



## CHAPTER 2

# Cisco Spectrum Expert Introduction

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## Purpose

Cisco Spectrum Expert monitors the RF spectrum used by a variety of wireless network and communications technologies, such as Wi-Fi (802.11) WLANs. Cisco Spectrum Expert consists of a hardware-based Spectrum Sensor card and GUI-based Cisco Spectrum Expert Software which provide complete visibility of the RF environment in which wireless network technologies operate.

Other monitoring technologies typically focus on protocol-oriented network data which only provides a picture of RF devices that are part of the network (or, in some cases, rogue devices which are attempting to penetrate network security or jam the network). Cisco Spectrum Expert is designed to monitor and report on the underlying, physical-layer RF activity which is shared by numerous devices that do not share the network protocols. See [Interferers: Classified \(Named\), Generic, and Unclassified](#) for a list of interfering devices.

Cisco Spectrum Expert can identify nearly all sources of RF activity in the unlicensed bands that wireless networks share with other devices (such as cordless phone and headsets, Bluetooth devices, and microwave ovens). Based on this data, network engineers can take steps to increase network performance and security in the face of interferers, network congestion, and security attacks.

## Cisco Spectrum Expert

Cisco Spectrum Expert monitors the 2.4 GHz and 5 GHz bands used by 802.11 networks in the Americas, Australia, the Asia/Pacific region, Japan, and Europe.

### Cisco Spectrum Expert Sensor Wi-Fi (Sensor card)



#### Note

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The Cisco Spectrum Expert Sensor Wi-Fi is also referred to as the Sensor card in this document.

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### LEDs

The Sensor card has two LEDs that indicate its operational status. The Status LED (located on the right) is a power indicator. When the Sensor card is plugged in, the Status LED should be green.

The other LED (Activity LED) indicates RF activity (Rx only). Possible states for the Activity LED include:

- Off—Indicates that the Cisco Spectrum Expert Software is not running.

- On or blinks green—Normal operational state. Indicates that the Cisco Spectrum Expert Software is running and there is RF activity.
- Red blinking—May indicate a hardware problem if the blinking is persistent.




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**Note** Occasional red blinking can be expected.

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- On red—May indicate that the driver is not fully loaded. When the driver is successfully loaded, the light should turn green.

## Spectrum Bands

Cisco Spectrum Expert supports various bands for spectrum monitoring. See [Table 2-1](#) for the supported bands.

**Table 2-1 Supported Bands for Spectrum Monitoring**

Product Bundle	Sensor Card	Abbreviated Band Reference	Actual Bands Supported
Wi-Fi	210C	2.4 GHz 5 GHz	2.4-2.5 GHz 4.9-5.9 GHz

Cisco Spectrum Expert provides a detailed, default channel scheme for each supported band. In addition, you can define your own channel scheme. Channelization is discussed further in [“Local Settings Overview.”](#)

## Users Guide and Online Help

This guide provides an overview of Cisco Spectrum Expert and its principal features. Additional information can be found in the Cisco Spectrum Expert Software online help system.

This document provides:

- Cisco Spectrum Expert installation information for network engineers including information on how to install the Sensor card in your notebook laptop.
- Cisco Spectrum Expert configuration instructions.
- A description of the comprehensive RF data displayed by the Cisco Spectrum Expert Software.



**Note**

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Installation information is also available in the *Cisco Spectrum Expert Quick Start Guide*.

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## Product Bundles

The following items are shipped with each Cisco Spectrum Expert Wi-Fi bundle:

- One 210C Sensor Card
- One 2.4-2.5, 4.9-5.9 GHz external omnidirectional antenna and antenna clip
- *Cisco Spectrum Expert Quick Start Guide*

**Caution**

The external antenna attachment is a potentially sensitive component that can easily be damaged. Take care when removing (disconnecting) the external antenna. See [“Removing the External Antenna”](#) for more information.

## System Requirements

The following are the system requirements for installing and running Cisco Spectrum Expert:

- Notebook computer with Pentium series processor running at 1 GHz or faster.
- Windows XP Professional, Windows 7 or Windows Vista Business (32 bit only) operating systems.
- 256 MB of RAM required (512 MB strongly recommended).
- Display resolution of 800 x 600 or higher (1024 x 768 recommended).
- 30 MB of available disk space.
- Available card slot.
- For Cisco Spectrum Expert, an 802.11 card or onboard 802.11 capability in order to monitor Wi-Fi devices.

## Using Cisco Spectrum Expert With Other Onboard Laptop Technologies

If your computer has an 802.11 interface, it should be enabled in order to detect Wi-Fi devices. Note that if you are connected to an AP or ad-hoc network through the 802.11 interface, you will occasionally see strong signals on the spectrum plots that are measurements of your own 802.11 transmissions. As long as your network transmissions are not excessive, Cisco Spectrum Expert will still operate correctly in the presence of these signals.

### Other Monitoring Technologies

Cisco Spectrum Expert can share your laptop with some other passive monitoring technologies. It can run concurrently with WildPackets AeroPeek, AirMagnet Laptop Analyzer, or AirMagnet Surveyor without an inappropriate degradation in product performance.

**Note**

This feature assumes that your laptop can accommodate the required number of Sensor cards.

**Note**

Some of these other monitoring technologies (such as AirMagnet Surveyor) also have “active” survey or monitoring modes that transmit packets to nearby access points. If you have one of these cards installed in the same laptop with Cisco Spectrum Expert, it is important to *not* use these active transmission modes because they interfere with the proper operation of Cisco Spectrum Expert.

**Note**

The products indicated above—AeroPeek, Laptop Analyzer, and Surveyor—offer monitoring capabilities which are complementary to those provided by Cisco Spectrum Expert. Although these products offer extensive 802.11 information, Cisco Spectrum Expert offers increased depth of physical layer (RF emissions data), identification of interfering devices, and more extensive spectrum plotting and related data (such as duty cycle measurements and other measures of overall RF activity).

## Concurrent 802.11 (Wi-Fi) Protocol Support

The Cisco Spectrum Expert Software detects the presence of Wi-Fi support in the laptop, either on the system board or as another sensor card. If so, and if you are using Cisco Spectrum Expert, the software provides basic support for 802.11 protocol monitoring in the Devices View (see “[Working With Devices View](#)” for more information) and Device Finder (see “[Device Finder Mode](#)” for more information) features of the software.