

# Wireless LAN Radio Frequently Asked Questions

Document ID: 14239

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# Introduction

This document provides information on the most frequently asked questions about wireless local–area network (WLAN) radios.

## Q. What are the different modes of an Access Point (AP) operation?

A. An AP can be performed by one of these modes of operation:

- ◆ **Root Mode** This is the actual AP mode. It can associate wireless clients and bridge the traffic to the wired network when needed.
- ◆ **Bridge Mode** AP acts as a bridge and can be used to connect wired networks at a distance.
- ◆ **Repeater Mode** When the Ethernet port is disabled, the AP becomes a repeater and associates to a nearby root AP.
- ◆ **Work Group Mode** A Workgroup Bridge (WGB) can provide a wireless infrastructure connection for Ethernet–enabled devices. Devices that do not have a wireless client adapter in order to connect to the wireless network can be connected to the WGB through the Ethernet port. The WGB associates to the root AP through the wireless interface.

## Q. Where can I download the latest firmware, drivers, and software for my wireless network?

A. Cisco Aironet equipment operates best when all components are loaded with the most current version of the software. Software, driver, and firmware updates are available at the [Cisco Downloads – Wireless Software Page](#) ( registered customers only) .

Due to United States export compliance regulations, you must be registered on Cisco.com to download wireless software. Registration is free. Refer to the [Cisco.com Registration](#) for information on how to register for a Cisco.com account and download wireless software.

## Q. What Cisco Aironet products are Wi-Fi certified?

A. Refer to [Wi-Fi Certified Products](#) for current certification information.

## Q. How does roaming work? Who roams when there is not enough signal strength, the client or the AP?

A. Roaming is an algorithm implemented and controlled by the client adapter and it is not defined by IEEE standards. The roaming functionality is based on signal quality, not just the proximity to the AP. Each vendor has their own logic to implement roaming. For Cisco clients, roaming is caused by one of these events:

- ◆ Maximum data retry count is exceeded
- ◆ Missed too many beacons
- ◆ Data rate shift
- ◆ Initial startup
- ◆ Periodic client interval (if configured)

For more information about roaming, refer to [How to configure roaming for Wireless LAN Clients](#) and how the roaming capabilities can be improved.

## Q. What is fast roaming?

A. Fast roaming is a feature where the client's credentials are not sent to the Authentication server every time the client authenticates. Once a client authenticates to an AAA server, credentials are cached in the AP. The next time a client roams, the AP authenticates and supplies the credentials by itself to the client without sending it back to the AAA server. This saves time and enables faster roams of clients. For more information on fast roaming, refer to the Understanding Fast Secure Roaming section of Configuring WDS, Fast Secure Roaming, and Radio Management.

## Q. Can the radios be damaged if they are operated without the antennas attached?

A. Some radio equipment manufacturers specifically warn against this because it damages the transmitter. Most pieces of amateur or commercial radio equipment carry this warning because they operate at a much higher transmitter power. The reflected wave standing wave ratio (SWR) caused by the lack of a proper antenna or load can damage the final amplifier stage known as the power amplifier (PA).

For Cisco Aironet equipment, the transmitter power output is 100 mW for the 350 series and 30 mW for the 340 series, so damage is unlikely but possible. If you absolutely have a requirement to run the devices without antennas, it is recommended that you turn the transmitter power down to 1–5 mW or use a 50–52 ohm "dummy load," just to be safe.



**Warning:** Never connect the antenna port of one device directly into the antenna port of another device since this could damage the devices.

## Q. What are all the authentication mechanisms currently supported by Cisco Access Points (APs)?

A. This is a list of authentication mechanisms currently supported:

- ◆ WEP
- ◆ WPA– Personal and WPA2–Personal
- ◆ WPA–Enterprise and WPA2–Enterprise

**Note:** For more information on WPA, refer to WPA Configuration Overview.

- ◆ EAP authentication
- ◆ MAC authentication

## Q. Do I need a license to operate WLANs?

A. WLAN equipment operates in a 2.4 GHz and 5 GHz frequency spectrum which are license free. In the United States, spread spectrum devices fall under Federal Communications Commission (FCC) Part 15 of the rules that govern unlicensed devices. However, other countries might require a license if you operate devices that are partially or completely outdoors, such as point-to-point bridges. In addition, some countries might require the system importer to obtain a telecommunications license to sell the product.

## **Q. Can I use my wireless device on an aircraft?**

**A.** Under current Federal Aviation Administration (FAA) rules, the use of wireless devices on an aircraft is permitted if the aircraft is parked at the gate and the door is open, and if usage is allowed in the airport. The device must not interfere with flight operation equipment such as navigation radar, communications, or emergency services.

The use of wireless devices on an aircraft with the door closed, whether it is sitting at the gate, taxiing, or in flight, is prohibited by the FAA and other Civil Aviation Agencies worldwide. Wireless devices used on the aircraft (when the door is open at the gate) must meet the requirements of the local country agency or have been granted a waiver by the agency or airport authority.

Wireless devices that are stored on the aircraft for use at the gate must meet certification requirements for the country that the local carrier is flagged for, and must be able to operate in the frequency band of the host country, unless a waiver is granted to the system user. It is the responsibility of the system installer to obtain all licenses and frequency or usage waivers.

## **Q. What is channel interference?**

**A.** When radios on multiple access points share the same channel or nearby channel, then the frequency band overlaps with other devices. The information transmitted is lost if there is any channel interference. Refer to Troubleshooting Problems Affecting Radio Frequency Communication for more information on how to overcome problems with channel interference.

## **Q. What is World Mode?**

**A.** Generally a wireless client can operate only in its Local Regulatory domain as channel and power settings carry for each domain. When World Mode is used, a client can automatically adjust channel and power settings according to the domain it migrates to. For example, if a user travels from the United States to Japan a client card that implements World Mode can automatically adjust its channel and power settings as per the Japan domain. The access point (AP) should also support World Mode for this to work. The Cisco client card and AP support World Mode.

## **Q. Are the WLAN cards safe to use from a health perspective since they use microwave frequencies?**

**A.** The WLAN devices are safe when used under normal operating conditions as stated in the user manuals. The power levels are below the power level of a typical microwave oven. The radio modules were tested by independent test labs in accordance with various recognized standards. The levels measured when the PCMCIA antenna was 1 cm away from the user were recorded at 10–12% of the maximum level allowed.

## **Q. The FCC limits the maximum system power to 4 watts Effective Isotropically Radiated Power (EIRP) for non point-to-point systems. However, a properly tested and certified system is allowed to exceed the 4 watt EIRP for a point-to-point system. I have two parabolic dishes aimed at an Omni. Can I exceed the 4 watt EIRP limit if I consider each leg point-to-point?**

A. No. The FCC defines the system that uses directional gain antennas as only part of the complete system. You cannot exceed the 4W EIRP for any of the legs of this system since the whole system is a point-to-multipoint. This topic is defined in FCC docket 96-8, which covers the spread spectrum transmitter.

### **Q. My WLAN system sees radio frequency interference (RFI) or electromagnetic interference (EMI) from another device. What can I do?**

A. Relocate the Cisco Aironet equipment as far away as practical from potential sources of EMI/RFI or reorient the point-to-point antennas away from the RFI/EMI emitter.

Use a different frequency range for the phone and WLAN.

It is suggested that you perform a site survey before you install a WLAN. In site survey you can detect all kinds of interference sources. This includes non-802.11 sources such as microwave ovens, cordless phones, etc. You can collect information on key parameters such as Signal strength, Noise, and Data rates that exist in the actual deployment scenario. Based on this, WLANs can be planned and deployed accordingly. For more information on site survey, refer to Wireless Site Survey FAQ.

### **Q. Would the frequency hopping (FH) equipment of another vendor that sits next to our direct sequence (DS) equipment have any negative effect?**

A. Yes. By its very nature, an FH product hops across the entire 2.4 frequency band. Therefore, it causes interference to WLAN 802.11 b/g products that operate in 2.4 GHz. There is no way to control where an FH unit hops. Try one or all of these steps:

- ◆ Change the location of the access point and/or the base of the cordless phone.
- ◆ Switch to channel 1 on the access point. If that does not work, try channel 11.
- ◆ Use a remote antenna on the client card if it is a PCI- or ISA-based card and you have that option.
- ◆ Operate the phone with the antenna lowered, if that is an option.
- ◆ If all else fails, use a 900-MHz phone instead of a 2.4-GHz phone.

### **Q. My WLAN system sees interference from a cordless phone. What can I do?**

A. Most cordless phones operate in 2.4 GHz and are another major source of interference. See Would the FH equipment of another vendor that sits next to our direct sequence (DS) equipment have any negative effect? for more information.

### **Q. What is the maximum speed of 802.11 a,b,g standards?**

A. 802.11b has a maximum speed of 11 Mbps while 802.11g and 802.11a have 54 Mbps.

### **Q. Does Cisco currently support 802.11n?**

A. Yes. Cisco supports 802.11n. However, 802.11n is supported only in 1250 series APs currently. For more information on 802.11n, refer to Cisco 802.11n Design and Deployment Guidelines.

## **Q. What antenna should I use for the Cisco Aironet 1010 access point?**

**A.** This device has a built in antenna. You do not need to connect an antenna.

The Cisco Aironet Antenna Reference Guide has all the information about the different types of antennas and accessories that Cisco provides as a part of the Cisco WLAN solution.

## **Q. I have an access point about 50 feet away from my client. The signal is very weak and there is significant interference in the path (paper storage). What should I do to obtain proper coverage?**

**A.** Install a high gain antenna for greater transmission and reception so that the signal at a longer distance can be picked up easily.

## **Q. What type of antennas should I use for bridges?**

**A.** There are different types of external antennas which are designed for external uses only. Choose one of them as per the individual requirement (Yagi, Dish, and so forth). Refer to Cisco Aironet 2.4 GHz and 5 GHz Antennas and Accessories for more information on antennas.

## **Q. Where should I install my access point?**

**A.** The co-location of an access point depends on the nature of the physical place where you need Wireless LAN coverage. It also depends on the type of facility warehouse, office, conference room, home, and so forth). The materials used in the physical place have an important role. Cisco strongly recommends to perform a site survey before any access point is placed. Refer to Wireless Site Survey FAQ for details on how to perform a site survey.

## **Q. Does Cisco provide any management software or a device to manage multiple access points (APs)?**

**A.** Yes . Cisco provides a management device know as Wireless LAN Solution Engine (WLSE) to manage multiple APs. You can push configurations and upgrade firmware simultaneously for multiple APs. The radio environment in which the APs operate can be monitored and controlled by the WLSE by periodically collecting RF information from the APs. For more information on WLSE, refer to User Guide for the CiscoWorks WLSE and WLSE Express, 2.13.

## **Q. What is Dynamic Transmit Power Control (DTPC) and how does it work?**

**A.** DTPC is a new beacon and probe information element that allows the access point to broadcast its transmit power. Clients can use this information to automatically configure themselves to that power while associated with that access point. In this manner, both devices transmit at the same level. The Cisco Wireless IP Phone 7920 automatically adjusts its transmit power to the same level as the access point to which it is associated. Refer to Transmit Power Control Algorithm for more information.

## **Q. What is the difference between 802.3 bridging and 802.11 bridging?**

**A.** A bridge is a device that connects two or more networks. The bridges can be separated with the media type they are connected with. If two wired networks are bridged together, then these are called 802.3 bridging while those which bridges the wireless network with the wired network are called 802.11 bridges. 802.3 frames differs in format and length that those of 802.11 frames. In order to communicate between them, there should be a translation of frame from one format to another. Translation is usually done by the access point.

## **Q. If I wish to install antenna at some distance from an access point (AP), which extension cable do I need between the AP and the antenna?**

**A.** There are two types of cable supplied by Cisco for mounting the antenna away from the radio unit LMR600 type cable and LMR400 type cables. These are low loss cables designed for better efficiency. For more information, refer to Cisco Aironet Antennas and Accessories Reference Guide.

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## **Related Information**

- **Cisco Downloads for Wireless Products**
- **Cisco Aironet Access Point Software Configuration Guide for VxWorks**
- **Cisco Aironet Access Point Software Configuration Guide for IOS**
- **Wireless Support Resources**
- **Technical Support & Documentation – Cisco Systems**

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Updated: Nov 20, 2008

Document ID: 14239

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