2							0	
	З							0	
	4					]		0	
	Isola	SSID: ate LAN: ate Men		Wire PCs Wire	on LAN.	ions) wit	th the sa	me SSID cannot access wired me SSID cannot access for	
					Гок		Cancel		

Item	Description



Enable Wireless LAN	Check the box to enable wireless function.		
Enable Limit Client	Check the box to set the maximum number of wireless stations which try to connect Internet through Vigor router. The number you can set is from 3 to 64.		
Enable Limit Client per SSID	Define the maximum number of wireless stations per SSID which try to connect to Internet through Vigor device. The number you can set is from 3 to 64.		
Mode	At present, VigorAP 710 can connect to 11b only, 11g only, 11n only, Mixed (11b+11g), Mixed (11g+11n) and Mixed (11b+11g+11n) stations simultaneously. Simply choose Mixed (11b+11g+11n) Mixed(11b+11g+11n) 11b Only 11n Only 11n Only Mixed(11b+11g) II Mixed(11b+11g) II Mixed(11b+11g+11n) Mixed(11b+11g+11n)		
Channel	Means the channel of frequency of the wireless LAN. You may switch channel if the selected channel is under serious interference. If you have no idea of choosing the frequency, please select <b>AutoSelect</b> to let system determine for you. 2437MHz (Channel 6) AutoSelect 2412MHz (Channel 1) 2417MHz (Channel 2) 2422MHz (Channel 3) 2427MHz (Channel 3) 2427MHz (Channel 4) 2432MHz (Channel 5) 2437MHz (Channel 6) 2442MHz (Channel 6) 2442MHz (Channel 7) 2447MHz (Channel 8) 2452MHz (Channel 10) 2462MHz (Channel 11) 2467MHz (Channel 12) 2472MHz (Channel 13)		
Extension Channel	With 802.11n, there is one option to double the bandwidth per channel. The available extension channel options will be varied according to the <b>Channel</b> selected above. Configure the extension channel you want.		
Enable	SSID #1 is enabled in default. SSID #2 ~ #4 can be enabled manually.		
Hide SSID	Check it to prevent from wireless sniffing and make it harder for unauthorized clients or STAs to join your wireless LAN. Depending on the wireless utility, the user may only see the information except SSID or just cannot see any thing about VigorAP 710 while site surveying. The system allows you to		



	set three sets of SSID for different usage.
SSID	Set a name for VigorAP 710 to be identified. Default setting is DrayTek.
Isolate LAN	Check this box to make the wireless clients (stations) with the same SSID not accessing for wired PC in LAN.
Isolate Member	Check this box to make the wireless clients (stations) with the same SSID not accessing for each other.
VLAN ID	Type the value for such SSID. Packets transferred from such SSID to LAN will be tagged with the number.
	If your network uses VLANs, you can assign the SSID to a VLAN on your network. Client devices that associate using the SSID are grouped into this VLAN. The VLAN ID range is from 3 to 4095. The VLAN ID is 0 by default, it means disabling the VLAN function for the SSID.

## 3.8.2 Security

This page allows you to set security with different modes for SSID 1, 2, 3 and 4 respectively. After configuring the correct settings, please click **OK** to save and invoke it.

By clicking the **Security Settings**, a new web page will appear so that you could configure the settings.

```
Wireless LAN >> Security Settings
```

SSID 1 SSID 2	SSID 3 SSID 4	
SSID	DrayTek	
Mode	Mixed(WPA+WPA2)/PSK 💙	
Set up <u>RADIUS Serv</u> WPA	<u>rer</u> if 802.1x is enabled.	
	0	
WPA Algorithms	OTKIP OAES ⊙TKIP/AES	
Pass Phrase	•••••	
Key Renewal Interv	al 3600 seconds	
WEP		
○ Key 1 :		Hex 💌
● Key 2 :		Hex 💌
○ Кеу 3 :		Hex 💌
○ Key 4 :		Hex 💌
802.1× WEP	O Disable O Enable	

Available settings are explained as follows:

Item	Description
Mode	There are several modes provided for you to choose.

**Dray** Tek

	Disable Disable WEP WPA/PSK WPA2/PSK Mixed(WPA+WPA2)/PSK WEP/802.1x WPA/802.1x WPA2/802.1x WPA2/802.1x Mixed(WPA+WPA2)/802.1x
	<b>Disable</b> - The encryption mechanism is turned off.
	<b>WEP</b> - Accepts only WEP clients and the encryption key should be entered in WEP Key.
	WPA/PSK or WPA2/PSK or Mixed (WPA+WPA2)/PSK - Accepts only WPA clients and the encryption key should be entered in PSK. The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication.
	<b>WEP/802.1x</b> - The built-in RADIUS client feature enables VigorAP 710 to assist the remote dial-in user or a wireless station and the RADIUS server in performing mutual authentication. It enables centralized remote access authentication for network management.
	The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication. Select WPA, WPA2 or Auto as WPA mode.
	<b>WPA/802.1x</b> - The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication.
	<b>WPA2/802.1x</b> - The WPA encrypts each frame transmitted from the radio using the key, which either PSK (Pre-Shared Key) entered manually in this field below or automatically negotiated via 802.1x authentication.
WPA Algorithms	Select TKIP, AES or TKIP/AES as the algorithm for WPA. Such feature is available for WPA2/802.1x, WPA/802.1x, WPA/PSK or WPA2/PSK or Mixed (WPA+WPA2)/PSK mode.
Pass Phrase	Type either <b>8~63</b> ASCII characters, such as 012345678 or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde". Such feature is available for <b>WPA/PSK or WPA2/PSK or</b> <b>Mixed (WPA+WPA2)/PSK</b> mode.
Key Renewal Interval	WPA uses shared key for authentication to the network. However, normal network operations use a different encryption key that is randomly generated. This randomly generated key that is periodically replaced. Enter the renewal security time (seconds) in the column. Smaller interval leads to greater security but lower performance. Default is 3600



	seconds. Set 0 to disable re-key. Such feature is available for WPA2/802.1,WPA/802.1x, WPA/PSK or WPA2/PSK or Mixed (WPA+WPA2)/PSK mode.
Key 1 – Key 4	Four keys can be entered here, but only one key can be selected at a time. The format of WEP Key is restricted to 5 ASCII characters or 10 hexadecimal values in 64-bit encryption level, or restricted to 13 ASCII characters or 26 hexadecimal values in 128-bit encryption level. The allowed content is the ASCII characters from 33(!) to 126(~) except '#' and ','. Such feature is available for <b>WEP</b> mode.
802.1x WEP	<b>Disable</b> - Disable the WEP Encryption. Data sent to the AP will not be encrypted.
	<b>Enable</b> - Enable the WEP Encryption.
	Such feature is available for WEP/802.1x mode.

Click the link of **RADIUS Server** to access into the following page for more settings.

RADIUS Server	
Use internal RADIUS Server	
IP Address	0
Port	1812
Shared Secret	DrayTek
Session Timeout	0
	ОК

Item	Description	
Use internal RADIUS Server	There is a RADIUS server built in VigorAP 710 which is used to authenticate the wireless client connecting to the access point. Check this box to use the internal RADIUS server for wireless security.	
	Besides, if you want to use the external RADIUS server for authentication, do not check this box.	
	Please refer to the section, <b>3.9 RADIUS Setting</b> to configure settings for internal server of VigorAP 710.	
IP Address	Enter the IP address of external RADIUS server.	
Port	The UDP port number that the external RADIUS server is using. The default value is 1812, based on RFC 2138.	
Shared Secret	The external RADIUS server and client share a secret that is used to authenticate the messages sent between them. Both sides must be configured to use the same shared secret.	
Session Timeout	Set the maximum time of service provided before re-authentication. Set to zero to perform another authentication immediately after the first authentication has successfully	

completed. (The unit is second.)

## 3.8.3 Access Control

For additional security of wireless access, the **Access Control** facility allows you to restrict the network access right by controlling the wireless LAN MAC address of client. Only the valid MAC address that has been configured can access the wireless LAN interface. By clicking the **Access Control**, a new web page will appear, as depicted below, so that you could edit the clients' MAC addresses to control their access rights (deny or allow).

SSID 1	SSID 2	SSID 3	SSID 4	
		SID: DrayTek	0010 1	
		olicy: Disable		~
	F	Disable		
		MAG	CAddress Filter	
	Index	<	MAC A	Address
	Client's M	AC Address :	:	
	Add	Delete	Edit Ca	ancel Limit:256 entries
		ОК	Cance	el
Backup ACL Cfg : Backup		Upload From Fil Restore	e: Choose File	) No file chosen

Wireless LAN >> Access Control

Item	Description	
Policy	Select to enable any one of the following policy or disable the policy. Choose Activate MAC address filter to type in the MAC addresses for other clients in the network manually. Choose Blocked MAC address filter, so that all of the devices with the MAC addresses listed on the MAC Address Filter table will be blocked and cannot access into VigorAP 710.          Activate MAC address filter         Disable         Activate MAC address filter         Blocked MAC address filter	
MAC Address Filter	Display all MAC addresses that are edited before.	
Client's MAC Address	Manually enter the MAC address of wireless client.	
Add	Add a new MAC address into the list.	

Delete	Delete the selected MAC address in the list.	
Edit	Edit the selected MAC address in the list.	
Cancel	Give up the access control set up.	
Backup	Click it to store the settings (MAC addresses on MAC Addres Filter table) on this page as a file.	
Restore	Click it to restore the settings (MAC addresses on MAC Address Filter table) from an existed file.	

#### 3.8.4 WPS

Open Wireless LAN>>WPS to configure the corresponding settings.

🔲 Enable WPS 🗋

Wi-Fi Protected Setup Information	
WPS Configured	Yes
WPS SSID	DrayTek
WPS Auth Mode	Mixed(WPA+WPA2)/PSK
WPS Encrypt Type	TKIP/AES

#### Device Configure

Configure via Push Button	Start PBC
Configure via Client PinCode	Start PIN
Status: Not used	

Status: Not used

Note: WPS can help your wireless client automatically connect to the Access point.

😳 : WPS is Disabled.

😳: WPS is Enabled.

ᅆ: Waiting for WPS requests from wireless clients.

Item	Description	
Enable WPS	Check this box to enable WPS setting.	
WPS Configured	Display related system information for WPS. If the wireless security (encryption) function of VigorAP 710 is properly configured, you can see 'Yes' message here.	
WPS SSID	Display current selected SSID.	
WPS Auth Mode	Display current authentication mode of the VigorAP 710. Only WPA2/PSK and WPA/PSK support WPS.	
WPS Encrypt Type	Display encryption mode (None, WEP, TKIP, AES, etc.) of VigorAP 710.	
Configure via Push Button	Click <b>Start PBC</b> to invoke Push-Button style WPS setup procedure. VigorAP 710 will wait for WPS requests from wireless clients about two minutes. The WPS LED on VigorAP 710 will blink fast when WPS is in progress. It will return to normal condition after two minutes. (You need to setup WPS within two minutes)	
Configure via Client	Type the PIN code specified in wireless client you wish to connect, and click <b>Start PIN</b> button. The WLAN LED on	



PinCode	VigorAP 710 will blink fast when WPS is in progress. It will return to normal condition after two minutes. (You need to
	setup WPS within two minutes).

# 3.8.5 Advanced Setting

This page is to determine which algorithm will be selected for wireless transmission rate.

#### Wireless LAN >> Advanced Setting

	🔘 20 MHz 💿 Auto 20/40 MHz 🔵 40 MHz
Tx Burst	◯Enable ⊙Disable (For 11g mode only)
	⊙2T2R ◯1T1R
	⊙100% ○80% ○60% ○30% ○20% ○10%
rithm	💿 New 🔘 Old
6 - 2346)	2346 bytes
47)	2347 bytes
	( <u>Reference</u> )
l Out List	1 2 3 4 5 6 7 8 9 10 11 12 13
	○Enable ⊙Disable
	SSIDs and the Wireless client.Please notice that the last s must be a multiple of 8.
	6 - 2346) 47) I Out List e MAC address of

OK Cancel

Item	Description	
Channel Width	<b>20 MHZ-</b> the AP will use 20Mhz for data transmission and receiving between the AP and the stations.	
	<b>Auto 20/40 MHZ</b> – the AP will use 20Mhz or 40Mhz for data transmission and receiving according to the station capability. Such channel can in	
	<b>40 MHZ-</b> the AP will use 40Mhz for data transmission and receiving between the AP and the stations.	
Packet-OVERDRIVE	This feature can enhance the performance in data transmission about 40%* more (by checking <b>Tx Burs</b> t). It is active only when both sides of Access Point and Station (in wireless client) invoke this function at the same time. That is, the wireless client must support this feature and invoke the function, too.	
	<b>Note:</b> Vigor N61 wireless adapter supports this function. Therefore, you can use and install it into your PC for matching with Packet-OVERDRIVE (refer to the following picture of Vigor N61 wireless utility window, choose <b>Enable</b> for <b>TxBURST</b> on the tab of <b>Option</b> ).	

	Vigor N61 802.11n Wireless USB Adapter Utility	X				
	Configuration Status Option About					
	General Setting Advance Setting					
	🔽 Auto launch when Windows start up	Disable Radio				
	Remember mini status position	Eragmentation Threshold : 2346				
	Auto <u>h</u> ide mini status	RTS Threshold : 2347				
	Set <u>m</u> ini status always on top	Frequency : 802.11b/g/n - 2.4GH 💌				
	Enable IP Setting and Proxy Setting in Profile	Ad-hoc Channel:				
	Group Roaming Ad-hoc	Power Save Mode:				
	Action	Tx Burst : Disable				
	WLAN type to connect ③ Infrastructure and A4-hoc getwork ③ Infrastructure getwork only					
	Ad-hoc network only					
	Automatically connect to non-preferred networks					
		OK Cancel Apply				
		Con Caper reper				
Antenna	VigorAP 710 can be attach	ed with two antennas to have good				
	data transmission via wirele	ess connection. However, if you				
	have only one antenna attac					
	have only one antenna attac	filed, please enouse 1111.				
	2T2R 🔽					
	2T2R					
	1T1R					
Tx Power	The default setting is the m	avimum (100%) Lowering down				
IXFOWER	-	aximum (100%). Lowering down				
	the value may degrade rang	e and throughput of wireless.				
	100%					
	100% 🚩					
	100%					
	80%					
	60%					
	30%					
	20%					
	10%					
Rate Adaptation	Wireless transmission rate	is adapted dynamically. Usually,				
Algorithm	performance of "new" algo	rithm is better than "old".				
8						
Fragment Length	Set the Fragment threshold	of wireless radio. Do not modify				
2 0		now what it is, default value is $234$				
RTS Threshold	Minimize the collision (uni	t is bytes) between hidden station				
	to improve wireless perform					
	· ·					
		reless radio. Do not modify defau				
	value if you don't know wh	at it is, default value is 2347.				
0 4 0 1	X' ADI 1 (	1 1 6 11 : 1 000 11 1				
Country Code		y codes by following the 802.11d				
		vireless stations will detect / scan				
	the country code to prevent	conflict occurred. If conflict is				
		ill be warned and is unable to mal				
	-					
		Fore, changing the country code to				
		connection will be necessary for				
	some clients.					
	The calcoted wineless share	nels will be discarded if AutoSele				
Auto Channel		iers will be discarded if AutoSele				
		is selected as Channel selection mode in Wireless				
	is selected as Channel sele	ction mode in Wireless				
		ction mode in Wireless				
Auto Channel Filtered Out List	is selected as <b>Channel</b> sele <b>LAN&gt;&gt;General Setup</b> .					
	is selected as <b>Channel</b> sele <b>LAN&gt;&gt;General Setup</b> . Click <b>Enable</b> and manually	r enter the MAC address of the AC address of other SSIDs will				



change based on this MAC address.

## 3.8.6 AP Discovery

VigorAP 710 can scan all regulatory channels and find working APs in the neighborhood. Based on the scanning result, users will know which channel is clean for usage. Also, it can be used to facilitate finding an AP for a WDS link. Notice that during the scanning process (about 5 seconds), no client is allowed to connect to Vigor.

This page is used to scan the existence of the APs on the wireless LAN. Yet, only the AP which is in the same channel of VigorAP 710 can be found. Please click **Scan** to discover all the connected APs.

Wireless LAN >> Access Point Discovery

							📃 Enable AP Monitor Mode			
Select	Index	SSID	BSSID	RSSI	Channel	Encryption	Authentication	Mode	Ch. Width	
$\bigcirc$	1	staffs	00:1d:aa:9c:fb:28	50%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20	
0	2	staffs_5F	00:1d:aa:3d:af:d6	100%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20	
$\circ$	З	guests	02:1d:aa:3c:af:d6	100%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20	
$\bigcirc$	4	staffs	02:1d:aa:3d:af:d6	100%	1	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20	
$\bigcirc$	5	guests	06:1d:aa:b0:bc:90	100%	6	AES	WPA2/PSK	11b/g/n	20	
$\bigcirc$	6	staffs_6F	00:1d:aa:b0:bc:90	91%	6	AES	WPA2/PSK	11b/g/n	20	
$\bigcirc$	7	staffs	02:1d:aa:b0:bc:90	100%	6	AES	WPA2/PSK	11b/g/n	20	
$\bigcirc$	8	staffs_4F	00:1d:aa:9d:68:ac	76%	8	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20	
$\bigcirc$	9	staffs	02:1d:aa:9d:68:ac	86%	8	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20	
$\bigcirc$	10	guests	0a:1d:aa:9d:68:ac	81%	8	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20	
0	11	V2832- RD2	00:1d:aa:f3:16:d0	55%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20	
$\circ$	12	V2832- RD2	00:1d:aa:f3:16:d1	65%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	20	
$\bigcirc$	13	DrayTek-LA	00:1d:aa:2a:5b:71	70%	11	TKIP/AES	Mixed(WPA+WPA2)/PSK	11b/g/n	40	
$\bigcirc$	14	DrayTek_Ia	00:1d:aa:00:00:00	81%	11	NONE		11b/g/n	20	

Scan

See Channel Interference

Note: During the scanning process (about 5 seconds), no station is allowed to connect with the AP.

```
AP's MAC Address : : : : : : : AP's SSID 
Select as Universal Repeater: Select
```

Each item is explained as follows:

Item	Description
Enable AP Monitor Mode	This function can help to get and keep the records of APs detected by such device after clicking Scan.
	In general, only the available AP will be detected by Vigor device. Once the AP is unavailable, it will be deleted from the Access Point List immediately. However, if such function is enabled, the system will keep the record of the AP (once detected by Vigor device) until it is available for Vigor device again.
SSID	Display the SSID of the AP scanned by VigorAP 710.
BSSID	Display the MAC address of the AP scanned by VigorAP 710.
RSSI	Display the signal strength of the access point. RSSI is the abbreviation of Receive Signal Strength Indication.
Channel	Display the wireless channel used for the AP that is scanned by VigorAP 710.
Encryption	Display the encryption mode for the scanned AP.



Authentication	Display the authentication type that the scanned AP applied.
Mode	Display the wireless connection mode that the scanned AP used.
Ch. Width	Display the channel width that the scanned AP used.
Scan	It is used to discover all the connected AP. The results will be shown on the box above this button
Channel Interference	Access into <b>Diagnostics&gt;&gt;Interference Monitor</b> for viewing interference status for channel(s).
<b>Channel Statistics</b>	It displays the statistics for the channels used by APs.
AP's MAC Address	If you want the found AP applying the WDS settings, please type in the AP's MAC address.
AP's SSID	To specify an AP to be applied with WDS settings, you can specify MAC address or SSID for the AP. Here is the place that you can type the SSID of the AP.
Select as Universal Repeater	In <b>Universal Repeater</b> mode, WAN would work as station mode and the wireless AP can be selected as a universal repeater. Choose one of the wireless APs from the Scan list.

## 3.8.7 Universal Repeater

The access point can act as a wireless repeater; it can be Station and AP at the same time. It can use Station function to connect to a Root AP and use AP function to serve all wireless stations within its coverage.

**Note:** While using **Universal Repeater** mode, the access point will demodulate the received signal. Please check if this signal is noise for the operating network, then have the signal modulated and amplified again. The output power of this mode is the same as that of WDS and normal AP mode.

#### Wireless LAN >> Universal Repeater

Universal Repeater Parameters	
SSID	
MAC Address (Optional)	
Channel	2462MHz (Channel 11) 💌
Security Mode	Open 💌
Encryption Type	None 💌
WEP Keys	
○ Key 1 :	Hex 💌
О Кеу 2 :	Hex 💌
О Кеу 3 :	Hex 💌
О Кеу 4 :	Hex 💌

Note : If Channel is modified, the Channel setting of AP would also be changed.

#### Universal Repeater IP Configuration

Connection Type	DHCP 💌	
Router Name	AP710	
	OK Cancel	

Item	Description
SSID	Set the name of access point that VigorAP 710 wants to connect to.
MAC Address (Optional)	Type the MAC address of access point that VigorAP 710 wants to connect to.
Channel	Means the channel of frequency of the wireless LAN. The default channel is 11. You may switch channel if the selected channel is under serious interference. If you have no idea of choosing the frequency, please select <b>AutoSelect</b> to let system determine for you.
Security Mode	There are several modes provided for you to choose. Each mode will bring up different parameters (e.g., WEP keys, Pass Phrase) for you to configure.

	Open  Open Shared WPA/PSK
Encryption Type for Open/Shared	WPA2/PSK This option is available when Open/Shared is selected as Security Mode. Choose None to disable the WEP Encryption. Data sent to the AP will not be encrypted. To enable WEP encryption for data transmission, please choose WEP.
	None V None WEP
	WEP Keys - Four keys can be entered here, but only one key can be selected at a time. The format of WEP Key is restricted to 5 ASCII characters or 10 hexadecimal values in 64-bit encryption level, or restricted to 13 ASCII characters or 26 hexadecimal values in 128-bit encryption level. The allowed content is the ASCII characters from 33(!) to 126(~) except '#' and ','.
	ASCII Hex
Encryption Type for WPA/PSK and WPA2/PSK	This option is available when WPA/PSK or WPA2/PSK is selected as <b>Security Mode</b> . Select <b>TKIP</b> or <b>AES</b> as the algorithm for WPA.
Pass Phrase	Either <b>8~63</b> ASCII characters, such as 012345678 (or 64 Hexadecimal digits leading by 0x, such as "0x321253abcde").
Connection Type	Choose DHCP or Static IP as the connection mode. <b>DHCP</b> – The wireless station will be assigned with an IP from Vigor router. <b>Static IP</b> – The wireless station shall specify a static IP for connecting to Internet via Vigor router. DHCP Static IP
	DHCP
Router Name	Type a name for the router as identification. Simply use the default name.
IP Address	This setting is available when <b>Static IP</b> is selected as <b>Connection Type</b> .



	Type an IP address with the same network segment of the LAN IP setting of the router. Such IP shall be different with any IP address in LAN.
Subnet Mask	This setting is available when <b>Static IP</b> is selected as <b>Connection Type</b> .
	Type the subnet mask setting which shall be the same as the one configured in LAN for the router.
Default Gateway	This setting is available when <b>Static IP</b> is selected as <b>Connection Type</b> .
	Type the gateway setting which shall be the same as the default gateway configured in LAN for the router.

### 3.8.8 WMM Configuration

WMM is an abbreviation of Wi-Fi Multimedia. It defines the priority levels for four access categories derived from 802.1d (prioritization tabs). The categories are designed with specific types of traffic, voice, video, best effort and low priority data. There are four accessing categories - AC\_BE, AC\_BK, AC\_VI and AC\_VO for WMM.

Wireless	LAN >>	WMM	Configuration
----------	--------	-----	---------------

MM Capable		(	🕽 Enable 🛛 💿 Dis	sable		
MM Paramete	rs of Access P	oint				
	Aifsn	CWMin	CWMax	Тхор	ACM	AckPolicy
AC_BE	3	15 💌	63 💌	O		
АС_ВК	7	15 💌	102: 💌	0		
AC_VI	1	7 💌	15 💌	94		
AC_VO	1	3 💌	7 💌	47		
/MM Paramete	rs of Station					
	Aifsn	CW	/Min	CWMax	Тхор	ACM
AC_BE	3	15	~	1023 💌	0	
AC_BK	7	15	~	1023 💌	0	
AC_VI	2	7	~	15 💌	94	
AC VO	2	3	*	7 💌	47	

Item	Description
WMM Capable	To apply WMM parameters for wireless data transmission, please click the <b>Enable</b> radio button.
Aifsn	It controls how long the client waits for each data transmission. Please specify the value ranging from 1 to 15. Such parameter will influence the time delay for WMM accessing categories. For the service of voice or video image, please set small value for AC_VI and AC_VO categories For the service of e-mail or web browsing, please set large value for AC_BE and AC_BK categories.



CWMin/CWMax	<b>CWMin</b> means contention Window-Min and <b>CWMax</b> means contention Window-Max. Please specify the value ranging from 1 to 15. Be aware that CWMax value must be greater than CWMin or equals to CWMin value. Both values will influence the time delay for WMM accessing categories. The difference between AC_VI and AC_VO categories must be smaller; however, the difference between AC_BE and AC_BK categories must be greater.
Тхор	It means transmission opportunity. For WMM categories of AC_VI and AC_VO that need higher priorities in data transmission, please set greater value for them to get highest transmission opportunity. Specify the value ranging from 0 to 65535.
ACM	It is an abbreviation of Admission control Mandatory. It can restrict stations from using specific category class if it is checked. <b>Note:</b> Vigor2120 provides standard WMM configuration in the web page. If you want to modify the parameters, please refer to the Wi-Fi WMM standard specification.
AckPolicy	"Uncheck" (default value) the box means the AP router will answer the response request while transmitting WMM packets through wireless connection. It can assure that the peer must receive the WMM packets. "Check" the box means the AP router will not answer any response request for the transmitting packets. It will have better performance with lower reliability.

### 3.8.9 Bandwidth Management

The downstream or upstream from FTP, HTTP or some P2P applications will occupy large of bandwidth and affect the applications for other programs. Please use Bandwidth Management to make the bandwidth usage more efficient.

#### Wireless LAN >> Bandwidth Management

SS	ID 1	SSID 2	SSID 3	SSID 4			
	SSID		DrayTe	k			
	Per Sta	tion Bandwid	th Limit				
	Enab	le					
	Uploa	ad Limit	User c	lefined 💌 K		bps (Default ( K)	
	Dowr	nload Limit	User d	lefined 💌 K	:	bps (Default ( K)	unit :
	Auto	Adjustment					
Note:	wirele	ss station. w auto adju				: Traffic being zation of avai	

OK Cancel



Available settings are explained as follows:

Item	Description
SSID	Display the specific SSID name.
Enable	Check this box to enable the bandwidth management for clients.
Upload Limit	Define the maximum speed of the data uploading which will be used for the wireless stations connecting to VigorAP with the same SSID. Use the drop down list to choose the rate. If you choose <b>User</b> <b>defined</b> , you have to specify the rate manually.
Download Limit	Define the maximum speed of the data downloading which will be used for the wireless station connecting to VigorAP with the same SSID. Use the drop down list to choose the rate. If you choose <b>User</b> <b>defined</b> , you have to specify the rate manually.
Auto Adjustment	Check this box to have the bandwidth limit determined by the system automatically.

After finishing this web page configuration, please click **OK** to save the settings.

### 3.8.10 Airtime Fairness

Airtime fairness is essential in wireless networks that must support critical enterprise applications.

Most of the applications are either symmetric or require more downlink than uplink capacity; telephony and email send the same amount of data in each direction, while video streaming and web surfing involve more traffic sent from access points to clients than the other way around. This is essential for ensuring predictable performance and quality-of-service, as well as allowing 802.11n and legacy clients to coexist on the same network. Without airtime fairness, offices using mixed mode networks risk having legacy clients slow down the entire network or letting the fastest client(s) crowd out other users.

With airtime fairness, every client at a given quality-of-service level has equal access to the network's airtime.

The wireless channel can be accessed by only one wireless station at the same time.

The principle behind the IEEE802.11 channel access mechanisms is that each station has *equal probability* to access the channel. When wireless stations have similar data rate, this principle leads to a fair result. In this case, stations get similar channel access time which is called airtime.

However, when stations have various data rate (e.g., 11g, 11n), the result is not fair. The slow stations (11g) work in their slow data rate and occupy too much airtime, whereas the fast stations (11n) become much slower.

Take the following figure as an example, both Station A(11g) and Station B(11n) transmit data packets through VigorAP 710. Although they have equal probability to access the wireless channel, Station B(11n) gets only a little airtime and waits too much because Station A(11g) spends longer time to send one packet. In other words, Station B(fast rate) is obstructed by Station A(slow rate).





To improve this problem, Airtime Fairness is added for VigorAP 710. Airtime Fairness function tries to assign *similar airtime* to each station (A/B) by controlling TX traffic. In the following figure, Station B(11n) has higher probability to send data packets than Station A(11g). By this way, Station B(fast rate) gets fair airtime and it's speed is not limited by Station A(slow rate).



It is similar to automatic Bandwidth Limit. The dynamic bandwidth limit of each station depends on instant active station number and airtime assignment. Please note that Airtime Fairness of 2.4GHz and 5GHz are independent. But stations of different SSIDs function together, because they all use the same wireless channel. IN SPECIFIC ENVIRONMENTS, this function can reduce the bad influence of slow wireless devices and improve the overall wireless performance.

Suitable environment:

- (1) Many wireless stations.
- (2) All stations mainly use download traffic.
- (3) The performance bottleneck is wireless connection.

Wireless LAN >> Airtime Fairness

Enable <u>Airtime Fairness</u> Triggering Client Number (2-64) 2 (default: 2)
Note : Please enable or disable this function according to the real situation and user experience. It is NOT suitable for all environments.
OK Cancel

Available settings are explained as follows:

Item	Description
Enable Airtime	Try to assign similar airtime to each wireless station by

**Dray** Tek

Fairness	controlling TX traffic.
	<b>Airtime Fairness</b> – Click the link to display the following screen of airtime fairness note.
	Wireless Artime Painess - Google Chrome
	<ul> <li>172.17.3.110/wireless/ap_af_note.asp</li> <li>Airtime Fairness Note:         <ul> <li>Airtime is the time where a wireless station occupies the wireless channel. Airtime Fairness function tries to assign similar airtime to each station by controlling TX traffic. IN SPECIFIC ENVIRONMENTS, this function can reduce the bad influence of slow wireless devices and improve the overall wireless performance.</li> <li>Suitable environment : (1) Many wireless stations. (2) All stations mainly use download traffic. (3) The performance bottleneck is wireless connection.</li> <li>Triggering Client Number: Airtime Fairness function is applied only when active station number achieves this number.</li> </ul> </li> </ul>
	<b>Triggering Client Number</b> –Airtime Fairness function is applied only when active station number achieves this number.

**Note**: Airtime Fairness function and Bandwidth Limit function should be mutually exclusive. So their webs have extra actions to ensure these two functions are not enabled simultaneously.

### 3.8.11 Station Control

Station Control is used to specify the duration for the wireless client to connect and reconnect VigorAP. If such function is not enabled, the wireless client can connect VigorAP until it shuts down.

Such feature is especially useful for free Wi-Fi service. For example, a coffee shop offers free Wi-Fi service for its guests for one hour every day. Then, the connection time can be set as "1 hour" and reconnection time can be set as "1 day". Thus, the guest can finish his job within one hour and will not occupy the wireless network for a long time.

Note: Up to 300 Wireless Station records are supported by VigorAP.

	Wireless	LAN	>>	Station	Control
--	----------	-----	----	---------	---------

SSID 1	SSID 2	SSID 3	SSID 4
SSI	)	DrayTek	
Enal	ole		
Con	nection Time	1 hour	*
Rec	onnection Time	1 day	*
<u>Disp</u>	lay All Station Contr	ol List	

Note: Once the feature is enabled, the connection time quota will apply to each wireless client (identified by MAC address).

OK Cancel	ОК	Cancel
-----------	----	--------

Item	Description
SSID	Display the SSID that the wireless station will use it to connect with Vigor router.
Enable	Check the box to enable the station control function.



After finishing all the settings here, please click **OK** to save the configuration.

## 3.8.12 Roaming

The network signal for a single wireless access point might be limited by its coverage range. Therefore, if you want to expand the wireless network in a large exhibition with a quick method, you can install multiple access points with enabling the Roaming feature for each AP to reach the purpose of expanding wireless signals seamlessly.

These access points connecting for each other shall be verified by pre-authentication. This page allows you to enable the roaming feature and the pre-authentication.

Minimum Basic Rate	1 • Mbps
Disable RSSI Requirement	
Strictly Minimum RSSI	-73 dBm (42 %) (Default: -73)
Minimum RSSI	-66 dBm (60 %) (Default: -66)
with Adjacent AP RSSI over	5 dBm (Default: 5)
st Roaming(WPA/802.1x)	
Enable	
PMK Caching : Cache Period	10 minute(s) (10 ~ 600) (Default: 10)

Available settings are explained as follows:

Wireless LAN (2.4GHz) >> Roaming

Item	Description
AP-assisted Client Roaming Parameters	When the link rate of wireless station is too low or the signal received by the wireless station is too worse, VigorAP 710 will automatically detect (based on the link rate and RSSI requirement) and cut off the network connection for that wireless station to assist it to connect another Wireless AP to get better signal.
	<b>Minimum Basic Rate</b> – Check the box to use the drop down list to specify a basic rate ( <b>Mbps</b> ). When the link rate of the wireless station is below such value, VigorAP 710 will terminate the network connection for that wireless station.
	<b>Disable RSSI Requirement -</b> If it is selected, VigorAP will not terminate the network connection based on RSSI.
	<b>Strictly Minimum RSSI -</b> VigorAP uses RSSI (received signal strength indicator) to decide to terminate the network connection of wireless station. When the signal strength is below the value ( <b>dBm</b> ) set here, VigorAP 710 will terminate the network connection for that wireless station.
	<b>Minimum RSSI</b> - When the signal strength of the wireless station is below the value ( <b>dBm</b> ) set here and adjacent AP (must be DrayTek AP and support such feature too) with higher signal strength value (defined in the field of <b>With Adjacent AP RSSI over</b> ) is detected by VigorAP 710, VigorAP 710 will terminate the network connection for that wireless station. Later, the wireless station can connect to the adjacent AP (with better RSSI).


	• With Adjacent AP RSSI over – Specify a value as a threshold.	
Fast Roaming (WPA/802.1x)	<ul> <li>Enable – Check the box to enable fast roaming configuration.</li> <li>PMK Caching: Cache Period - Set the expire time of WPA2</li> <li>PMK (Pairwise master key) cache. PMK Cache manages the list from the BSSIDs in the associated SSID with which it has pre-authenticated. Such feature is available for WPA2/802.1 mode.</li> </ul>	
	<ul> <li>Pre-Authentication - Enables a station to authenticate to multiple APs for roaming securer and faster. With the pre-authentication procedure defined in IEEE 802.11i specification, the pre-four-way-handshake can reduce handoff delay perceivable by a mobile node. It makes roaming faster and more secure. (Only valid in WPA2)</li> <li>Enable - Enable IEEE 802.1X Pre-Authentication.</li> <li>Disable - Disable IEEE 802.1X Pre-Authentication.</li> </ul>	

# 3.8.13 Station List

**Station List** provides the knowledge of connecting wireless clients now along with its status code. Each tab (general, advanced, control, neighbor) will display different status information (including MAC address, Vendor, SSID, Auth, Encrypt, Tx/Rx Rate, Hostname, RSSI, Link Speed, BW, PSM, WMM, PHMd, MCS, Connection Time, Reconnection Time, Approx. Distance, Visit Time, and so on).

Wireless LAN >> Station List

						Neighbor
MAC Address	RSSI	Approx.	Distance	SSID	Visit Time	
dc:85:de:03:fb:6f	73%	6.31m		N/A	0d:1h:26m:11s	
80:86:f2:8f:d4:91	78%	5.01m		N/A	0d:7h:0m:8s	
b4:ce:f6:25:03:el	100%	1.58m		N/A	Od:Oh:Om:Os	
44:2a:60:80:15:d6	86%	3.55m		N/A	0d:14h:2m:26s	
84:7a:88:79:41:01	31%	39.81m		N/A	0d:0h:2m:56s	
5c:ff:35:84:d9:ba	52%	15.85m		N/A	0d:8h:18m:1s	
00:1d:aa:7e:84:38	100%	0.20m		N/A	Od:Oh:Om:Os	
f4:f1:5a:8a:e8:b9	83%	3.98m		N/A	Od:Oh:Om:ls	
50:2e:5c:29:43:e6	20%	70.79m		N/A	0d:0h:0m:5s	
		Ref	resh			
Access Control :						
MAC Address :	:	: . :	:			
4	dc:85:de:03:fb:6f 80:86:f2:8f:d4:91 b4:ce:f6:25:03:e1 44:2a:60:80:15:66 84:7a:88:79:41:01 5c:ff:35:84:d9:ba 00:1d:aa:7e:84:38 f4:f1:5a:8a:e8:b9 50:2e:5c:29:43:e6 ccess Control :	dc:85:de:03:fb:6f 73% 80:86:f2:8f:d4:91 78% b4:ce:f6:25:03:e1 100% 44:2a:60:80:15:d6 86% 84:7a:88:79:41:01 31% 5c:ff:35:84:d9:ba 52% 00:1d:aa:7e:84:38 100% f4:f1:5a:8a:e8:b9 83% 50:2e:5c:29:43:e6 20%	dc:85:de:03:fb:6f       73%       6.31m         80:86:f2:8f:d4:91       78%       5.01m         b4:ce:f6:25:03:e1       100%       1.58m         44:2a:60:80:15:d6       66%       3.55m         84:7a:88:79:41:01       31%       39.81m         5c:ff:35:84:d9:ba       52%       15.85m         00:1d:aa:7e:84:38       100%       0.20m         f4:f1:5a:8a:e8:b9       83%       3.98m         50:2e:5c:29:43:e6       20%       70.79m         Ref	dc:85:de:03:fb:6f       73%       6.31m         80:86:f2:8f:d4:91       78%       5.01m         b4:ce:f6:25:03:e1       100%       1.58m         44:2a:60:80:15:d6       86%       3.55m         84:7a:88:79:41:01       31%       39.81m         5c:ff:35:84:d9:ba       52%       15.85m         00:1d:aa:7e:84:38       100%       0.20m         f4:f1:5a:8a:e8:b9       83%       3.98m         50:2e:5c:29:43:e6       20%       70.79m         Refresh	dc:85:de:03:fb:6f       73%       6.31m       N/A         80:86:f2:8f:d4:91       78%       5.01m       N/A         b4:ce:f6:25:03:e1       100%       1.58m       N/A         44:2a:60:80:15:d6       86%       3.55m       N/A         84:7a:88:79:41:01       31%       39.81m       N/A         5c:ff:35:84:d9:ba       52%       15.85m       N/A         00:1d:aa:7e:84:38       100%       0.20m       N/A         f4:f1:5a:8a:e8:b9       83%       3.98m       N/A         50:2e:5c:29:43:e6       20%       70.79m       N/A         Refresh	dc:85:de:03:fb:6f       73%       6.31m       N/A       0d:1h:26m:1ls         80:86:f2:8f:d4:91       78%       5.01m       N/A       0d:7h:0m:8s         b4:ce:f6:25:03:e1       100%       1.58m       N/A       0d:0h:0m:0s         44:2a:60:80:15:d6       86%       3.55m       N/A       0d:14h:2m:26s         84:7a:88:79:41:01       31%       39.81m       N/A       0d:0h:2m:56s         5c:ff:35:84:d9:ba       52%       15.85m       N/A       0d:0h:0m:0s         d4:f1:5a:8a:e8:b9       83%       3.98m       N/A       0d:0h:0m:1s         50:2e:5c:29:43:e6       20%       70.79m       N/A       0d:0h:0m:5s

Available settings are explained as follows:

Item	Description
MAC Address	Display the MAC Address for the connecting client.
SSID	Display the SSID that the wireless client connects to.
Auth	Display the authentication that the wireless client uses for connection with such AP.

Encrypt	Display the encryption mode used by the wireless client.
Tx Rate/Rx Rate	Display the transmission /receiving rate for packets.
Refresh	Click this button to refresh the status of station list.
Add to Access Control	<b>Client's MAC Address</b> - For additional security of wireless access, the Access Control facility allows you to restrict the network access right by controlling the wireless LAN MAC address of client. Only the valid MAC address that has been configured can access the wireless LAN interface.
Add	Click this button to add current typed MAC address into <b>Access Contro</b> l.

### General

Display general information (e.g., MAC Address, SSID, Auth, Encrypt, TX/RX Rate) for the station.

### Advanced

Display more information (e.g., AID, PSM, WMM, RSSI PhMd, BW, MCS, Rate) for the station.

### Control

Display connection and reconnection time of the wireless stations.

### Neighbor

Display more information for the neighboring wireless stations.

# 3.9 RADIUS Setting

VigorAP 710 offers a built-in RADIUS server to authenticate the wireless client that tries to connect to VigorAP 710. The AP can accept the wireless connection authentication requested by wireless clients.

# 3.9.1 RADIUS Server

Enable RADIUS Serve	er		
Authentication Type			
Rac	dius EAP Type	PE	AP 🔽
Users Profile (up to 96 u	sers)		
Username	Password	Confirm Password	Configure
			Add Cancel
NO.	Username		Select
Delete Selected	Delete All		
Authentication Client (up	to 16 clients)		
		Confirm Secret Key	Configure
Authentication Client (up	to 16 clients)	Confirm Secret Key	Configure Add Cancel
Authentication Client (up	to 16 clients)	Confirm Secret Key	
Authentication Client (up Client IP	to 16 clients) Secret Key	Confirm Secret Key	Add Cancel
Authentication Client (up Client IP NO.	to 16 clients) Secret Key Client IP	Confirm Secret Key	Add Cancel

Backup Radius Cfg :	Upload From File: 選擇檔案 未選擇檔案
Backup	Restore

Available settings are explained as follows:

Item	Description	
Enable RADIUS Server	Check it to enable the internal RADIUS server.	
Authentication Type	Let the user to choose the authentication method for RADIUS server.	
	<b>Radius EAP Type</b> – There are two types, PEAP and EAP TLS, offered for selection. If EAP TLS is selected, a certificate must be installed or must be ensured to be trusted.	
Users Profile	<ul> <li>Username – Type a new name for the user profile.</li> <li>Password – Type a new password for such new user profile.</li> <li>Confirm Password – Retype the password to confirm it.</li> <li>Configure</li> </ul>	
	<ul> <li>Add – Make a new user profile with the name and password specified on the left boxes.</li> <li>Cancel – Clear current settings for user profile.</li> </ul>	

	<b>Delete Selected</b> – Delete the selected user profile (s).			
	<b>Delete All</b> – Delete all of the user profiles.			
Authentication Client	This internal RADIUS server of VigorAP 710 can be treated as the external RADIUS server for other users. Specify the client IP and secret key to make the wireless client choosing VigorAP 710 as its external RADUIS server.			
	<b>Client IP</b> – Type the IP address for the user to be authenticated by VigorAP 710 when the user tries to use VigorAP 710 as the external RADIUS server.			
	<b>Secret Key</b> – Type the password for the user to be authenticated by VigorAP 710 while the user tries to use VigorAP 710 as the external RADIUS server.			
	<b>Confirm Secrete Key</b> – Type the password again for confirmation.			
	Configure			
	• Add – Make a new client with IP and secrete key specified on the left boxes.			
	• <b>Cancel</b> – Clear current settings for the client.			
	<b>Delete Selected</b> – Delete the selected client(s).			
	<b>Delete All</b> – Delete all of the clients.			
Backup	Click it to store the settings (RADIUS configuration) on this page as a file.			
Restore	Click it to restore the settings (RADIUS configuration) from an existed file.			

After finishing this web page configuration, please click **OK** to save the settings.

### 3.9.2 Certificate Management

When the local client and remote client are required to make certificate authentication (e.g., IPsec X.509) for data passing through SSL tunnel and avoiding the attack of MITM, a trusted root certificate authority (Root CA) will be used to authenticate the digital certificates offered by both ends.

However, the procedure of applying digital certificate from a trusted root certificate authority is complicated and time-consuming. Therefore, Vigor router offers a mechanism which allows you to generate root CA to save time and provide convenience for general user. Later, such root CA generated by DrayTek server can perform the issuing of local certificate.

In addition, you can build a Root CA certificate by clicking Create Root CA if required.

### RADIUS Setting >> X509 Trusted CA Certificate Configuration

Name	Subject	Status	Modify	
Root CA			Create Root CA	
lote: 1. Please setup the "System Maintenance >> <u>Time and Date</u> " correctly before you try to generate a RootCA.				

2. The Time Zone MUST be setup correctly.

Note that Root CA can be deleted but not edited. If you want to modify the settings for a Root CA, please delete that one and create another one by clicking Create Root CA. After clicking Create Root CA, the web page will be shown as below.



### RADIUS Setting >> Create Root CA

Certificate Name	Root CA
Subject Name	
Country (C)	
State (S)	
Location (L)	
Organization (O)	
Organization Unit (OU)	
Common Name (CN)	
Email (E)	
Кеу Туре	RSA 💌
Key Size	1024 Bit 💌
Apply to Web HTTPS	
	OK Cancel

Available settings are explained as follows:

Item	Description		
Subject Name	Type the required information for creating a root CA.		
	Country (C) – Type the country code (two characters) in this box.		
	State (S)/ Location (L)/ Organization (O)/ Organization Unit (OU) /Common Name (CN) - Type the name or information for the root CA with length less than 32 characters.		
	Email (E) – Type the email address for the root CA with length less than 32 characters.		
Кеу Туре	At present, only RSA (an encryption algorithm) is supported by such device.		
Key Size	To determine the size of a key to be authenticated, use the drop down list to specify the one you need.		
Apply to Web HTTPS	VigorAP needs a certificate to access into Internet via Web HTTPS.		
	Check this box to use the user-defined root CA certificate which will substitute for the original certificate applied by web HTTPS.		

Type in all the information that the window request such as certificate name (used for identifying different certificate), and relational settings for subject name. Then click **OK**.

# 3.10 Applications

Below shows the menu items for Applications.



### 3.10.1 Schedule

The Vigor router has a built-in clock which can update itself manually or automatically by means of Network Time Protocols (NTP). As a result, you can not only schedule the router to dialup to the Internet at a specified time, but also restrict Internet access to certain hours so that users can connect to the Internet only during certain hours, say, business hours. The schedule is also applicable to other functions.

You have to set your time before set schedule. In **System Maintenance>> Time and Date** menu, press **Inquire Time** button to set the Vigor router's clock to current time of your PC. The clock will reset once if you power down or reset the router. There is another way to set up time. You can inquiry an NTP server (a time server) on the Internet to synchronize the router's clock. This method can only be applied when the WAN connection has been built up.

Applications >> So	chedule		
Schedule			
🔲 Enable Sche	edule		
	ОК		
Schedule Configur	ation		
Index.	Setting	Action	Status
1	2017 Jan. 18, 00:01 Once	Auto Reboot	V
	Add Delete		

Available settings are explained as follows:

Item	Description
Schedule	<b>Enable Schedule</b> - Check it to enable the function of schedule configuration.
Schedule	<b>Index</b> – Display the sort number of the schedule profile.
Configuration	<b>Setting</b> – Display the summary of the schedule profile.
	Action – Display the action performed by the router.
	<b>Status</b> – Display if the profile is enabled (V) or not (X).
	<b>Add</b> – Such button is available when Enable Schedule is checked. It allows to add a new schedule profile.
	<b>Delete</b> – Such button is used to remove the existed schedule profile.

You can set up to **15** schedules. To add a schedule:

- 1. Check the box of **Enable Schedule**.
- 2. Click the **Add** button to open the following web page.

### Applications >> Schedule

Add Schedule	
🗹 Enable	
Start Date	2000 💌 - 🔟 💌 - 🔟 💌 ( Year - Month - Day )
Start Time	0 💌 : 0 💌 ( Hour : Minute )
End Time	🛛 💌 : 🖸 🗹 ( Hour : Minute )
Action	Auto Reboot
WiFi(2.4GHz)	Radio SSID2 SSID3 SSID4
Acts	Once 💌
Weekday	🗌 Monday 🗌 Tuesday 🗋 Wednesday 📄 Thursday 📄 Friday 📄 Saturday 🗹 Sunday
	OK Cancel

Item Description Enable Check to enable such schedule profile. **Start Date** Specify the starting date of the schedule. **Start Time** Specify the starting time of the schedule. Action Specify which action should apply the schedule. Wi-Fi UP \* Auto Reboot Wi-Fi UP Wi-Fi DOWN WiFi(2.4GHz) When Wi-Fi UP or Wi-Fi DOWN is selected as Action, you can check the Radio or SSID 2~4 boxes to setup the network based on the schedule profile. Note: When Radio is selected, SSID2, SSID3 and SSID4 are

Available settings are explained as follows:

	not available for choosing, vice versa.	
Acts	Specify how often the schedule will be applied.	
	Once - The schedule will be applied just once	
	<b>Routine -</b> Specify which days in one week should perform the schedule.	
	Routine Once Routine	
Weekday	Choose and check the day to perform the schedule. It is available when <b>Routine</b> is selected as <b>Acts</b> .	

3. After finishing this web page configuration, please click **OK** to save the settings. A new schedule profile has been created and displayed on the screen.

Applications >> Sche	edule	
Schedule		
🗹 Enable Schedu	le	
Schedule Configurat	ion	
Index.	Setting	Status
1	2013 July. 1, 12:0-0:0 Routine: Tue Fri Sun	V
	OK Add	

# 3.10.2 Apple iOS Keep Alive

To keep the wireless connection (via Wi-Fi) on iOS device in alive, VigorAP 710 will send the UDP packets with 5353 port to the specific IP every five seconds.

Applications >> Apple iOS Keep Alive

Enable Apple iOS Keep Alive
Apple iOS Keep Alive:
Apple iOS Keep Alive can keep Wifi connection of iOS device by sending UDP port 5353 packets every 5 seconds.

Index	Apple iOS Keep Alive IP Address	Index	Apple iOS Keep Alive IP Address
1		2	
3		<u>4</u>	
<u>5</u>		<u>6</u>	

OK Cancel

Available settings are explained as follows:

Item	Description
Enable Apple iOS Keep Alive	Check to enable the function.
Index	Display the setting link. Click the index link to open the configuration page for setting the IP address.
Apple iOS Keep Alive IP Address	Display the IP address.

# 3.11 Mobile Device Management

Such feature can control / manage the mobile devices accessing the wireless network of VigorAP. VigorAP offers wireless LAN service for mobile device(s), PC users, MAC users or other users according to the policy selected.

Below shows the menu items for Mobile Device Management.



Mobile Device Management >> Detection

# 3.11.1 Detection

Such page displays mobile device(s) detected by VigorAP Detected device(s) with Policy – **Pass** can access into the wireless LAN offered by VigorAP. Detected device(s) with Policy – **Block** are not allowed to access into Internet via VigorAP's WLAN.

		Refre	sh Seconds:	10 • Page:	1 •	Refresh
Index	05	MAC		Vendor	Model	Policy
1	Ś.	F0:DB:F8:1C:E	4:9F	Apple	iPad	Pass
2	Ś.	F4:F1:5A:8A:E	8:89	Apple	iPhone	Pass
3	<b>1</b>	60:FA:CD:71:9	9B:91	Apple	Detecting	Pass
4	<b>•</b>	44:2A:60:80:1	.5:D6	Apple	Detecting	Pass
te : Pleas	se make su	re your internet acce	ss is avaliabl	e before enabling	MDM.	
) ios	(	Android	🕀 Windov	vs 🜔 Lin	ux 🔘	Others

Once you check/uncheck the box of **Enable Mobile Device Management** and click **OK**, VigorAP will reboot automatically to activate MDM.

At present, OS (for mobile device) categories supported by VigorAP include:

- Windows
- Linux
- iOS
- Andorid
- WindowsPhone
- BlackBerry
- Symbian.



# 3.11.2 Policy

Such page determines which devices (mobile, PC, MAC or others) allowed to make network connections via VigorAP or blocked by VigorAP.

Mobile Device	• Management >	> Policy
---------------	----------------	----------

🔲 Block Mobile Co	nnections (OS:Android,iOS)	
🔲 Block PC Conne	ctions (OS:Windows,Linux,iMac)	
🔲 Block Unknown	Connections (OS:Others)	
WiFi(2.4GHz)	SSID1 SSID2 SSID3 SSID4	
	OK Cancel	

Each item is explained as follows:

Item	Description
Block Mobile Connections	All of mobile devices will be blocked and not allowed to access into Internet via VigorAP.
Block PC Connections	All of network connections based on PC, MAC or Linux platform will be blocked and terminated.
Block Unknown Connections	Only the unknown network connections (unable to be recognized by Vigor router) will be blocked and terminated.
WiFi(2.4GHz)	Specify the SSID(s) to apply such policy.

After finished the policy selection, click **OK**. VigorAP will *reboot* to activate the new policy automatically.

# 3.11.3 Statistics

The number of detected devices and the number of device(s) passed/blocked according to the policy specified in **Mobile Device Management>>Policy** can be illustrated as doughnut chart.



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- Android is a trademark of Google Inc..
- Tux logo was created by Larry Ewing and The GIMP in 1996.

# 3.12 System Maintenance

For the system setup, there are several items that you have to know the way of configuration: System Status, TR-069, Administrator Password, Configuration Backup, Syslog/Mail Alert, Time and Date, Management, Reboot System and Firmware Upgrade.

Below shows the menu items for System Maintenance.

and the second sec
System Maintenance
System Status
TR-069
Administration Password
Configuration Backup
Syslog/Mail Alert
Time and Date
Management
Reboot System
Firmware Upgrade
Diagnostics

# 3.12.1 System Status

The **System Status** provides basic network settings of Vigor modem. It includes LAN and WAN interface information. Also, you could get the current running firmware version or firmware related information from this presentation.

System Status			
Aodel Jevice Name irmware Version Juild Date/Time System Uptime Operation Mode	: VigorAP710 : VigorAP710 : 1.2.0 : r6709 Tue Jan 3 : 0d 00:04:43 : AP	17:47:46 CST 2017	
	System		LAN
Memory Total Memory Left	: 62328 kB : 31264 kB	MAC Address IP Address	
Cached Memory	: 19652 kB / 62328 kB	IP Mask	: 255.255.255.0
	Wireless	]	
MAC Address SSID Channel	: 00:50:7F:F1:00:14 : DrayTek : 11		
Driver Version	: 2.7.2.0		



Each item is explained as follows:

Item	Description
Model Name	Display the model name of the modem.
Firmware Version	Display the firmware version of the modem.
<b>Build Date/Time</b>	Display the date and time of the current firmware build.
System Uptime	Display the period that such device connects to Internet.
<b>Operation Mode</b>	Display the operation mode that the device used.
System	
Memory total	Display the total memory of your system.



Memory left	Display the remaining memory of your system.
LAN	
MAC Address	Display the MAC address of the LAN Interface.
IP Address	Display the IP address of the LAN interface.
IP Mask	Display the subnet mask address of the LAN interface.
Wireless	
MAC Address	Display the MAC address of the WAN Interface.
SSID	Display the SSID of the device.
Channel	Display the channel that the station used for connecting with such device.

### 3.12.2 TR-069

This device supports TR-069 standard. It is very convenient for an administrator to manage a TR-069 device through an Auto Configuration Server, e.g., VigorACS SI.

System Maintenance >> TR-069 Settings

ACS Settings	[		
URL			
Username		]	
Password		]	
CDE Sattings			

CFL JEUINGS	
Enable	
SSL(HTTPS) Mode	
URL	http://192.168.1.2:8069/cwm/CRN.html
Port	8069
Username	vigor
Password	•••••
DNS Server IP Address	
Primary IP Address	
Secondary IP Address	

Note: Please set default gateway, no matter choose LAN-A or LAN-B.

SSL(HTTPS) Mode only works when Vigor ACS SI is 1.1.6 and above version.

### Periodic Inform Settings -Enable Interval Time 900 second(s) STUN Settings 🔍 Enable 💿 Disable Server Address Server Port 3478 Minimum Keep Alive Period second(s) 60 Maximum Keep Alive Period second(s) -1 ОK Cancel

Available settings are explained as follows:

Item	Description
ACS Settings	URL/Username/Password – Such data must be typed according



	1
	to the ACS (Auto Configuration Server) you want to link. Please refer to Auto Configuration Server user's manual for detailed information. The setting for URL can be domain name or IP address.
CPE Settings	Such information is useful for Auto Configuration Server (ACS). <b>Enable</b> – Check the box to allow the CPE Client to connect with Auto Configuration Server.
	<b>SSL(HTTPS)</b> Mode – Check the box to allow the CPE client to connect with ACS through SSL.
	<b>Port</b> – Sometimes, port conflict might be occurred. To solve such problem, you might change port number for CPE.
	<b>Username and Password</b> – Type the username and password that VigorACS can use to access into such CPE.
	<b>DNS Server IP Address</b> – Such field is to specify the IP address if a URL is configured with a domain name.
	• <b>Primary IP Address</b> –You must specify a DNS server IP address here because your ISP should provide you with usually more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default DNS Server IP address: 194.109.6.66 to this field.
	• Secondary IP Address – You can specify secondary DNS server IP address here because your ISP often provides you more than one DNS Server. If your ISP does not provide it, the modem will automatically apply default secondary DNS Server IP address: 194.98.0.1 to this field.
Periodic Inform Settings	The default setting is <b>Enable</b> . Please set interval time or schedule time for the AP to send notification to VigorACS server. Or click <b>Disable</b> to close the mechanism of notification.
	<b>Interval Time</b> – Type the value for the interval time setting. The unit is "second".
STUN Settings	The default is <b>Disable</b> . If you click <b>Enable</b> , please type the relational settings listed below:
	Server Address – Type the IP address of the STUN server.
	<b>Server Port</b> – Type the port number of the STUN server.
	<b>Minimum Keep Alive Period</b> – If STUN is enabled, the CPE must send binding request to the server for the purpose of maintaining the binding in the Gateway. Please type a number as the minimum period. The default setting is "60 seconds".
	<b>Maximum Keep Alive Period</b> – If STUN is enabled, the CPE must send binding request to the server for the purpose of maintaining the binding in the Gateway. Please type a number as the maximum period. A value of "-1" indicates that no maximum period is specified.

After finishing this web page configuration, please click **OK** to save the settings.



# 3.12.3 Administrator Password

This page allows you to set new password.

### System Maintenance >> Administration Password

# Administrator Settings Account admin Password ••••• Confirm Password ••••• Confirm Password ••••• Confirm Password ••••• Password Strength: Weak Medium Strong Strong password requirements: 1. Have at least one upper-case letter and one lower-case letter. 2. Including non-alphanumeric characters is a plus. Note: Authorization Account can contain only a-z A-Z 0-9 , ~`!@\$%^\*()\_+ + = {}[]|;<>.? Authorization Password can contain only a-z A-Z 0-9 , ~`!@#\$%^& \* ()\_+ + = {}[]|\;

OK

Available settings are explained as follows:

Item	Description
Account	Type the name for accessing into Web User Interface.
Password	Type in new password in this filed.
Confirm Password	Type the new password again for confirmation.
Password Strength	The system will display the password strength (represented with the word of weak, medium or strong) of the password specified above.

Cancel

When you click **OK**, the login window will appear. Please use the new password to access into the web user interface again.

# 3.12.4 Configuration Backup

# **Backup the Configuration**

Follow the steps below to backup your configuration.

System Maintenance >> Configuration Backup

1. Go to **System Maintenance** >> **Configuration Backup**. The following windows will be popped-up, as shown below.

Configuration Restoration	tion Backup / Restoration
	Select a configuration file. 選擇檔案 未選擇任何檔案
	Please enter the password and click Restore to upload the configuration file. Password (optional): Restore
	Note: 1. You will need the same password to do configuration restoration. 2. The configuration file from the supported model list would be adopted.
Backup	
	Please specify a password and click Backup to download current running configurations as an encrypted file. Password (optional):Backup

2. Click **Backup** button to get into the following dialog. Click **Save** button to open another dialog for saving configuration as a file.

File Dos	wnload 🔀
?	You are downloading the file: config.cfg from 192.168.1.1 Would you like to open the file or save it to your computer? Open Save Cancel More Info Always ask before opening this type of file

3. In **Save As** dialog, the default filename is **config.cfg**. You could give it another name by yourself.



4. Click **Save** button, the configuration will download automatically to your computer as a file named **config.cfg**.

The above example is using **Windows** platform for demonstrating examples. The **Mac** or **Linux** platform will appear different windows, but the backup function is still available.

**Note:** Backup for Certification must be done independently. The Configuration Backup does not include information of Certificate.

### **Restore Configuration**

1. Go to **System Maintenance** >> **Configuration Backup**. The following windows will be popped-up, as shown below.

Configurati	ion Backup / Restoration
Restoratio	n
	Select a configuration file. 選擇檔案 未選擇任何檔案
	Please enter the password and click Restore to upload the configuration file. Password (optional): Restore
	Note: 1. You will need the same password to do configuration restoration. 2. The configuration file from the supported model list would be adopted.
Backup	
	Please specify a password and click Backup to download current running configurations as an encrypted file. Password (optional):Backup

- 2. Click **Browse** button to choose the correct configuration file for uploading to the modem.
- 3. Click **Restore** button and wait for few seconds, the system will tell you that the restoration procedure is successful.



# 3.12.5 Syslog/Mail Alert

Syslog function is provided for users to monitor router.

System Maintenance >> Syslog / Mail Alert Setup

Syslog Access Setup	
Enable	
Server IP Address	
Destination Port	514
Log Level	All 💌
Mail Alert Setup	
Enable	
SMTP Server	
Mail To	
Mail From	
User Name	
Password	
Enable E-Mail Alert:	
🗹 When Admin Login AP	
	OK Cancel

Available parameters are explained as follows:

Item	Description	
SysLog Access Setup	Enable - Check Enable to activate function of syslog.	
	Server IP Address - The IP address of the Syslog server.	
	<b>Destination Port -</b> Assign a port for the Syslog protocol.	
	<b>Log Level</b> – Specify log type on this web page to send the corresponding message of info, warning, error or all.	
Mail Alert Setup	Check Enable to activate function of mail alert.	
	SMTP Server - The IP address of the SMTP server.	
	Mail To - Assign a mail address for sending mails out.	
	<b>Mail From -</b> Assign a path for receiving the mail from outside.	
	User Name - Type the user name for authentication.	
	<b>Password -</b> Type the password for authentication.	
	<b>Use TLS</b> – Check this box to encrypt alert mail. However, if the SMTP server specified here does not support TLS protocol, the alert mail with encrypted data will not be received by the receiver.	
	<b>Enable E-mail Alert -</b> Check the box to send alert message to the e-mail box while the router detecting the item(s) you specify here.	



# 3.12.6 Time and Date

It allows you to specify where the time of the router should be inquired from.

System Maintenance >>	Time and Date
-----------------------	---------------

Current System Time	2017 Jan 12 Thu 11:45:52 Inquire Time
Time Setting	
⊙Use Browser Time	
OUse NTP Client	
Time Zone (GN	IT-11:00) Midway Island, Samoa 🛛 🔗
NTP Server	Use Default
Daylight Saving	
NTP synchronization 30	sec 🔽

Available parameters are explained as follows:

Item	Description
Current System Time	Click <b>Inquire Time</b> to get the current time.
Use Browser Time	Select this option to use the browser time from the remote administrator PC host as router's system time.
Use NTP Client	Select to inquire time information from Time Server on the Internet using assigned protocol.
Time Zone	Select a time protocol.
NTP Server	Type the IP address of the time server. Use Default – Click it to choose the default NTP server.
Daylight Saving	Check the box to enable the daylight saving. Such feature is available for certain area.
NTP synchronization	Select a time interval for updating from the NTP server.

Click **OK** to save these settings.

### 3.12.7 Management

System Maintenance >> Management

This page allows you to manage the port settings for HTTP and HTTPS.

Device Name	
Name	VigorAP710
Management Port Setup	
HTTP Port	80
HTTPS Port	443
Telnet Setup	
Telnet Server	Enable 💌

OK Cancel

Available parameters are explained as follows:

Item	Description
Name	The default setting is VigorAP710. Change the name if required.
HTTP port/HTTPS port	Specify user-defined port numbers for the HTTP and HTTPS servers.
Telnet Server	<ul> <li>Enable – The administrator / user can access into the command line interface of VigorAP remotely for configuring settings.</li> <li>Disable – The administrator / user is unable to access into the command line interface of VigorAP remotely for configuring settings.</li> </ul>

### 3.12.8 Reboot System

The Web user interface may be used to restart your modem. Click **Reboot System** from **System Maintenance** to open the following page.

System Maintenance >> Reboot System

Reboot System	
	Do You want to reboot your AP ?
	<ul> <li>Using current configuration</li> <li>Using factory default configuration</li> </ul>
	ОК

If you want to reboot the modem using the current configuration, check **Using current configuration** and click **OK**. To reset the modem settings to default values, check **Using factory default configuration** and click **OK**. The modem will take 5 seconds to reboot the system.



**Note:** When the system pops up Reboot System web page after you configure web settings, please click **OK** to reboot your modem for ensuring normal operation and preventing unexpected errors of the modem in the future.

### 3.12.9 Firmware Upgrade

Before upgrading your modem firmware, you need to install the Modem Tools. The **Firmware Upgrade Utility** is included in the tools. The following web page will guide you to upgrade firmware by using an example. Note that this example is running over Windows OS (Operating System).

Download the newest firmware from DrayTek's web site or FTP site. The DrayTek web site is www.draytek.com (or local DrayTek's web site) and FTP site is ftp.draytek.com.

Click **System Maintenance>> Firmware Upgrade** to launch the Firmware Upgrade Utility.

System Maintenance >> Firmware Upgrade	System	Maintenance	>>	Firmware	Upgrade
--	--------	-------------	----	----------	---------

Firmware Update	
Select a firmware file.	
Choose File No file chosen	
Click Upgrade to upload the file.	lpgrade
Click Upgrade to upload the file.	lpgrade

Click **Browse** to locate the newest firmware from your hard disk and click **Upgrade**.

# 3.13 Diagnostics

Diagnostic Tools provide a useful way to view or diagnose the status of your VigorAP 710.

Diagnostics System Log Speed Test Traffic Graph Data Flow Monitor WLAN Statistics Station Statistics Interference Monitor Station Airtime Station Traffic Graph Station Link Speed

# 3.13.1 System Log

At present, only **System Log** is offered.

```
Diagnostics >> System Log
```

Syster	mL	.og Informa	tion   <u>Clear</u>   <u>Refresh</u>   🔲 Line wrap
Jan	1	00:57:40	syslogd started: BusyBox v1.12.1
Jan	1	00:57:40	kernel: klogd started: BusyBox v1.12.1 (2016-07-05 15:19:29 CST)
Jan	1	00:57:40	kernel: ++++++++++++++++++++++++++++++++++++
Jan	1	00:57:40	kernel: trust dhcp(A) en = 0, ip=0x00000000 ^M
Jan	1	00:57:40	kernel: trust dhcp(B) en = 0, ip=0x00000000 ^M
Jan	1	00:57:40	kernel: ++++++++++++++++++++++++++++++++ ^M
Jan	1	00:57:40	kernel: flag: 0x0
Jan	1	00:57:40	kernel: ravid 0: 0x0
Jan	1	00:57:40	kernel: ravid 1: 0x0
Jan	1	00:57:40	kernel: ravid 2: 0x0
Jan	1	00:57:40	kernel: ravid 3: 0x0
Jan	1	00:57:40	kernel: ravid 4: 0x0
Jan	1	00:57:40	kernel: ravid 5: 0x0
Jan	1	00:57:40	kernel: ravid 6: 0x0
Jan	1	00:57:40	kernel: ravid 7: 0x0
Jan	1	00:57:51	kernel: brl: port l(eth2.2) entering forwarding state

# 3.13.2 Speed Test

Click the **Start** button on the page to test the speed. Such feature can help you to find the best installation place for Vigor AP.

### Diagnostics >> Speed Test

Speed Test
Welcome to VigorAP710 Speed Test.
This test allows you to find out the best place for VigorAP710. You can execute the speed test at different places of the building and select the best location for it. The performance test result is only for your reference.
Start

# 3.13.3 Traffic Graph

Click **Traffic Graph** to open the web page. Choose one of the managed Access Points, LAN-A or LAN-B, daily or weekly for viewing data transmission chart. Click **Refresh** to renew the graph at any time.



The horizontal axis represents time; the vertical axis represents the transmission rate (in kbps).

# 3.13.4 Data Flow Monitor

This page displays general information for the client connecting to VigorAP 710.

Diagnostics >>	Data	Flow	Monitor
Diagnootioo	Data		Monitor

			Page: 1	💌 Auto-refresh	Refresh
Index	MAC Address	Station	TX rate(Kbps)	RX rate(Kbps)	Action
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
Total			0	0	

# 3.13.5 WLAN Statistics

Such page is used for debug by RD only.

### Diagnostics >> WLAN Statistics

		🗌 Auto-Ref	resh (Refresh)
Tx success	9026	Rx success	96212
Tx retry count	366	Rx with CRC	110866
Tx fail to Rcv ACK after retry	15	Rx drop due to out of resource	0
RTS Success Rcv CTS	0	Rx duplicate frame	23
RTS Fail Rcv CTS	0	False CCA (one second)	0
TransmitCountFromOS	216	MulticastReceivedFrameCount	0
TransmittedFragmentCount	9026	RealFcsErrCount	110866
TransmittedFrameCount	9026	WEPUndecryptableCount	0
MulticastTransmittedFrameCount	0	MultipleRetryCount	0
TransmittedAMSDUCount	0	ACKFailureCount	0
TransmittedOctetsInAMSDU	0	ReceivedAMSDUCount	0
TransmittedAMPDUCount	0	ReceivedOctesInAMSDUCount	0
TransmittedMPDUsInAMPDUCount	0	MPDUInReceivedAMPDUCount	0
TransmittedOctetsInAMPDUCount	0	fAnyStaFortyIntolerant	0

	SSID1 (DrayTek)	SSID2 (N/A)	SSID3 (N/A)	SSID4 (N/A)
Packets Received	140	N/A	N/A	N/A
Packets Sent	40	N/A	N/A	N/A
Bytes Received	7963	N/A	N/A	N/A
Byte Sent	3960	N/A	N/A	N/A
Error Packets Received	0	N/A	N/A	N/A
Drop Received Packets	107	N/A	N/A	N/A

# **3.13.6 Station Statistics**

Such page is used for debug or for the user to observe network traffic and network quality.







Note : Only browser supporting  $\underline{\text{HTML5}}$  can display Station Statistics correctly.

Available settings are explained as follows:

Item	Description
Show Chart	Choose one of the items to display the statistics chart for wireless stations.



# 3.13.7 Interference Monitor

As an interference detector, VigorAP can detect all of the environmental interference factors for certain channel used or for all of the wireless channels.

### **Current Channel**

The analysis page with information about wireless band, channel, transmission power, bandwidth, wireless mode, and country code chosen will be displayed on this page completely based on the wireless band selected. Also, channel status can be seen easily from this page.

### Diagnostics >> Interference Monitor

Current Channe	al All C	Channels			
				🗌 Auto-R	efresh Refresh
Channel Informa	ation				
Band	2.4G		Country Code	LK	
Channel	11		Mode	Mixed(11	o+11g+11n)
Tx Power	100%		Bandwidth	Auto(Acti	ve: 40 MHz)
Channel Status					
Channel Utilizati	on 🕕	51%			
Channel Energy	6	36%			
FalseCCA		1107			
TX Fail		0			
TX Retry OK		0			
Primary channel	busy	44%			
Secondary chan	nel busy	1%			
The histroy of 🗌	1-5 minutes 🛛 💊	*			
44.5	13:30:50),4	shynywww.	www.wy	way from	Utilization
	13:29:56 1:	3:30:56	13:31:56	13:32:56 1	3:33:56

### **All Channels**

This page displays the utilization and energy result for all channels based on 2.4G. Click **Refresh** to get the newly update interference situation.

### 3.13.8 Station Airtime

This page displays the operation status for 2.4GHz wireless stations within 30 minutes.



# 3.13.9 Station Traffic Graph

This page displays the data traffic (receiving/transmitting) status for 2.4GHz wireless stations within 30 minutes with a run chart.

Diagnostics >> Station Traffic Graph



# 3.13.10 Station Link Speed

This page displays the link rate status for 2.4GHz/5GHz wireless stations within one hour with a run chart.



# 3.14 Support Area

When you click the menu item under **Support Area**, you will be guided to visit www.draytek.com and open the corresponding pages directly.



This section will guide you to solve abnormal situations if you cannot access into the Internet after installing the modem and finishing the web configuration. Please follow sections below to check your basic installation status stage by stage.

- Checking if the hardware status is OK or not.
- Checking if the network connection settings on your computer are OK or not.
- Pinging the modem from your computer.
- Checking if the ISP settings are OK or not.
- Backing to factory default setting if necessary.

If all above stages are done and the modem still cannot run normally, it is the time for you to contact your dealer for advanced help.

# 4.1 Checking If the Hardware Status Is OK or Not

Follow the steps below to verify the hardware status.

- 1. Check the power line and cable connections. Refer to "**1.3 Hardware Installation**" for details.
- 2. Power on the modem. Make sure the **POWER** LED, **ACT** LED and **SSID** LED are bright.
- 3. If not, it means that there is something wrong with the hardware status. Simply back to **"1.3 Hardware Installation"** to execute the hardware installation again. And then, try again.

# 4.2 Checking If the Network Connection Settings on Your Computer Is OK or Not

Sometimes the link failure occurs due to the wrong network connection settings. After trying the above section, if the link is stilled failed, please do the steps listed below to make sure the network connection settings is OK.

### **For Windows**



The example is based on Windows 7 (Professional Edition). As to the examples for other operation systems, please refer to the similar steps or find support notes in **www.draytek.com**.

- 1. Open All Programs>>Getting Started>>Control Panel. Click Network and Sharing Center.
  - Fonts
     Java
     Network and Sharing Center
     Personalization
     Recovery
- 2. In the following window, click Change adapter settings.



3. Icons of network connection will be shown on the window. Right-click on Local Area Connection and click on Properties.



4. Select Internet Protocol Version 4 (TCP/IP) and then click Properties.

Local Area Connecti	on Properties	
etworking Sharing		
Connect using:		
🛐 Intel(R) PRO/10	00 MT Network Conn	ection
		Configure
This connection uses t	he following items:	
🗹 📑 Client for Micro	osoft Networks	
🗹 📙 Privacyware F	ilter Driver	
🗹 📙 QoS Packet S	cheduler	
🗆 📙 File and Printe	r Sharing for Microsof	t Networks
🗹 🔺 Internet Proto	col Version 6 (TCP/IP	v6)
🗹 📥 Internet Proto	col Version 4 (TCP/IP	v4)
🗌 🔺 Link-Layer To	pology Discovery Map	per I/O Driver
🗆 🔺 Link-Layer To	pology Discovery Res	ponder

5. Select **Obtain an IP address automatically** and **Obtain DNS server address automatically**. Finally, click **OK**.

ieral Alternate Configuration ou can get IP settings assigned auto is capability. Otherwise, you need to r the appropriate IP settings.				
Obtain an IP address automatica	ally			
😳 Use the following IP address:				
IP address:		9		
Subnet mask:				
Default gateway:				
Obtain DNS server address auto	matically			
🔿 Use the following DNS server ad	dresses:			
Preferred DNS server:	- i	5	- 37 -	
Alternate DNS server:				
🗖 Validate settings upon exit			Adv	anced

### For Mac Os

- 1. Double click on the current used Mac Os on the desktop.
- 2. Open the **Application** folder and get into **Network**.
- 3. On the **Network** screen, select **Using DHCP** from the drop down list of Configure IPv4.



e O Network	0
Show All Displays Sound Network Startup Disk	
Location: Automatic 🛟 Show: Built-in Ethernet	
TCP/IP PPPoE AppleTalk Proxies Ethernet	
Configure IPv4: Using DHCP	
IP Address: 192.168.1.10 Renew DHG	CP Lease
Subnet Mask: 255.255.255.0 DHCP Client ID: Router: 192.168.1.1 (If required)	,
DNS Servers:	(Optional)
Search Domains:	(Optional)
IPv6 Address: fe80:0000:0000:0000:020a:95ff:fe8d:72e4	
Configure IPv6	?
Click the lock to prevent further changes.	Apply Now

# 4.3 Pinging the Modem from Your Computer

The default gateway IP address of the modem is 192.168.1.2. For some reason, you might need to use "ping" command to check the link status of the modem. **The most important thing is that the computer will receive a reply from 192.168.1.2.** If not, please check the IP address of your computer. We suggest you setting the network connection as **get IP automatically**. (Please refer to the section 4.2)

Please follow the steps below to ping the modem correctly.

### **For Windows**

- 1. Open the **Command** Prompt window (from **Start menu> Run**).
- 2. Type **command** (for Windows 95/98/ME) or **cmd** (for Windows NT/ 2000/XP/Vista/7). The DOS command dialog will appear.



- 3. Type ping 192.168.1.2 and press [Enter]. If the link is OK, the line of **"Reply from 192.168.1.2:bytes=32 time<1ms TTL=255"** will appear.
- 4. If the line does not appear, please check the IP address setting of your computer.

### For Mac Os (Terminal)

- 1. Double click on the current used Mac Os on the desktop.
- 2. Open the Application folder and get into Utilities.
- 3. Double click **Terminal**. The Terminal window will appear.
- 4. Type **ping 192.168.1.2** and press [Enter]. If the link is OK, the line of **"64 bytes from 192.168.1.2: icmp\_seq=0 ttl=255 time=xxxx ms**" will appear.

000	Terminal - bash - 80x24	
Welcome to Darwin! Vigor10:~ draytek\$   PING 192.168.1.1 (1 64 bytes from 192.1 64 bytes from 192.1	92.168.1.1): 56 data bytes 58.1.1: icmp_seq=0 ttl=255 time=0.755 ms 58.1.1: icmp_seq=1 ttl=255 time=0.697 ms 58.1.1: icmp_seq=2 ttl=255 time=0.716 ms 58.1.1: icmp_seq=3 ttl=255 time=0.731 ms 58.1.1: icmp_seq=4 ttl=255 time=0.72 ms	1
IN THE PARTY OF THE PARTY OF THE PARTY OF THE	ed, 5 packets received, 0% packet loss max = 0.697/0.723/0.755 Mš	

# 4.4 Backing to Factory Default Setting If Necessary

Sometimes, a wrong connection can be improved by returning to the default settings. Try to reset the modem by software or hardware.



**Warning:** After pressing **factory default setting**, you will loose all settings you did before. Make sure you have recorded all useful settings before you pressing. The password of factory default is null.

### Software Reset

You can reset the modem to factory default via Web page.

Go to **System Maintenance** and choose **Reboot System** on the web page. The following screen will appear. Choose **Using factory default configuration** and click **OK**. After few seconds, the modem will return all the settings to the factory settings.

Reboot System	
	Do You want to reboot your AP ?
	<ul> <li>Using current configuration</li> <li>Using factory default configuration</li> </ul>
	ОК

### **Hardware Reset**

While the modem is running, press the **Factory Reset** button and hold for more than 5 seconds. When you see the **ACT** LED blinks rapidly, please release the button. Then, the modem will restart with the default configuration.



After restore the factory default setting, you can configure the settings for the modem again to fit your personal request.

# 4.5 Contacting DrayTek

If the modem still cannot work correctly after trying many efforts, please contact DrayTek or your dealer for further help right away. For any questions, please feel free to send e-mail to support@draytek.com.

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### VigorAP 710 User's Guide

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