



Conducting a WIPT Survey

This chapter describes specific steps for performing a site survey for WIPT.

How To Survey for the WIPT

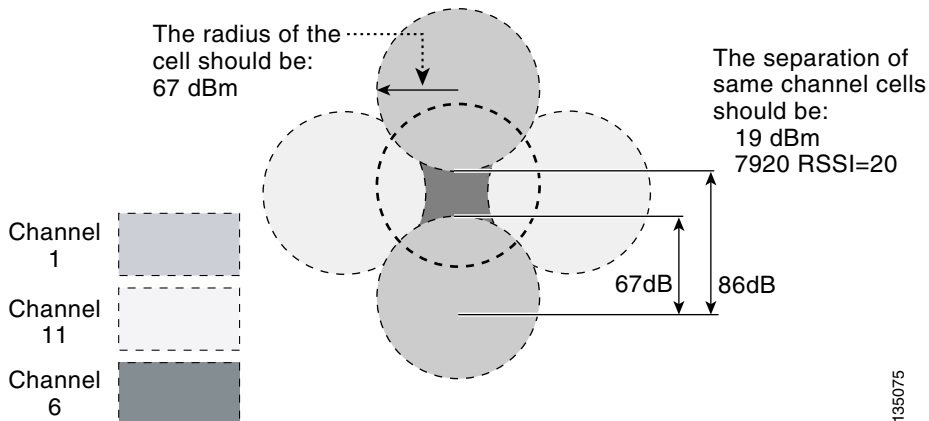
Cisco recommends that the first step of a survey is to work with administrators at the local site to determine the requirements of the RF network. Determine what the coverage areas are or will become. Determine the number of RF network users by location in the site. If the site already has an active RF network, learn the site's radio frequencies, equipment locations, and equipment characteristics. Next, do a complete scan for RF signals throughout the site. Determine the levels of RF at the site, and verify that the information you've been given about the locations of RF devices is correct. Report your findings to the site administrators.

Cisco recommends that the next step is to find on the drawings the locations of the existing RF devices. Use the drawings to estimate the cells based on the requirements for 7920 call capacities and cell design. Plan the antennas needed and transmit powers required for the access points within the site. When surveying with an existing WLAN, plan for the areas to be filled in and for changes to existing data rate and transmit power settings. Plan on possible changes to antenna types. At a multi-floor site, plan the survey of the coverage for the floor above and below. When doing a manual survey, record the cell edges of the current floor and then use your survey tool on other floors to measure and record the signal levels. When doing an automated survey, include the access point on the floors above and below in the walk-through survey.

When you survey a site without an installed 802.11 network, plan to use two or three access points to measure cell coverage and cell overlap. The cell edge for the 7920 at the 11-Mbps data rate is -67 dBm. The signal strength at the edge of that cell needs to be 19 dB weaker than the signal from the next cell on the same channel. That means at the -67 dBm edge of the cell, the next cell on the same channel should measure -86 dBm, as shown in [Figure 4-1](#).

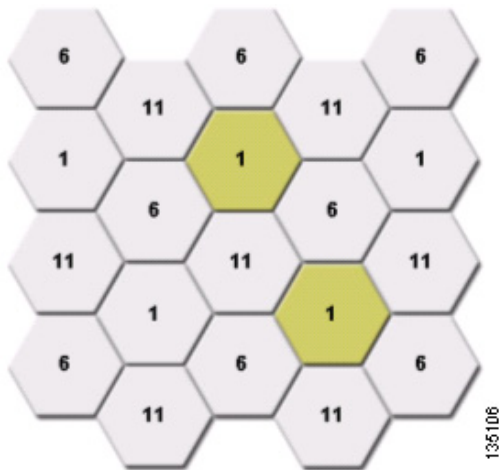
Figure 4-1 Ideal WIPT Environment

- A typical deployment showing a 15-20% overlap from each of the adjoining cells.
- Provides almost complete redundancy throughout the cell



Channel Re-Use

Figure 4-2 shows the typical channel re-use for 802.11b and 802.11g WLANs. The two gold channel 1 cells are -86 dBm apart from center to center. The same separation should be maintained between floors of a multi-floor site.

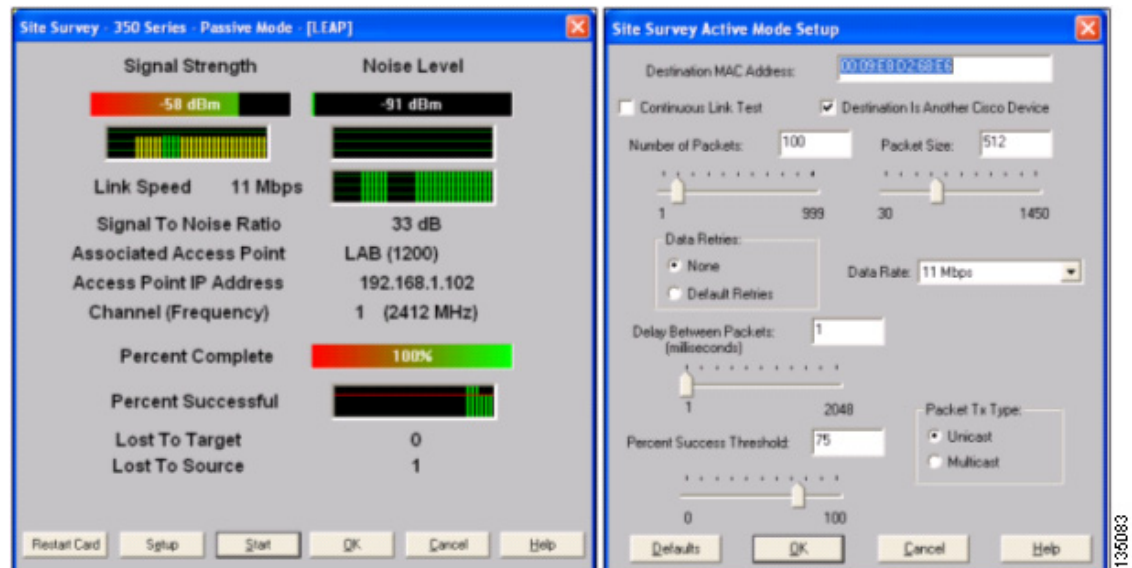
Figure 4-2 802.11b/802.11g Channel Reuse Diagram

You can use the two Aironet client tools and the survey tool in the 7920 to measure cell separation. The ACU for the PCM350 client has an active survey mode. Cisco recommends an active survey where there are transmitted and received packets of the same size as a voice packet.

Manual Survey for the WIPT

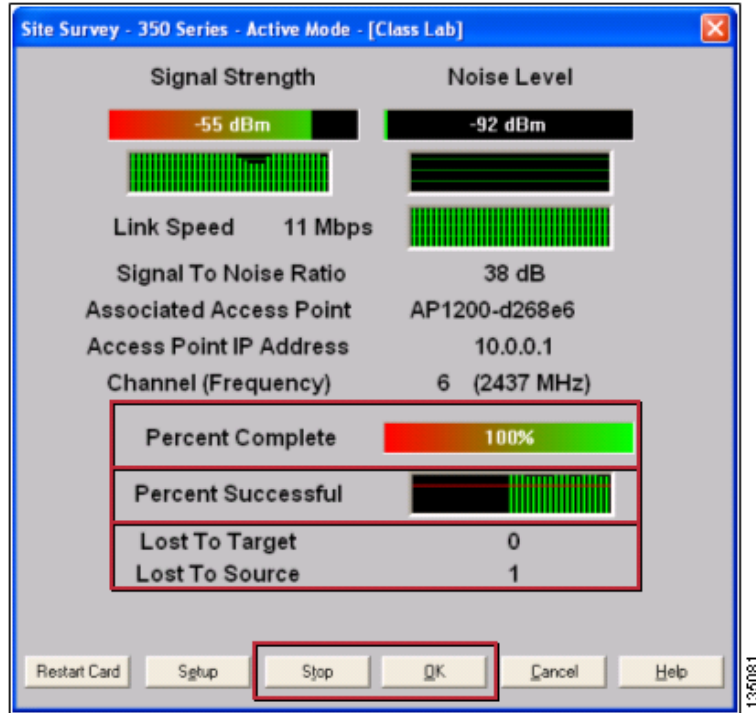
You can use passive or active mode when you use ACU to run a site survey. Figure 4-3 shows the ACU Site Survey windows.

Figure 4-3 ACU Site Survey Windows



To set up active mode, click the **Setup** button at the bottom of the screen. If the Setup button is unavailable, the client is using a version of firmware that does not support active mode, and you should upgrade the firmware. The destination MAC address should belong to the access point to which you want to test coverage. The destination MAC address prevents the client from roaming to another AP. For most surveys, you should uncheck the **Destination is Another Cisco Device** check box. Set the packet size to **256**. Set the Data Rate to **11 Mbps**. On the access point, set the 11 Mbps data rate to **required**, and set all other data rates to **disabled**.

Figure 4-4 ACU Site Survey Active Mode



Click **OK** to return to the Site Survey screen. Click **Start** to start the site survey in active mode.

This information updates constantly during the survey:

- **Percent Complete**—the percentage of packets that have been sent. When you select continuous link test, this field shows the percentage of packets that have been sent. When it reaches 100 it starts over.
- **Percent Successful**—the number of packets that have been successfully sent and received. Notice the red threshold line. If the percentage drops below this line, the bars become yellow.
- **Lost to Target**—the number of packets that were lost between the client and the access point.
- **Lost to Source**—the number of packets that successfully reached the access point but did not reach the client.

Click **Stop** or **OK** to stop the survey.

The goal for a site survey for 7920 phones is 99 percent of packets successfully sent and received for each cell.

Automated Survey for the WIPT

Cisco recommends the use of AirMagnet Surveyor for automated surveys. AirMagnet Surveyor uses a client walkabout function that formulates coverage in both signal strength and signal to noise ratio from all the data points taken during the walkabout.

You can configure the AirMagnet surveyor client to associate and authenticate to the network. When the unit associates, begin the walkabout. You should walk at a slow pace; the program takes a data point about once per second.

The AirMagnet surveyor works very well for surveying a site with an installed WLAN or for surveying a site without a WLAN. The tool works with the existing transmit power of the access points, but allows you to redisplay coverage areas with simulated transmit power settings, another time-saving feature over manual surveys. Figure 4-5 shows the AirMagnet Surveyor main window. Figure 4-6 shows the Active Mode window.

Figure 4-5 AirMagnet Surveyor Main

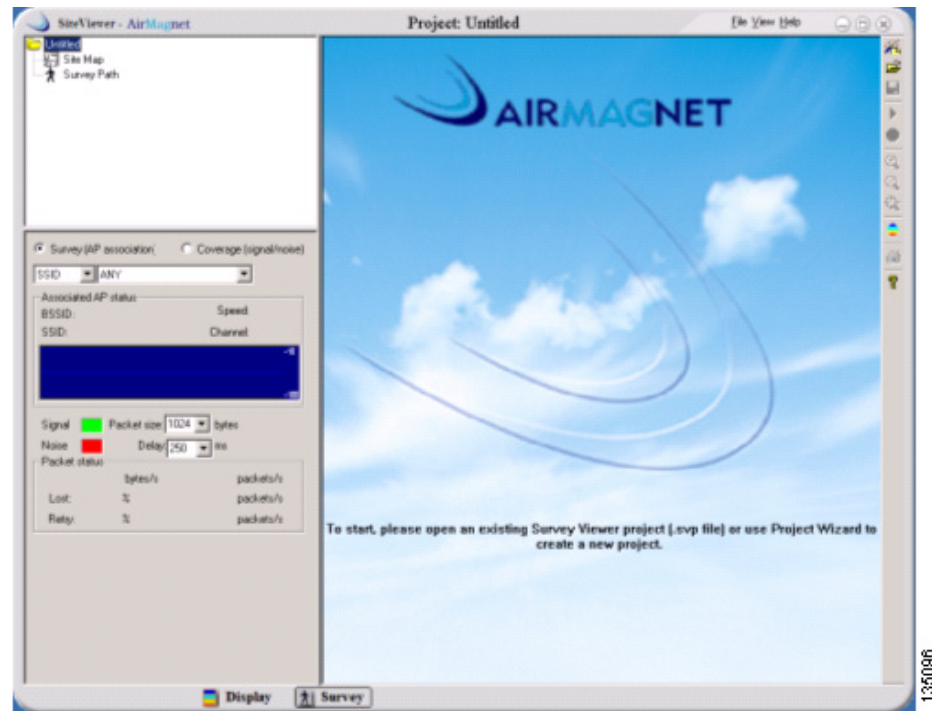
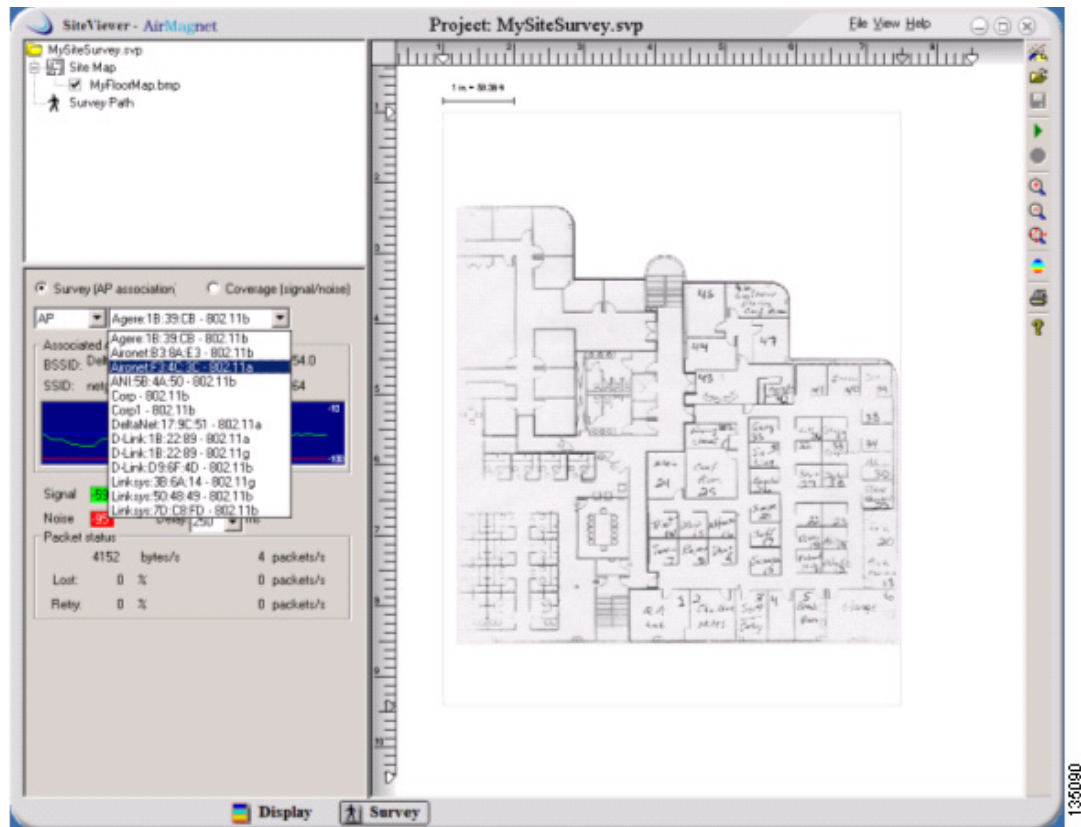


Figure 4-6 AirMagnet Survey Active Mode



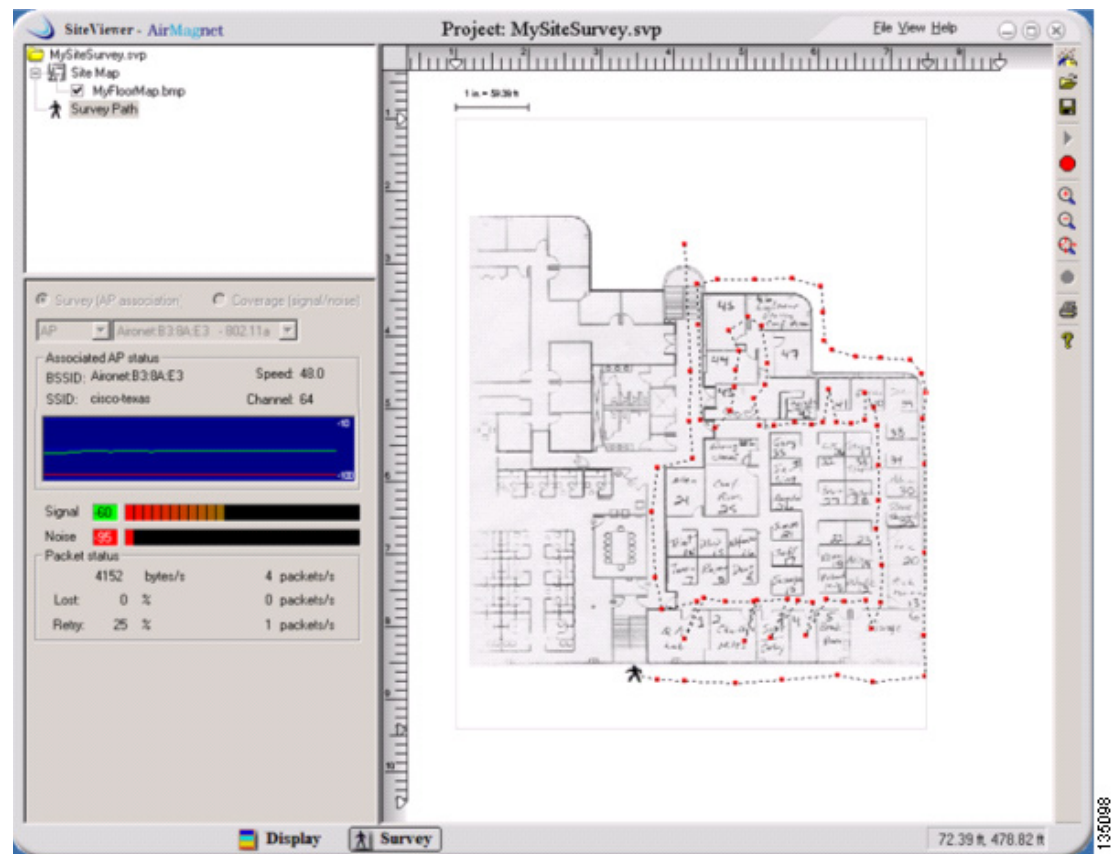
To survey a group of access points using the Active Mode tool, configure the tool with an SSID that is configured on the access points.

To begin the data collection in active mode, select a starting position near the perimeter of the area to be covered. Click this location on the floor map to indicate the starting point. A small stick figure appears on that spot. Begin the walkabout by moving at a smooth rate to the next vertex in the path; stop briefly to click this spot, and continue.

The survey tool control area displays various real-time data as you conduct the survey. Use the data to monitor the state of the link. The signal strength, noise level, link speed, and packet loss statistics are all displayed.

Figure 4-7 shows the complete walkabout path taken for an example coverage area. Note that the path includes a section *outside* the perimeter walls of the building. Continuing the walkabout outdoors measures possible propagation outside of the building, where the signal level should be as low as possible without compromising connectivity to the interior areas, which helps prevent unauthorized connections to the WLAN.

Figure 4-7 AirMagnet Client Walkabout



When you select display mode on the bottom tool bar, SiteViewer displays data collected during the survey. Two new panels appear in this mode: the Filter area in the center left panel, and the map zoom box in the lower left. You can display one or more survey data sets by clicking the appropriate check box in the data catalog area in the upper left of the window. You can also select the display parameter for the data sets from the menu in the upper right corner of the floor plan display area. The choices include: Signal, Noise, Speed, SNR. You can enable appropriate filters for the data. The survey data is displayed in color-coded zones. In Figure 4-8, colored areas represent signal level in 10-dBm increments.

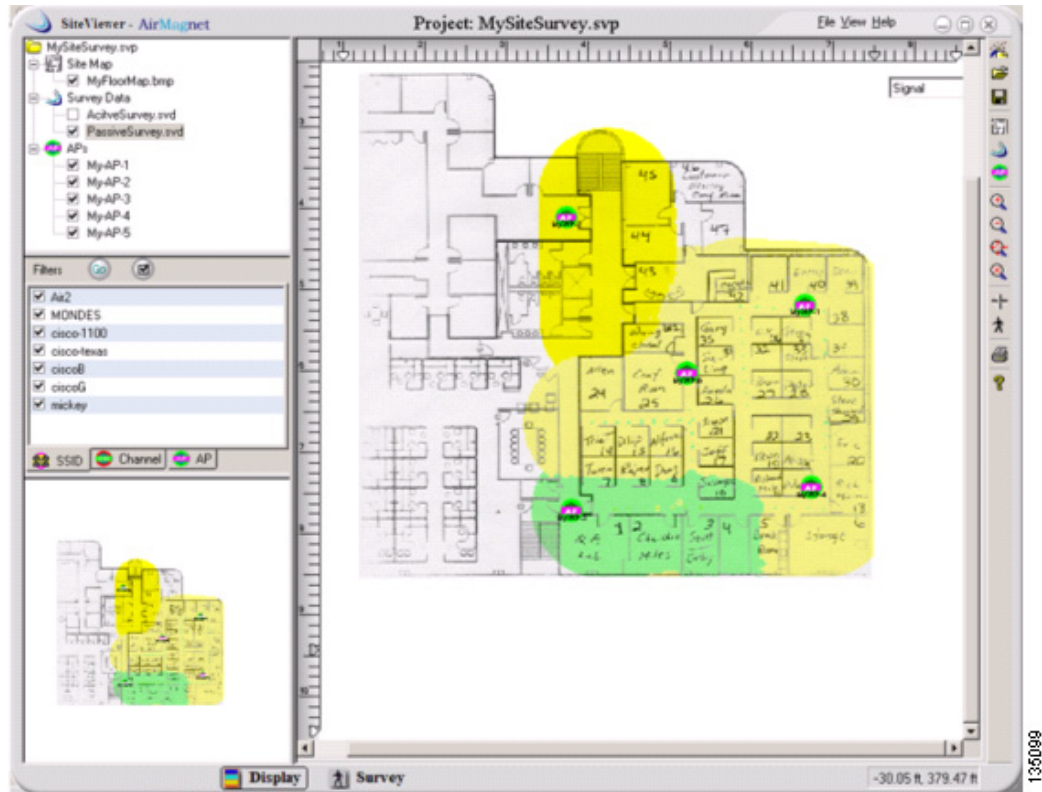
Figure 4-8 AirMagnet Showing Access Points and Merged Display

Figure 4-9 shows SiteViewer's four-panel display. Viewing more than one survey data type helps you compare measurement factors.

Figure 4-9 AirMagnet Four-Panel Display



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