



Introduction: Broadcom BCM94321MC PCI-E Mini Card User's Guide

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Before you begin

Obtain the following information from your network administrator (if you are a home user, obtain this information from the person that installed your wireless access point):

- Network names (SSID) of the specific wireless networks that you want to connect to.
- WEP (Wired Equivalent Privacy) key information (if any) for the networks you want to connect to.
- For Microsoft® Windows® networking, your customer name and workgroup name.
- For your network account, your user name and password.
- Your IP address (if not using a DHCP server)

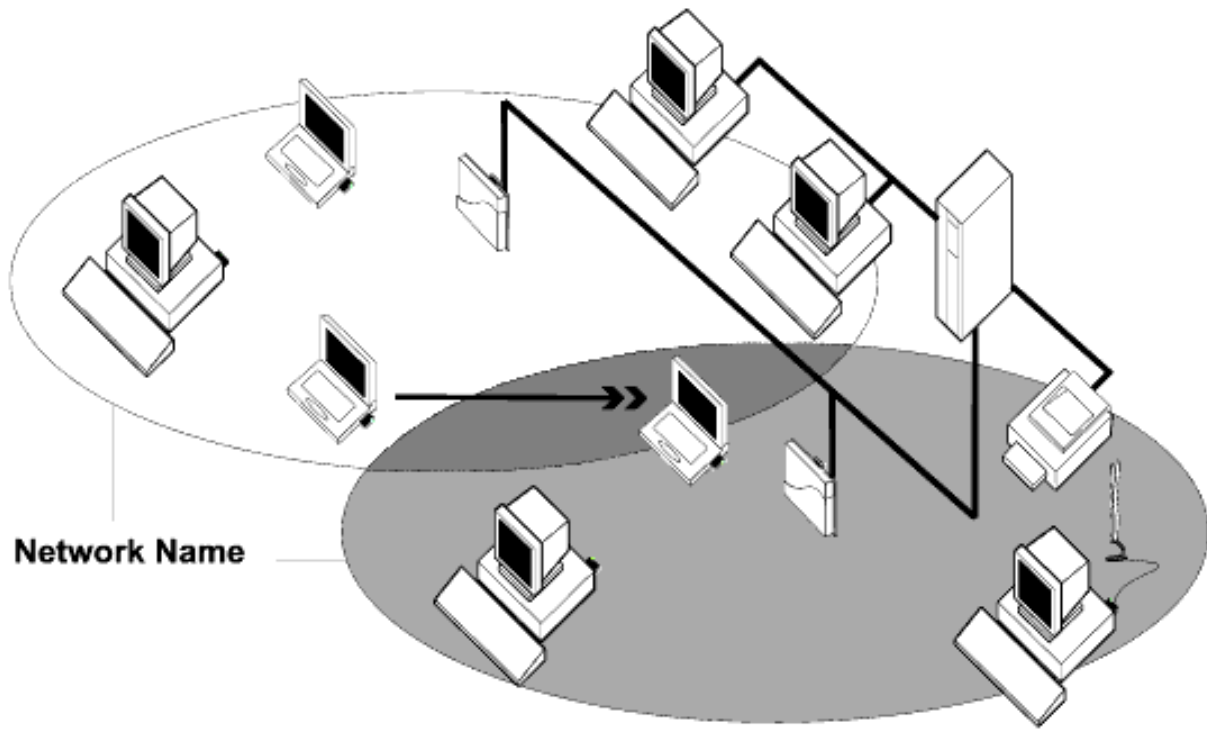
Things you should know

When you start your computer, your Broadcom BCM94321MC PCI-E Mini card detects certain wireless networks that are within range. Before you can connect to these and other wireless networks, you must configure a profile for each network using the information you obtained from your network administrator.

WEP is a security protocol for wireless local area networks (defined in the IEEE 802.11g standard) that encrypts data sent over radio waves. The use of the WEP key is optional and can be enabled or disabled. If the network you are connecting to has enabled WEP, you must also enable WEP in the network profile and set the WEP key to match the WEP key used by the network. Otherwise, you cannot connect to the network.

Broadcom BCM94321MC network

The Broadcom BCM94321MC solution allows you to make a wireless connection to a network, as illustrated below.



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Using the Broadcom Wireless Utility: Broadcom AirForce™ 54g™ and Intensi-fi™ Wireless Network Adapter User Guide

● [Overview](#)

● [Utility Components](#)


Overview

The Broadcom Wireless Utility enables you to do the following network tasks:

- Manage your wireless networks and create network connection profiles ([Wireless Networks](#) tab)
- Connect to available networks ([utility icon](#) in notification area)
- Get information about the network status and signal and noise of your network connection ([Link Status](#) tab)
- View current and accumulated statistics ([Statistics](#) tab)
- Find out which broadcasting networks are in range and search for nonbroadcasting networks ([Site Monitor](#) tab)
- Run tests on the wireless network adapter ([Diagnostics](#) tab)
- Get date and version information about the utility, and software, hardware, and location details about your wireless network adapter ([Information](#) tab)
- Manually add or delete trusted servers and enable the manual acceptance or rejection of auto-provisioning and A-ID group changes ([Wireless Networks](#) tab)
- Manually import EAP-FAST PACs ([Wireless Networks](#) tab)

In the utility, you can open Wireless Network Wizard to connect to a basic network or create an ad hoc network, or you can open the Wireless Network Connection Settings tool to connect to an advanced network. To do any of the other tasks, click the tab that is associated with the described task.

To start using the utility, right-click the utility icon  in the notification area, and then click **Open Utility**. If the icon is not available, open **Broadcom Wireless Utility** in Control Panel.

 **NOTE:** The utility icon may not appear exactly as shown here. See "[Table 1. Signal Strength Indicated by the Broadcom Wireless Utility Icon.](#)"

Utility Components

Utility components include the utility icon in the notification area, the six utility tabs, and Wireless Network Connection Settings.

Utility Icon

To do any of the following tasks or operations, right-click the utility icon, and then click the appropriate item.

- Open the on-line Broadcom AirForce™ 54g™ and Intensi-fi™ Wireless Network Adapter User Guide (Help Files)
- Open About WLAN Card Utility to view links to Broadcom and Broadcom Customer Support websites and to view the version and date of the utility (About)
- Hide the utility icon (Hide Tray Icon)
- Disable or enable the radio (Disable/Enable Radio)
- Connect to any of the networks for which you have created a connection profile and are within range (Connect To)
- Open the utility to the Wireless Networks tab (Open Utility)
- Open the utility to the Link Status tab to view information about the connection (Status)
- Display a log of your wireless network events (Display Log)

Wireless Networks Tab

The **Wireless Networks** tab has tools that enable you to do the following:

- Use the utility to manage your wireless networks
- Add a network connection profile
- Edit or remove a network connection profile
- Change the order in which profiles are listed under **Preferred network connections**
- Connect to any listed network without changing its order in the list
- Disable or enable the radio (Disable/Enable Radio)
- Show or hide the utility icon in the notification area
- Choose which type of network to access
- Lock or unlock a preferred network connection profile
- Save your wireless network connection profiles as a [WPN](#) file
- Import a WPN file
- Manually add or delete trusted servers and enable the manual acceptance or rejection of auto-provisioning and A-ID group changes
- Manually import EAP-FAST PACS

On the **Add** menu, you can use either the wireless network wizard that is available from Broadcom Wireless Utility (see [Connecting to a Basic Network or Creating an Ad Hoc Network Using the Wireless Network Wizard](#)) or the utility (see "[Connecting to an Advanced Network Using the Broadcom Wireless Utility](#)") to add a network connection profile.

To use the utility to manage your wireless networks, select the **Let this tool manage your wireless networks** check box.

To add a network connection profile, click the **Add** arrow, and then click either **Use Wizard (basic network)** or **Use Utility (advanced network)**.

To edit or remove a network connection profile, right-click the network name, and then click either **Edit** or **Remove**.

To change the order in which profiles are listed under **Preferred network connections**, click the network name, and then click either the up arrow or down arrow.

To connect to any listed network without changing its order in the list, right-click the network name, and then click **Connect**.

To disable the radio, clear the **Enable radio** check box. To enable the radio, select the **Enable radio** check box.

To hide the utility icon , clear the **Show utility icon** check box. To show the icon, select the **Show utility icon** check box.

To choose the type of network to access, click the **Options** arrow, and then click **Advanced**.

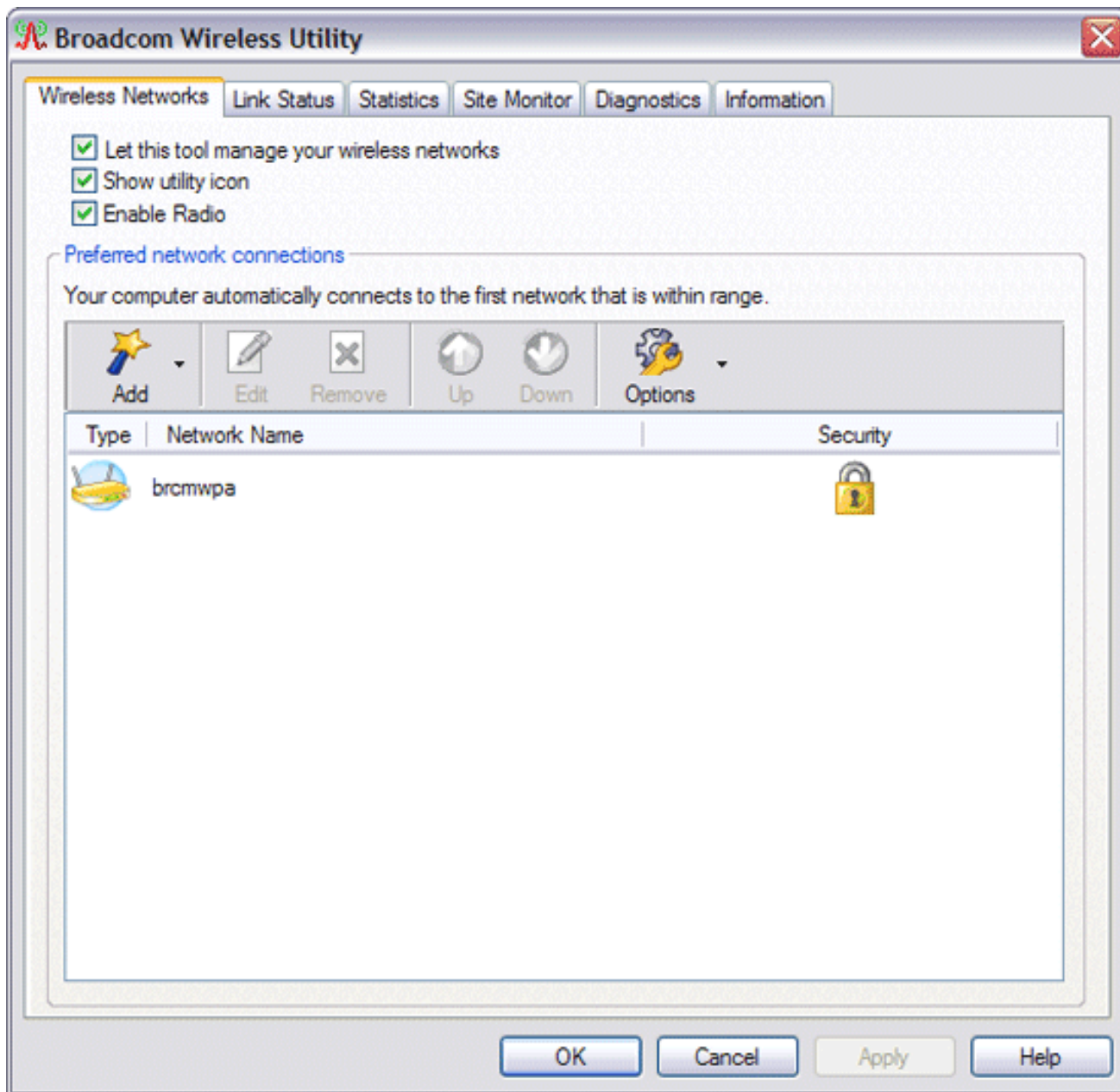
To lock or unlock a preferred network connection profile, right-click anywhere in the row that lists the network name, and then click **Lock** or **Unlock**, as appropriate.

 **NOTE:** You must have system or administrator rights to be able to lock or unlock a profile.

To save your wireless network connection profiles to a WPN file, click the **Options** arrow, and then click **Export** (see "[Saving Preferred Network Connection Settings to a File](#)" in "Connecting to an Advanced Network Using the Broadcom Wireless Utility."

To import a WPN file, click the **Options** arrow, and then click **Import** (see "[Importing a Preferred Network Connection Profiles File](#)" in "Connecting to an Advanced Network Using the Broadcom Wireless Utility."

Click **Apply** or **OK** after you change any of the settings for the change to take effect.



For networks that use the EAP-FAST authentication method, the Wireless WLAN Card Utility automatically adds trusted servers to the trust list and accepts [auto-provisioning](#) and [AID](#) (A-ID) group changes by default. The utility also enables you to import a [Protected Access Credential](#) (PAC). From the utility, you can also manually add or delete trusted servers, enable the manual acceptance or rejection of auto-provisioning and A-ID group changes, or import or delete PACS, as described in the following instructions. In general, you should use the default settings. Therefore, check with the network administrator before you make any changes.

To manually add a trusted server to the trust list

1. Open Broadcom Wireless Utility.
2. From the **Wireless Networks** tab, click **Options**, point to **Cisco Compatible Extensions**, and then click **Administrator Settings**.
3. Click **Add**.
4. Type *the A-ID friendly name of the trusted server* in the space provided, and then click **OK**.

To delete a trusted server from the trust list

1. Open Broadcom Wireless Utility.
2. From the **Wireless Networks** tab, click **Options**, point to **Cisco Compatible Extensions**, and then click **Administrator Settings**.
3. In the **Trust list (A-ID)**, click the name of the trusted server you want to delete, and then click **Delete**.

To change the default settings for administering Cisco Compatible Extensions

1. Open Broadcom Wireless Utility.
2. From the **Wireless Networks** tab, click **Options**, point to **Cisco Compatible Extensions**, and then click **Administrator Settings**.
3. Clear the **Disable auto-provision prompt** check box to enable manual acceptance or rejection.
4. Clear the **Disable A-ID group change prompt** check box to enable manual acceptance or rejection.
5. Select the **Auto-provision PAC only once** check box to auto-provision a Protected Access Credential (PAC) only once.

To import or remove an EAP-FAST PAC

1. Open Broadcom Wireless Utility.
2. From the **Wireless Networks** tab, click **Options**, point to **Cisco Compatible Extensions**, and then click **Manage PACs**.
3. To import a PAC: in Protected Access Credentials, click **Add**, and then follow the on-screen instructions.

 **NOTE:** The PAC is password protected, so you must know the password to be able to import the PAC.

-or-

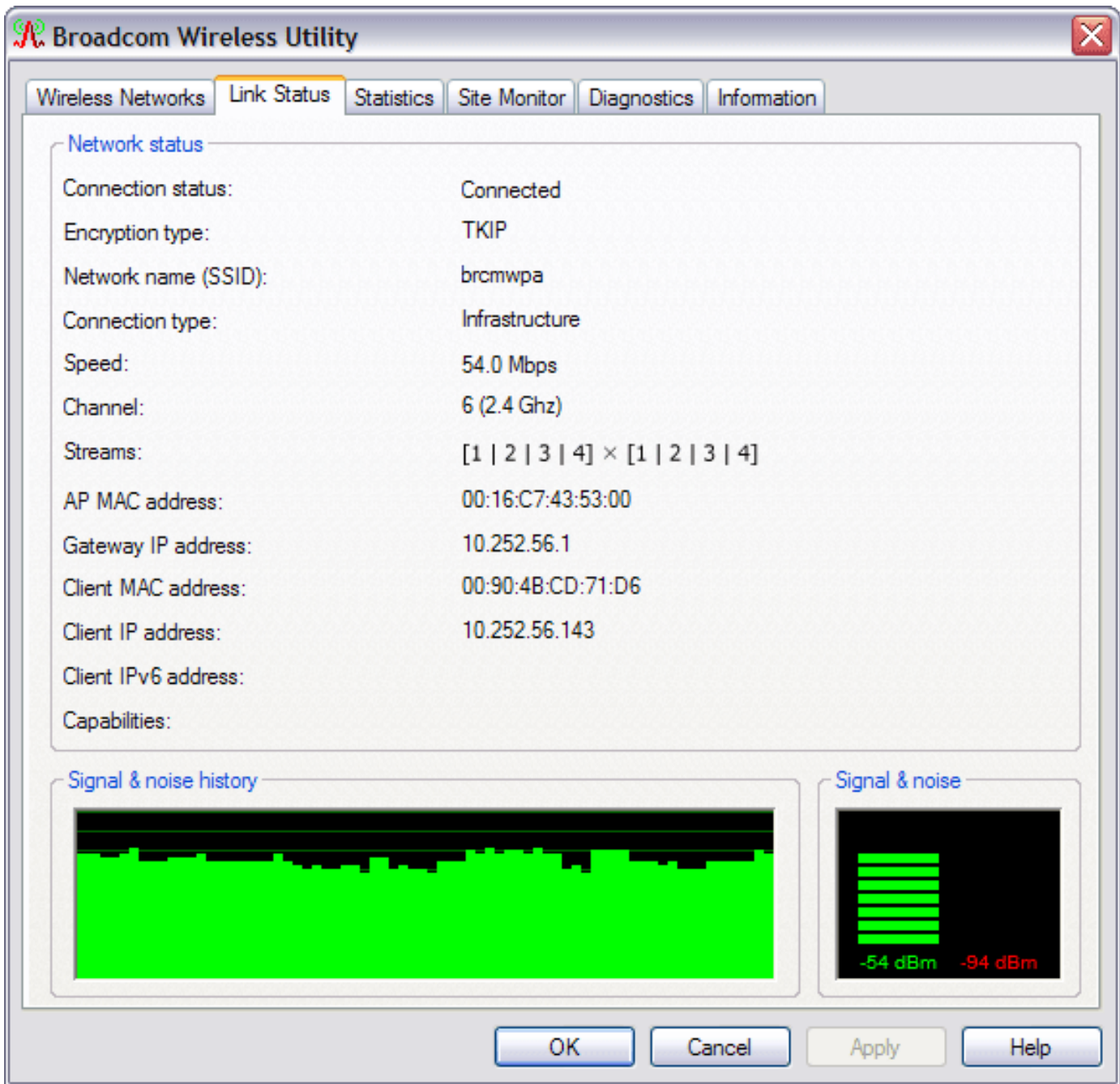
To remove a PAC: click anywhere in the row that lists the PAC, and then click **Remove**.


Link Status

Network status and signal and noise information about your network connection is displayed on the Link Status tab.


NOTES:

- For IEEE 802.11n connections, speed is indicated by an [MCS value](#).
- [Radio Stream](#) information is provided only for IEEE 802.11n connections.
- Click anywhere in the **Signal & noise history** box to change the type of history being displayed. Successive clicks change the type from both signal and noise, to noise only, to signal only, and back to both signal and noise.







The status of your network connection is also indicated by the appearance of the utility icon . The number and color of the radio waves indicates the strength or weakness of the signal (see [Table 1. Signal Strength Indicated by the Broadcom Wireless Utility Icon](#) for details).

To view the network name (SSID), speed, signal strength rating, connection status, and the client IP address of the network connection, move your mouse pointer over the utility icon.

 **NOTE:** On computers running Windows XP, you also can view the SSID, speed, signal strength rating, and connection status by moving your mouse pointer over the

Windows **Wireless Network Connection** icon  in the notification area.

Table 1. Signal Strength Indicated by the Broadcom Wireless Utility Icon

Icon Appearance	Indicated Received Signal Strength
	The signal strength is very good or excellent .
	The signal strength is weak . See Troubleshooting for suggested action.
	No signal is being received. See Troubleshooting for probable causes and suggested action.
	The radio is disabled or switched off. See Troubleshooting for suggested action.

Statistics

On the Statistics tab under Current, the following current statistics are shown:

- Network name (SSID)
- Connection time
- Packets sent
- Packets received
- Sent packets lost
- Received packets lost
- Total packets lost (%)

Under Accumulated, the following accumulated statistics are shown:

- Packets sent
- Packets received
- Sent packets lost
- Received packets lost



Site Monitor

Basic Site Monitor

On the Site Monitor tab, the basic Site Monitor displays information about [wireless routers/APs](#) and [ad hoc networks](#) that are within range. To sort the list, click the column heading that shows the characteristic you want to sort by. For example, to sort by signal strength, click **Signal**.

To view information about a particular wireless router/AP or ad hoc network, click anywhere in the row that lists the wireless router/AP or ad hoc network. The network information is shown under Selected Network. To view or change the network connection settings for a particular wireless router/AP or ad hoc network, right-click anywhere in the row that lists the wireless router/AP or ad hoc network, and then click **Edit**—if you have not yet created a network connection profile for that particular wireless router/AP or ad hoc network and want to do so, click **Add**.

To see the information elements for a listed AP or ad hoc network, right-click anywhere in the row that lists the AP or ad hoc network, and then click **Show Information Elements**.

NOTES:

- Nonbroadcasting networks are labeled (nonbroadcasting) under Network Name.
- The network performance may be degraded while Site Monitor is displaying nonbroadcasting APs to which you are not currently connected.
- The symbols under AP Band indicate IEEE 802.11a, IEEE 802.11b, IEEE 802.11g, or IEEE 802.11n operation.

To see more detailed information about a particular wireless router/AP or ad hoc network, click anywhere in the row that lists the wireless router/AP or ad hoc network, and then click **Advanced**.

The screenshot shows the 'Broadcom Wireless Utility' window with the 'Site Monitor' tab selected. The window contains a table of wireless networks and a 'Selected Network' section.

Type	Network Name	Security	802.11	Speed	Channel	Signal
	brcmwnpa			54	6	
	brcmwnpa			54	11	
	UCInet Mobile ...			11	11	
	la_wireless			54	6	
	brcmwnpa			54	1	
	nerf			54	6	
	brcmwnpa			54	6	
	linksys			54	11	

Selected Network

Mode.....


Network address.....

Data encryption.....

Advanced Site Monitor

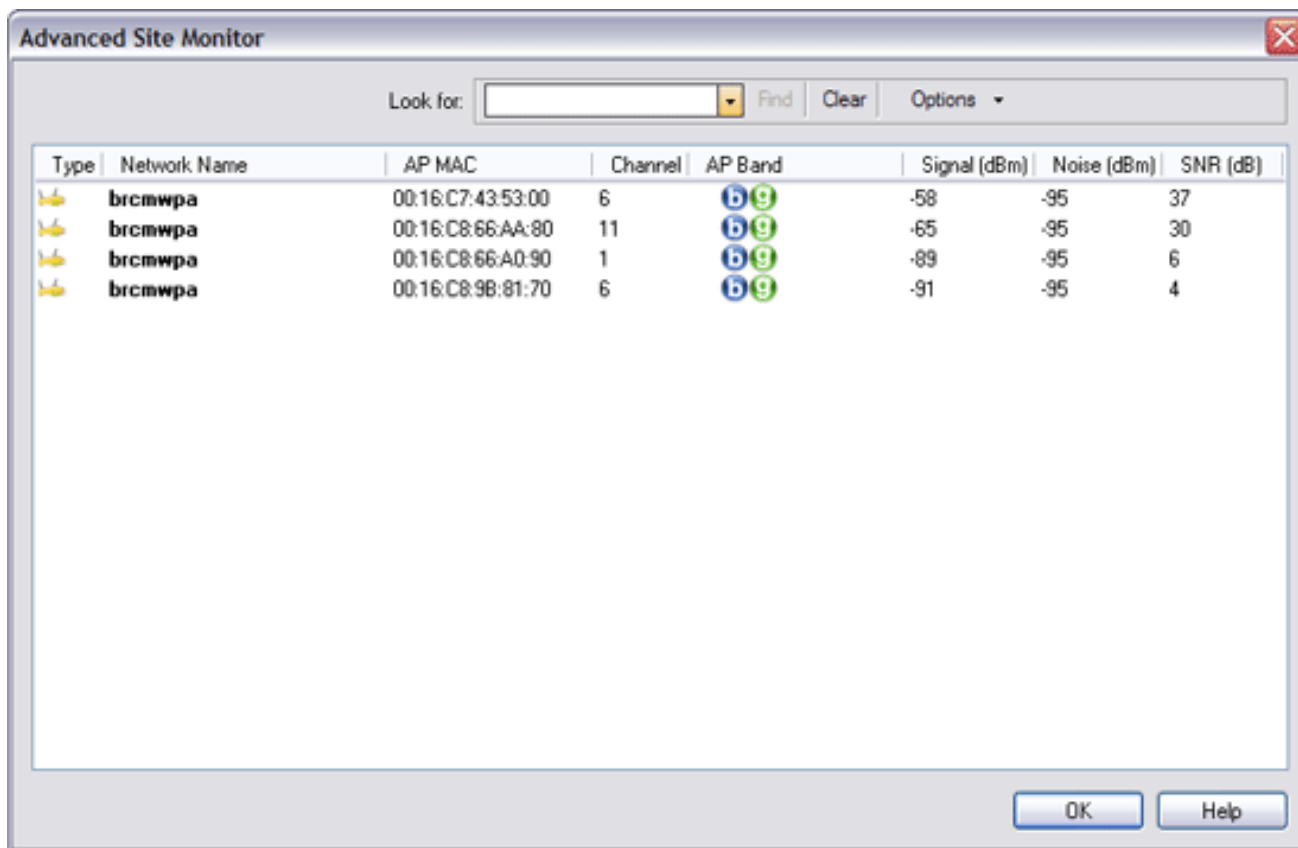
To save the activity log to a file, click the **Options** arrow, and then click **Start Log**.

You can adjust the time interval between scans by clicking the **Options** arrow, and then clicking either one of the preset values or clicking **Customize** to specify a different time interval.

 **NOTE:** The network performance may be degraded while Site Monitor is displaying nonbroadcasting networks to which you are not currently connected.


To view detailed network information for a single [nonbroadcasting network](#), type *the network name* in the **Look for** box, and then click **Find**.

To reset the site monitor to the broadcasting networks, click **Clear**.



Diagnostics

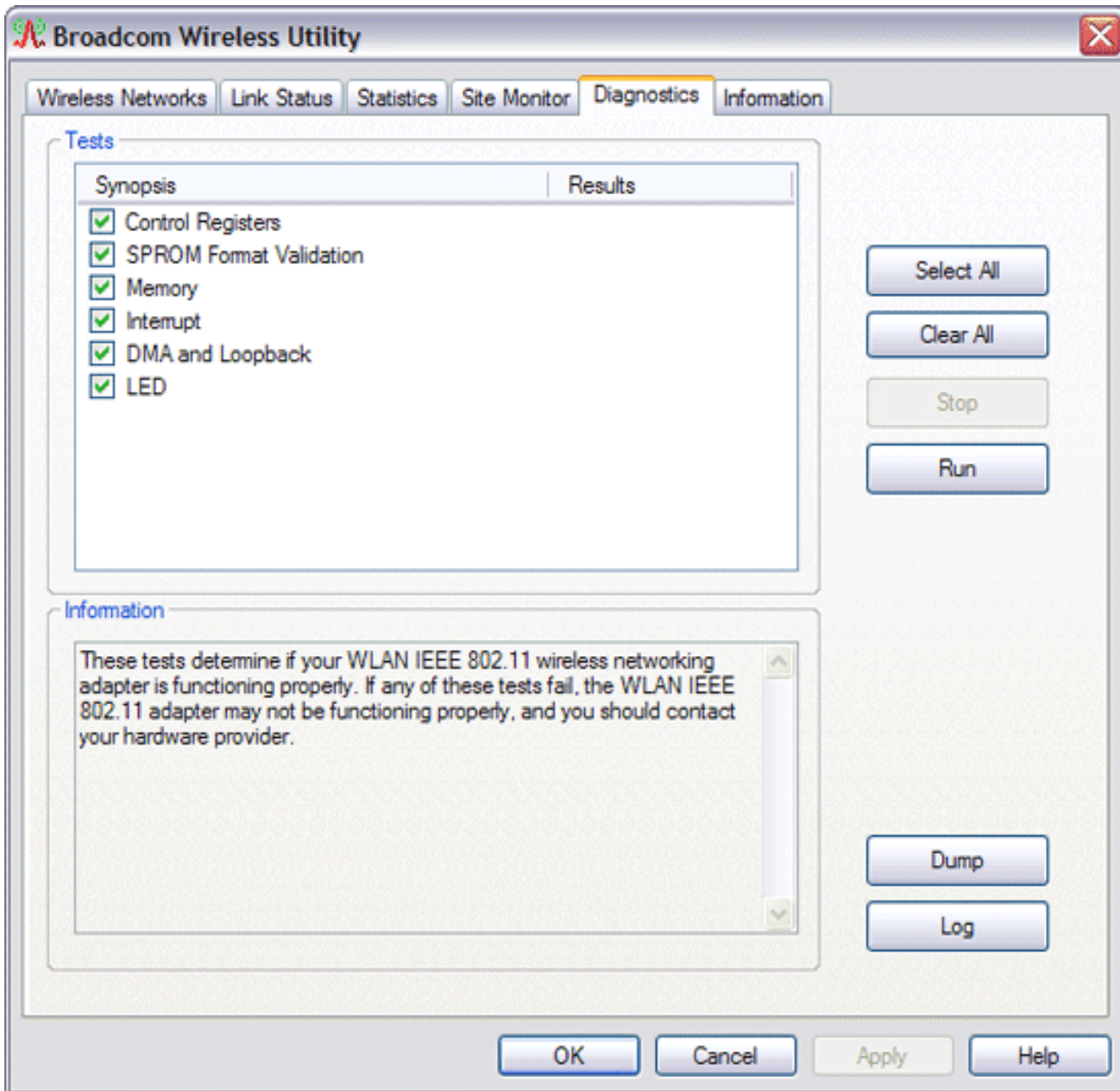
On the **Diagnostics** tab, you can run a number of tests to determine if your wireless network adapter is functioning properly. Select the tests you want to run, and then click **Run**. For information about an individual test, look under **Information** before you click **Run**. To see the test results, look under **Information** after you click **Run**.

 **NOTE:** The network connection is lost when you run the tests. When the test run is over, your network connection is automatically reestablished.

Also, you can view a log of your wireless network events. To do so, click **Log**.

Examples of wireless network events that are logged include:

- Initiation of user session
- Connecting to a network
- Disconnecting from current network
- Authentication mode being used
- Driver status
- Supplicant status
- New wireless device available
- Initializing wireless state machine
- Wireless utility is managing this adapter
- Wireless utility is not managing this adapter

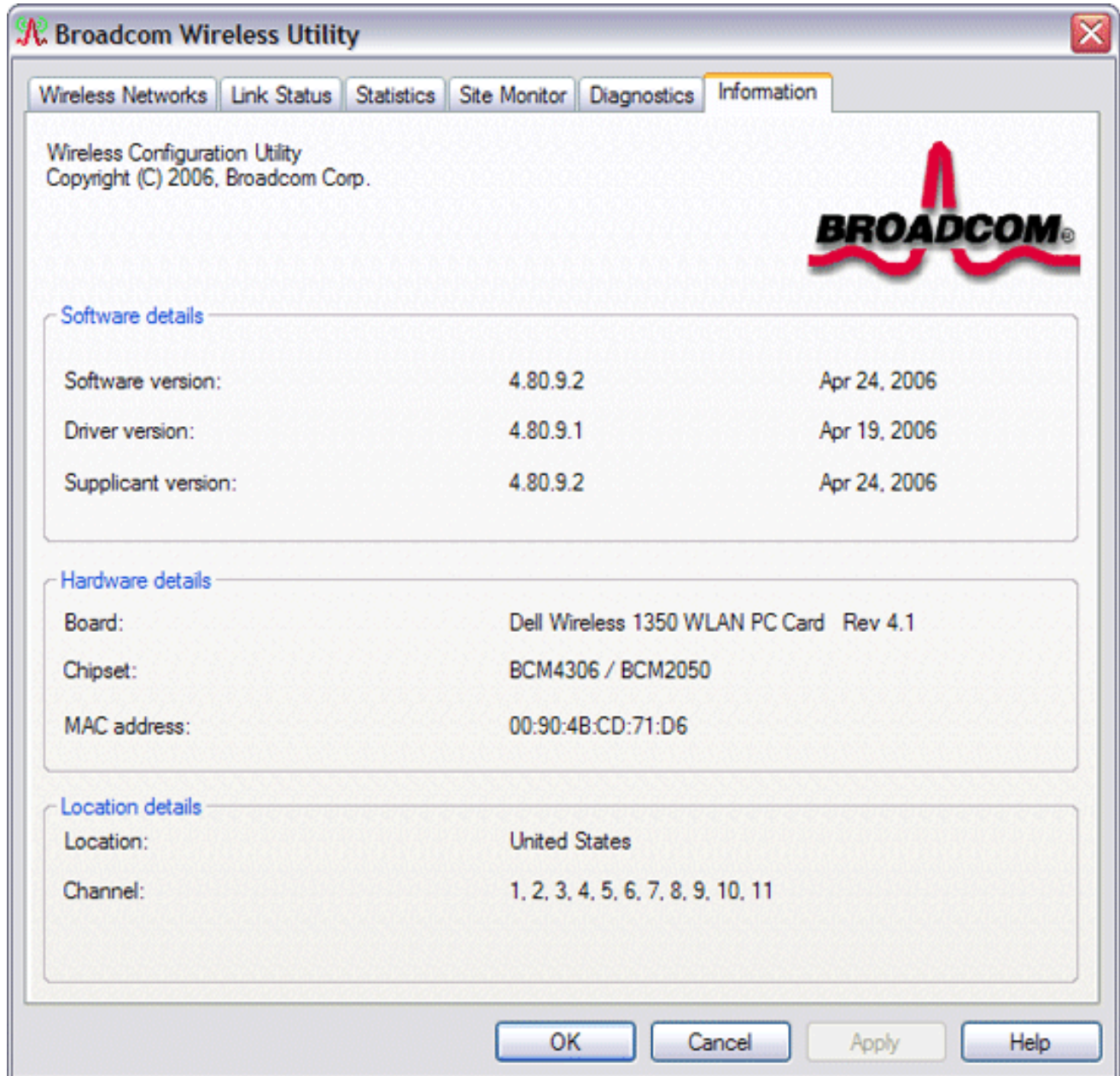


If your Broadcom 802.11 Network Adapter fails any of the diagnostics tests, go to <http://www.broadcom.com/> for technical support.

Information

The following information is displayed on the **Information** tab:

- Software details
- Hardware details
- Location details (shows the country for which the driver is installed and the channels supported for that location)



Wireless Network Connection Settings

The Wireless Network Connection Settings component is intended for use by advanced users or network administrators. You can use Wireless Network Connection Settings to create a connection profile for an advanced infrastructure network, a basic infrastructure network, or an ad hoc network (see "[Connecting to an Advanced Network Using the Broadcom Wireless Utility](#)").

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Regulatory Statements for BCM94321MC

USA-Federal Communications Commission (FCC)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of 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. If not installed and used in accordance with the instructions, it 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 tuning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

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

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

Caution: Exposure to Radio Frequency Radiation.

To comply with FCC RF exposure compliance requirements, for mobile configurations, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.

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

IMPORTANT NOTE:

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in devices where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in visible area with the following: "Contains TX FCC ID: QDS-BRCM1022HR1"

End Product Manual Information

The user manual for end users must include the following information in a prominent location: "IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."

FCC Compliance Information

This device complies with Part 15 of FCC Rules.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device.”

Canada – Industry Canada (IC)

This device complies with RSS 210 of Industry Canada.

Operation is subject to the following two conditions:

(1) this device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of this device.”

L' utilisation de ce dispositif est autorisée seulement aux conditions suivantes : (1) il ne doit pas produire de brouillage et (2) l' utilisateur du dispositif doit être prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.

The term "IC" before the equipment certification number only signifies that the Industry Canada technical specifications were met.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.


Pour empêcher que cet appareil cause du brouillage au service faisant l'objet d'une licence, il doit être utilisé à l'intérieur et devrait être placé loin des fenêtres afin de fournir un écran de blindage maximal. Si le matériel (ou son antenne d'émission) est installé à l'extérieur, il doit faire l'objet d'une licence.

Caution: Exposure to Radio Frequency Radiation.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website www.hc-sc.gc.ca/rpb.

Europe—EU Declaration of Conformity and Restrictions

Hereby, Broadcom Corp, declares that this equipment complies with the essential requirements and other relevant provisions of Directive 1999/5/EC.

This equipment is marked with the **CE 0984**  symbol and can be used throughout the European community.

This indicates compliance with the R&TTE Directive 1999/5/EC and meets the relevant parts of following technical specifications:

EN 300 328 – Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission Systems; Data transmission equipment operating in the 2,4GHz ISM band and using spread spectrum modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE directive.

EN 301 893 - Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive

EN 301 489-17 - Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17 Specific Conditions for Wideband Data and HIPERLAN Equipment.

EN 60950 - Safety of Information Technology Equipment.

EN 50385 – Product standard to demonstrate the compliances of radio base stations and fixed terminal stations for wireless telecommunication systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields.

Marking by the symbol  indicates that usage restrictions apply.

France - 2.4GHz for Metropolitan France :

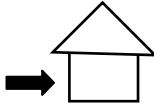
In all Metropolitan départements, wireless LAN frequencies can be used under the following conditions, either for public or private use:

- Indoor use: maximum power (EIRP*) of 100 mW for the entire 2400-2483.5 MHz frequency band
- Outdoor use: maximum power (EIRP*) of 100 mW for the 2400-2454 MHz band and with maximum power (EIRP*) of 10 mW for the 2454-2483 MHz band

802.11a Restrictions:

- This product is for indoor use only when using channels 36, 40, 44, 48, 52, 56, 60, or 64 (5150–5350 MHz). - DFS and TPC must remain enabled to ensure product compliance with EC regulations.
- To ensure compliance with local regulations, be sure to select the country in which the access point is installed.

- This product can be used as shown in the table below:

<p>5 GHz wireless LAN IEEE 802.11a</p>	 <p>Indoor Use Only</p>	<p>A, AND, B, CH, D, CY, CZ, DK, ES, EST, F, FIN, FL, FR, GB, GR, H, I, IRL, IS, L, LT, M, MC, N, NL, P, PL, RSM, S, SK, SLO, V</p>
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Caution: Exposure to Radio Frequency Radiation

To comply with RF exposure compliance requirements, for mobile configurations, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.

Taiwan DGT warning statement

低功率電波輻射性電機管理辦法

第十四條經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十七條低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前項合法通信，指依電信規定作業之無線電信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

在5.25G ~5.35G頻帶內操作之無線資訊傳輸設備僅適於室內使用

Translation:

Article 14

Without permission granted, the frequency change, transmitting power enhance or alter of original design characteristic as well as function by company, enterprise, or user for approved Low-power radio frequency devices is not allowed.

Article 17


Low-power radio-frequency devices shall not influence aircraft security and interfere legal communications; If found, shall cease operating immediately until no interference is achieved.

Above mentioned Legal Communications is defined as radio communications operation follows Telecommunications Act. Low-power radio-frequency devices must susceptible with the interference from legal communications, ISM radio wave radiated devices.

Radio devices using 5.25-5.35GHz bands are restricted to indoor use only.

Appendix:

模組認證合格標籤 (ID):

“含  XXXyyyLPDzzzz-x ”

如果使用本模組之平台，無法在外部看見審驗合格標籤時，應在該平台的外部明顯標示內含射頻模組 XXXyyyLPDzzz-x 字樣。