Cisco Spectrum Expert Wi-Fi

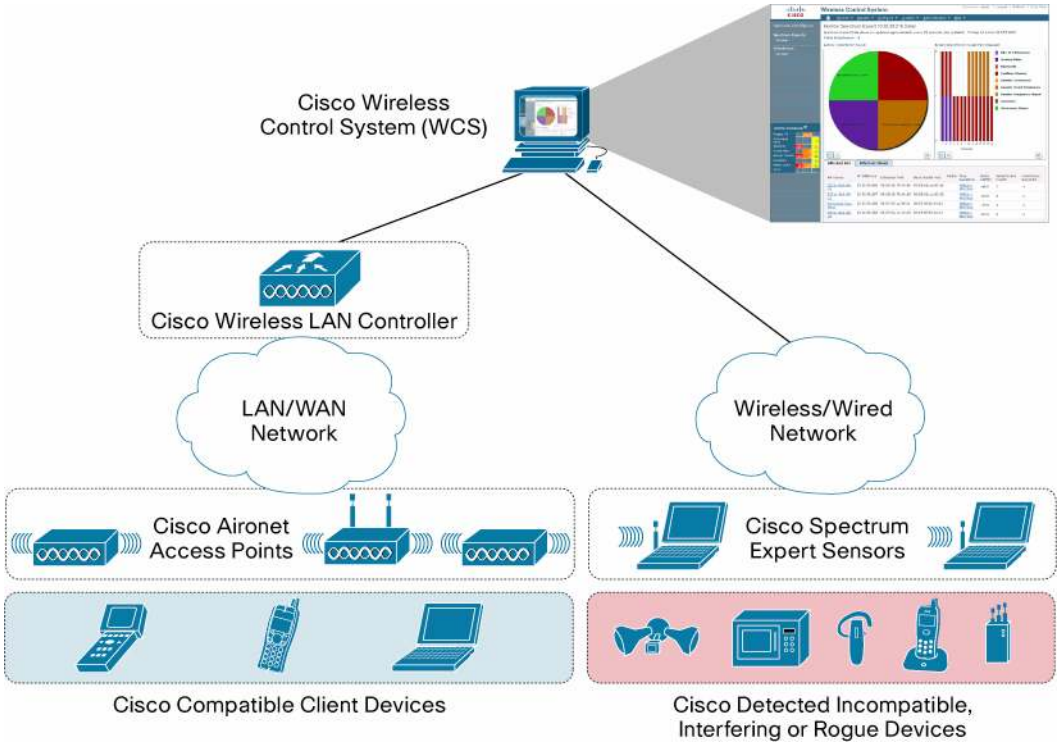
Overview

The Cisco® Spectrum Expert™ Wi-Fi integrates with the Cisco Unified Wireless Network to deliver real-time spectrum intelligence for Wi-Fi networks. This industry-leading solution detects, classifies, and locates sources of RF interference in the unlicensed 2.4-GHz and 5-GHz bands. The Cisco Wireless Control System (WCS) works in conjunction with Cisco Spectrum Expert Wi-Fi to provide visibility into non-Wi-Fi interference sources that may cause wireless performance degradation. With Cisco Spectrum Expert Wi-Fi the source of the interference can be determined allowing businesses to remove, move, shield, adjust, or replace the interference source. Organizations can troubleshoot their wireless networks to determine the root causes of interference problems and optimize network performance.

The Cisco Spectrum Expert Wi-Fi is part of the Cisco Spectrum Intelligence solution (Figure 1) and integrates with the Cisco Unified Wireless Network. The solution includes the following components:

- Cisco Spectrum Expert Wi-Fi
- Cisco Wireless Control System (Software Release 4.2 or later)
- Cisco WCS Spectrum Intelligence license

Figure 1. Cisco Spectrum Intelligence Solution Topology



Cisco Spectrum Expert Wi-Fi Components

The Cisco Spectrum Expert Wi-Fi is the industry-leading spectrum intelligence product for Wi-Fi networks. Cisco Spectrum Expert Wi-Fi offers complete visibility into the RF physical layer in the 2.4-GHz and 5-GHz frequencies allowing for enhanced performance, security, and reliability of WLAN services.

The Cisco Spectrum Expert Wi-Fi (Figure 2) includes the following components:

- Cisco Spectrum Expert Wi-Fi sensor
- Cisco Spectrum Expert software
- Cisco Spectrum Expert antenna

The Cisco Spectrum Expert Wi-Fi sensor is a sensor in CardBus card form factor for notebooks. It is supported on Microsoft Windows-based laptops and delivers comprehensive spectrum intelligence. Network administrators can streamline wireless network troubleshooting with better visibility into the RF spectrum and can easily identify and detect sources of wireless interference.

Figure 2. Cisco Spectrum Expert Wi-Fi Application and Cardbus Product (Laptop not included).

Features

Table 1 lists the features and description of Cisco Spectrum Expert Wi-Fi.

Table 1. Features of Cisco Spectrum Expert Wi-Fi

Feature	Description
Active Devices	Provides a comprehensive list of all access points, ad-hoc networks, and interferer devices (for example, microwave ovens, cordless phones, wireless security cameras, Bluetooth devices, and RF jammers).
Channel Summary	Provides visibility of RF activity—such as power levels, and presence of 802.11 and interferer devices—on a channel-by-channel basis.
Devices View	Provides granular data on each device and its impact to the wireless network, including power level, channel coverage, and other data.

Feature	Description
Device Finder	Tracks down the location of devices causing wireless interference throughout your enterprise.
Device Classifier	Offers the most comprehensive classification of the RF devices, including the following categories: • Wi-Fi access points • In-network devices • Known devices • Unknown devices • Ad hoc devices ◦ Wi-Fi stations ◦ A wide variety of Bluetooth devices ◦ A wide variety of cordless phones[1] ◦ Microwave ovens ◦ Generic fixed-frequency devices ◦ Generic frequency-hopped devices ◦ Generic continuous transmitters (for example, FM phones, NTSC video devices) ◦ RF jamming devices ◦ 802.11FH devices ◦ Analog video devices
Record Spectrum Capture	Allows you to record, share, and archive captures of your enterprise for baseline spectrum audits or for collaborative troubleshooting.
Spectrum Views	Provides plots and charts for a direct view into the RF spectrum, including measurements of RF power and network device activity. The plots are especially useful to trained RF engineers, and the charts are informative for both the expert RF engineer and the generalist network engineer.
Alarms Setting	Configures enterprise-specific alerts and alarm triggers to notify you when wireless network is at critical utilization points.
Integrated with Cisco WCS	Provides enterprise-ready spectrum management at remote locations centralized in the familiar Cisco WCS network management system.

Benefits

Benefits of using the Cisco Spectrum Expert Wi-Fi include:

- Improved network performance and coverage because RF interference is quickly detected and mitigated via better spectrum visibility
- Increased network security through quick detection of RF-level denial-of-service (DoS) attacks, nonsecure clients such as Bluetooth data-bridging devices, and more accurate rogue RF device identification
- Lowered operational costs through centralized management of all wireless interference, faster problem resolution times, decreased support calls, and simplified support of remote end users
- More efficient RF troubleshooting that allows organizations to quickly determine whether RF interference is the cause of a wireless network problem
- Optimization of the WLAN by isolating interference from network or client problems and determining the root causes of interference problems
- Delivery of robust wireless network foundation for mobility services and applications

[1] Cordless Phone, 2.4/5.8 GHz, DECT1
Cordless Phone, 2.4/5.8 GHz, DECT2
Cordless Phone, 5.8 GHz, DECT3
Cordless Phone, 2.4 GHz, TDD/Fixed Channel variant 1
Cordless Phone, 900 MHz, FHSS variant 1

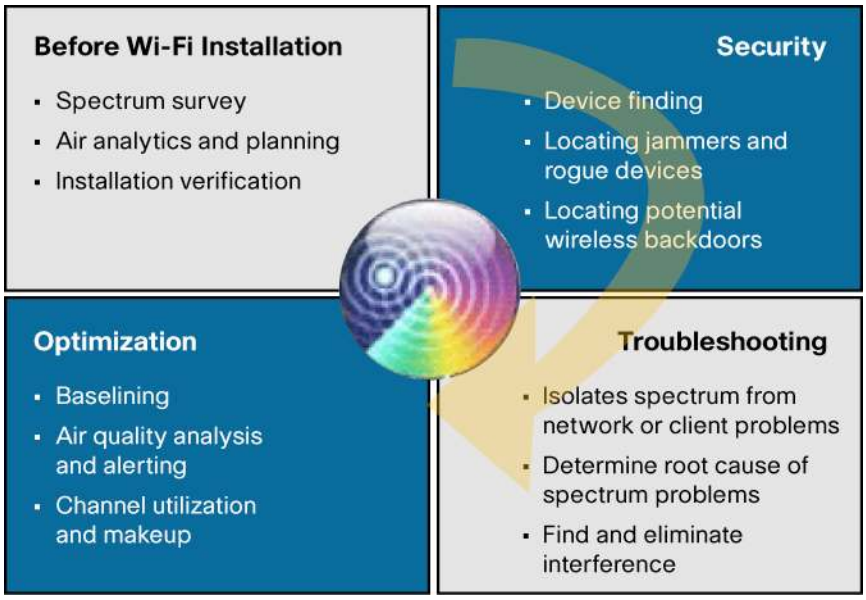
Deployment Scenarios

There are several uses for Cisco Spectrum Expert including the complete lifecycle management of the RF and wireless network. The tool can be used in either standalone mode (laptop based) or as an integrated part of Cisco WCS.

Cisco Spectrum Expert Wi-Fi and Wireless Network Lifecycle

Cisco Spectrum Expert Wi-Fi is critical at every phase of a business-ready wireless deployment, from pre- to post-deployment phases. Figure 3 illustrates the lifecycle application of Cisco Spectrum Expert Wi-Fi in all phases of a WLAN lifecycle.

Figure 3. Cisco Spectrum Expert and WLAN Lifecycle



Standalone, Mobile, and Static Deployments

There are three deployment scenarios for the Cisco Spectrum Expert Wi-Fi:

- Standalone scenario (pre-installation of WLAN)
- Mobile scenario
- Static scenario

Standalone is most utilized deployment of Cisco Spectrum Expert Wi-Fi. In this deployment option, the network administrator uses the spectrum intelligence provided by the product to identify, classify, and locate potential sources of wireless interference. A major analysis is usually done prior to a wireless deployment as part of a comprehensive spectrum site survey.

The Cisco Spectrum Expert Wi-Fi can be used in a mobile mode throughout the lifecycle of a wireless network, especially during troubleshooting of a wireless performance issue. For instance, network administrators can locate and find sources of wireless interference by employing Cisco Spectrum Expert Wi-Fi on their laptops during a site walk- through.

Static usage of Cisco Spectrum Expert Wi-Fi is helpful in solving more problematic sources of wireless interference (for example, intermittent interference). For example, the network

administrator might leave the Cisco Spectrum Expert sensor in a static location for continuous monitoring.

In either the static or mobile deployment scenarios, Cisco Spectrum Expert Wi-Fi helps network managers with:

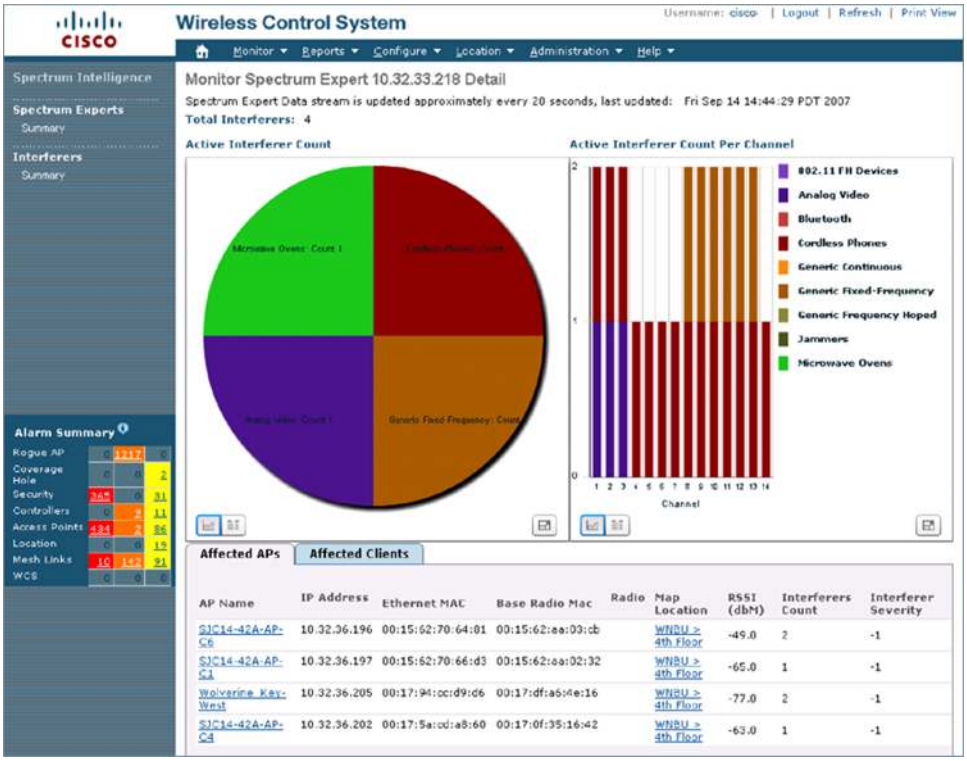
- **Pre-emptive interference mitigation:** Any interferers that are discovered to be contributing significant RF activity can be moved, deactivated, or shielded, before deploying a wireless network.
- **Band and channel allocation optimization:** Cisco Spectrum Expert Wi-Fi can determine which bands and/or channels have the most RF interference activity. Wi-Fi access points can then be programmed to use other channels, resulting in higher speed transmissions, and reduced packet retransmissions.
- **Streamlined troubleshooting:** Administrators can quickly detect and identify root causes of wireless interference (from 802.11 and non-802.11 compliant devices) that contribute to more than 50 percent of known wireless performance and connectivity problems.
- **Protection of network from threats at the RF physical layer:** Network administrators can identify and locate new threats to physical layer, from rogue access points operating in man-in-middle attacks to RF jammers making DoS attacks on the wireless network.

Using Cisco Spectrum Expert Wi-Fi with Cisco WCS

Both mobile and static deployment scenarios are further enhanced through the interoperability of Cisco Spectrum Expert Wi-Fi with the Cisco Wireless Control System (WCS). Cisco Spectrum Expert Wi-Fi card sensors can be deployed at disparate locations at which critical spectrum analysis data can be centralized and funneled to Cisco WCS for centralized spectrum intelligence and management throughout an enterprise.

Multiple Cisco Spectrum Expert Wi-Fi sensors can simultaneously interface with Cisco WCS to monitor RF interference. This allows organizations to easily detect ongoing and intermittent RF problems by placing one or more Cisco Spectrum Expert sensors at local or remote locations. Cisco WCS (Figure 4) is then used as the centralized hub for all spectrum intelligence throughout an enterprise deployment.

Figure 4. Cisco Spectrum Expert Wi-Fi Monitoring in Cisco WCS



Product Specifications

Tables 2, 3 and 4 list the product specifications for Cisco Spectrum Expert Wi-Fi:

Table 2. Cisco Spectrum Expert Wi-Fi Specifications

Dimensions	• Unit sizes: Cardbus Type II • Unit weight: 1.65 oz • Shipping weight: 1 lb • Operating temperature: 32F to 131F • Storage temperature: –4F to 149F
Analyzer Specifications	• Displayed average noise level: –124 dBm • Reference level: –150 (min) to +10 (max) dBm • 512 MB capture limit • Frequency stability: +/–20 ppm • Max safe input level: 0 dBm • Amplitude accuracy: =/– 2.5 dBm • Public safety: 4.9 Ghz • Frequency span at 2.4 GHz: 0.03 (min) to 100 (max) MHz • Frequency span at 5 GHz: 0.03 (min) to 975 (max) MHz • Center frequency resolution: 10 kHz • Resolution bandwidth: 0.01 (min) to 5 (max) MHz • Sweep time RTFFT mode: 6.4 us • Sweep time PvT mode: 10 ms (max) • Trigger delay (ms): –10 (min) to +10 (max) • Power consumption: -3.3V @ 425 mA or 1.4 watts

Classifier Specification	• 802.11 a/b/g/n via onboard or external Wi-Fi chipset • Bluetooth SCO, ACL • DECT cordless phones • TDD cordless phones • Analog cordless phones • Analog video (NTSC, PAL, SECAM) • Microwave ovens • Generic classifiers • Radar

Table 3. Application Specifications

Minimum system requirements	• Microsoft Windows XP Professional, Microsoft Windows Vista Business edition only (32 bit) Processor 1 GHz or equivalent • 256 MB of RAM (512 MB recommended) • 150 MB hard drive available storage space • 800 X 600 display (1024 x 768 recommended) • One available CardBus slot • An 802.11 card or onboard 802.11 capability in order to monitor Wi-Fi devices
Interoperability	Cisco WCS 4.2 Later

Table 4. Cisco Spectrum Expert Antenna Specifications

Frequency Range	2.4–2.5 GHz, 4.9–5.9 GHz
Gain	5 dBi
Polarization	Linear

Ordering Guide

Please refer to the Cisco Spectrum Expert Wi-Fi Ordering Guide for step-by-step ordering instructions for product and service.

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, visit Cisco Technical Support Services or Cisco Advanced Services.

For More Information

For more information about Cisco Spectrum Expert Wi-Fi, visit:

http://www.cisco.com/en/US/products/ps9393/index.html

For more information about Cisco WCS, visit:

http://www.cisco.com/en/US/products/ps6305/index.html

For more information about the Cisco Unified Wireless Network, visit:
http://www.cisco.com/go/unifiedwireless

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Printed in USA C78-442956-02 09/08