Macworld

Troubleshooting AirPort Interference

by Glenn Fleishman, Macworld.com

Imagine a large room full of loud people. Voices bounce off the walls, making it impossible to follow any one conversation. That's something like what happens to wireless networks: there are all sorts of other electronic devices out there using the same wireless spectrum, and your AirPort hardware can have a hard time distinguishing one transmitter from another. The result: poor network performance.

If your AirPort network has been acting flaky, interference could be the culprit. But before you can solve the problem, you need to figure out its cause.

Other networks

Wi-Fi uses two unlicensed spectrum bands, at 2.4GHz and 5GHz. Nearly all Wi-Fi equipment sold before 2007, including Apple's, uses the 2.4GHz band. The 5GHz band has been available for years, but until recently most Wi-Fi gear didn't support it.

Licensed spectrum bands, such as those employed by cell phone networks, are restricted for use by specific parties and limited to specific geographic areas. Unlicensed bands can be used by anyone. That freedom can result in conflicts when multiple networks operate too close to one another.

How do you tell if other wireless networks are interfering with yours? The clearest signs are stutters and drops: file transfers or streaming downloads halt and restart, or your network connection periodically drops out altogether.

You can also check your AirPort menu; is it crowded with other network names? If you really want to know what's going on, download iStumbler (donation requested). It's an easy-to-use OS X program that provides a continuously updated list of in-range Wi-Fi networks and Bluetooth devices.

If another wireless network is putting the hurt on yours, you have a number of options:

Change Channels Whenever you power up or restart an AirPort base station, it automatically scans for the least-crowded available channel (a subsection of the spectrum band) and sets itself to use it. But if you're having problems with interference, you can change the channel: in AirPort Utility's Wireless tab, use the Channel pop-up menu. (If your base station is using the 5GHz band, change channels by holding down the option key while selecting the Channel pop-up menu.)

Move the Base Station If interference is particularly bad in one part of your house or office, move the base station to another location. But this can be tricky if your AirPort base station has to connect to the broadband feed coming into the house and that feed happens to enter at a particularly interference-prone spot.

You could move the plug, but doing so would require an expensive service call to your cable or phone company; if you're a renter or if the plug is located on a stone or brick wall, moving it might be impossible.

But there's another alternative: home power-line networking, which carries data across a home's electrical wiring. You can run an Ethernet cable from your broadband modem's LAN port to a power-line adapter plugged into a nearby electrical outlet. You then plug another power-line adapter into an outlet near an interference-free spot somewhere else in the house, place your base station there, and run an Ethernet cable from that adapter to your base station's WAN port. Belkin, Netgear, and other networking vendors make power-line hardware.

Use the 5GHz Band Compared with the 2.4GHz band, the 5GHz band is practically empty. The newest AirPort Extreme Base Station is one of the few Wi-Fi base stations designed for home use that work in that 5GHz band. All of Apple's Core 2 Duo laptops and iMacs (except the discontinued 17-inch 1.87GHz model) can also use the 5GHz band; with the build-to-order wireless option, so can the Mac Pro.

To switch to the 5GHz band, launch AirPort Utility, select your base station, and switch to Manual Setup. Click on the AirPort button and select the Wireless tab. Select 802.11n Only (5 GHz) from the Radio Mode pop-up menu. Click on the Wireless Options button and select Use Wide Channels. Click on Update to restart the base station.

Currently, no Mac-compatible adapters enable you to use the 5GHz band in older Macs or with older versions of OS X.

Reduce Power Output Full-strength Wi-Fi signals can interfere with other gateways. Those other gateways have to retransmit data or send it at a slower rate; this requires more radio time and produces interference. A weaker signal from your base station, on the other hand, could improve the overall network environment.

To adjust the strength of your base station's output, open AirPort Utility and click on Wireless Options. Select something less than 100 percent from the Transmit Power pop-up menu.

Other communication devices

Cordless phones and Bluetooth devices use the 2.4GHz band, too. But these and similar devices don't transmit data the same way as your AirPort hardware, and that can also cause interference.

Wi-Fi devices stake out subsets of the spectrum available in each band, using 20MHz channels of the 85MHz available in the 2.4GHz band, or of the 550MHz available in the 5GHz

band in the United States. (Though 802.11n can use 40MHz channels for faster transmission, Apple has chosen to allow that only in the 5GHz band.) Bluetooth equipment, cordless phones, and other devices use channels that are a few megahertz wide, but they don't stay on them continuously. Instead, they hop from one channel to another in a preset pattern. This frequency hopping can degrade Wi-Fi networks.

Assuming you've ruled out other Wi-Fi networks as the cause of your AirPort woes, these other devices are your next suspects. Does your Wi-Fi connection stutter or fail when you're talking on your cordless phone? Is your Bluetooth keyboard missing keystrokes? Do your cordless phones produce static when the Wi-Fi network is busy? If so, you need to do something about those devices.

Update Your Bluetooth Make sure all your Bluetooth equipment is using version 1.2 or later. Bluetooth devices using those versions avoid hopping onto frequencies that are in use. The procedure for updating older versions of Bluetooth varies by device; check the manual.

Get New Phones Swap your cordless phones or baby monitors for new ones that use another band. If you currently have 2.4GHz cordless phones, replace them with models that use the 5GHz or 900MHz spectrum band.

Use the 5GHz Band See "Use the 5GHz Band" under "Other Networks."

Other hardware

The 2.4GHz band has long been called the "junk band," because it's where many industrial, medical, and scientific devices send their transmissions, whether intentional (as with data devices) or not (as with equipment that generates signals as a by-product of its real operation). That's not an accident: regulators confined those devices—including microwave ovens, industrial sealers, medical monitors, and measurement equipment—to that spectrum band to keep potential interference away from licensed bands.

To figure out if these devices are causing your AirPort problems, be observant. Does your Wi-Fi network go berserk when you turn on the microwave? If your network is bad during work hours, chances are a nearby business is the problem. If you live near an industrial enterprise or a hospital, those are likely culprits.

If you've ruled out other Wi-Fi networks, Bluetooth devices, and cordless phones, and you suspect other 2.4GHz emitters are messing up your network, here are a couple of things to try:

Turn On Use Interference Robustness To turn it on, use OS X's AirPort menu or (for an AirPort Base Station) use AirPort Utility (click on the Wireless tab, and then on Wireless Options).

Use the 5GHz Band See "Use the 5GHz Band" under "Other Networks."

[Glenn Fleishman writes daily about Wi-Fi at Wi-Fi Networking News . He wrote Take Control of Your 802.11n AirPort Extreme Network (Take Control Books, 2007).]

Interference Robustness: While Apple's never been clear about what exactly this cryptically named option does, it can help if you're experiencing interference.iStumbler: This program can show you all the nearby Wi-Fi networks and Bluetooth devices that might be interfering with your AirPort network.